The College of Emergency Medicine

Clinical Audits

Asthma in Children Clinical Audit 2013-14

National Report

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Introduction

This report shows the results from an audit of the treatment of children over the age of 5 years and under the age of 16 years who presented at Emergency Departments (EDs) around the UK with moderate or severe asthma. The report compares the findings against the clinical standards published by the College of Emergency Medicine (CEM) Quality in Emergency Care Committee (QEC) and with EDs that made audit returns.

Nationally, 7001 cases from 172 EDs (including 81% of relevant EDs in England) were included in the audit.

CEM Standards

1. O_2 prescribed on arrival to maintain O_2 saturation > 92%
2. Vital signs taken as per CEM standards
3. Beta agonist (moderate) or Bata agonist and ipratroprium (severe) given as dosages below within 10 minutes of arrival:

Drug	***Moderate***	***Severe***
Beta 2 agonist	2-10 puffs via spacer (or salbutamol 2.5-5mg or terbutaline 5-10mg by nebuliser) Increase by 2 puffs every 2 min up to 10 puffs depending on response	10 puffs via spacer or salbutamol 2.5-5mg or terbutaline 5-10mg by nebuliser
Beta 2 agonist +/- ipratroprium		Add 250 microgram (5mcg/kg) via spacer or nebuliser if poor response

4. IV hydrocortisone or oral prednisone given as dosages below before leaving the ED:

Drug	***Moderate***	***Severe***
IV hydrocortisone	N/A	4 mg/kg (if vomiting)
or oral prednisone	30-40mg (over 5 yrs)	30-40mg (over 5 yrs)

5. 90% of discharged patients to be prescribed oral prednisolone as follows:

Drug	***Moderate***	***Severe***
Oral prednisolone	30 – 40mg for up to 3 days …. Doses as above	30–40 mg for up to 3 days

6. Written discharge plan including follow up given and documented in the notes.

Audit history

All EDs in the UK were invited to participate in May 2013. Data was collected using a new online data collection tool. This is the first time this audit has been conducted.

Participants were asked to collect data from ED/hospital records on 50 consecutive cases of children (aged between 5 years old and under 16 years old) who presented to the ED with moderate or severe asthma between 1st August 2013 and 31st March 2014. EDs that did not see 50 eligible patients within the timescale were able to include cases from before 1st August 2013.

Format of this report

The table overleaf shows the overall results of all participating trusts in the UK. The table indicates the variations in performance between departments as displayed through the lower and upper quartiles of performance as well as the median values. More detailed information about the distribution of audit results can be obtained from the charts on subsequent pages of the report. Please bear in mind the comparatively small sample sizes when interpreting the charts and results. Also note that data quality was variable, and incomplete records often led to poorer performance figures.

Summary of overall results for national participating EDs

Total number. of cases audited						7001
Question			CEM Standard	Overall Results		
				Lower quartile	Median *	Upper quartile
Contextual data						
Q3	Patients admitted			40%	51%	64%
	Patients discharged			35%	48%	58%
Initial observations						
Q4	Respiratory rate	Yes	100%	94%	98%	100%
		Yes (≤ 15 minutes)		52%	65%	75%
	Oxygen saturation	Yes	100%	98%	100%	100%
		Yes (≤ 15 minutes)		52%	66%	76%
	Pulse	Yes	100%	97%	100%	100%
		Yes (≤ 15 minutes)		52%	66%	76%
	Systolic blood pressure	Yes	100%	8%	19%	37%
		Yes (≤ 15 minutes)		4%	10%	24%
	GCS score (or AVPU)	Yes	100%	58%	80%	92%
		Yes (≤ 15 minutes)		34%	48%	64%
	Temperature	Yes	100%	90%	94%	98%
		Yes (≤ 15 minutes)		50%	62%	72%
	Peak Flow	Yes	100%	8%	17%	30%
		Yes (≤ 15 minutes)		4%	10%	18%
	- Unable to measure peak flow			0%	3%	7%
Treatment						
Q5	Beta 2 agonist (+/- ipratropium) given by spacer or nebuliser as per CEM dosage		100%	80%	88%	94%
	- within 10 minutes of arrival		100%	4%	8%	14%
	- Partially administered**			0%	0%	6%
	- None administered - reasons recorded			0%	4%	9%
Q6	IV hydrocortisone or oral prednisone given -CEM dosage		100%	57%	66%	78%
	- Partially administered**			0%	2%	8%
	- None administered - reasons recorded			4%	10%	16%
Subsequent observations following beta 2 agonist administration						
Q7	Respiratory rate	*% of patients given beta 2 agonist*		52%	68%	82%
	Oxygen saturation			54%	70%	83%
	Pulse			50%	68%	82%
	Peak Flow			8%	14%	23%
Discharged patients						
Q8	Discharge prescription for oral prednisolone given	*% of discharged patients*	90%	48%	62%	73%
	- Partially**			0%	0%	10%
	- None prescribed - reasons documented			0%	8%	16%

See overleaf for notes and legend

Notes about national results

*The median value of each indicator is that where equal numbers of participating EDs had results above and below that value.

These median figures may differ from other results quoted in the body of this report which are mean (average) values calculated over all audited cases.

The lower quartile is the median of the lower half of the data values.

The upper quartile is the median of the upper half of the data values.

** 'Partially' means dosages were different to CEM standards.

Legend

Red = Percentage in red indicates result is below CEM standard

Green = Percentage in green indicates result is equal to or above CEM standard

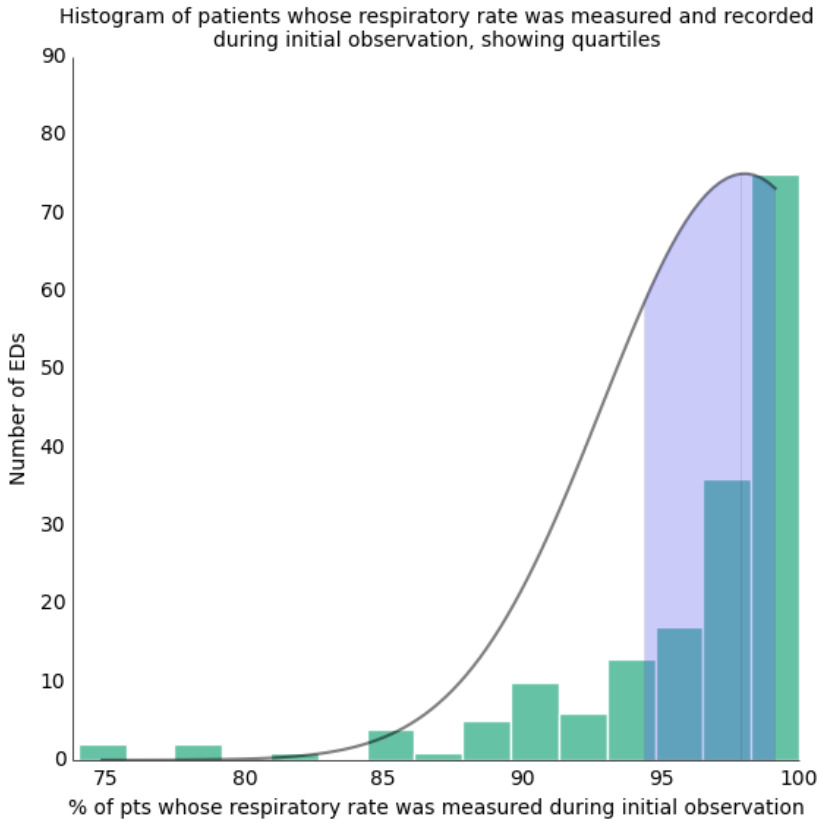
= Lowest Quartile performance

= Median performance

= Highest quartile performance

Histogram charts

Histogram charts are used to show the distribution and frequency of results. Each histogram shows the number of EDs per % of patients as the height of each block.



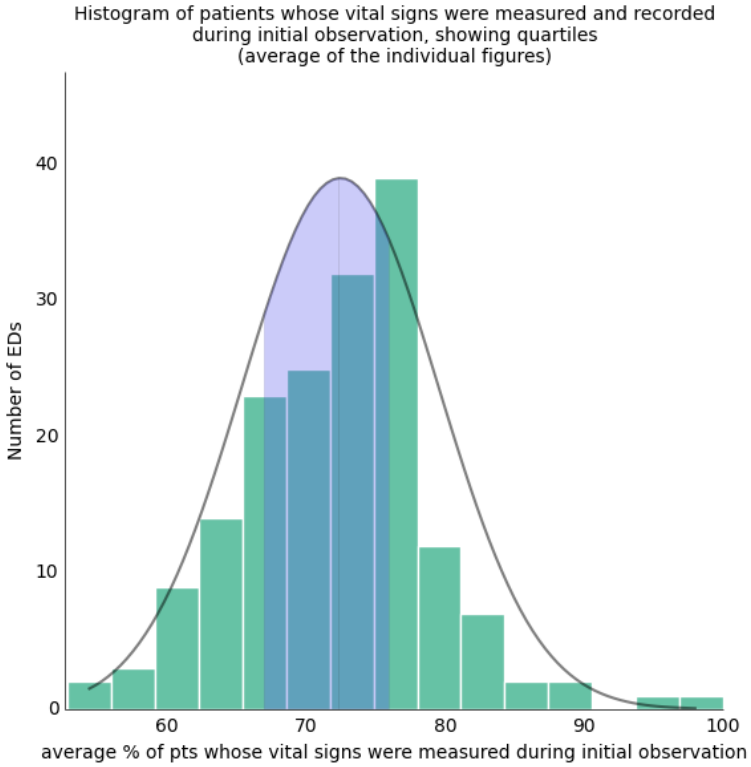
The light purple area shows the interquartile range (the spread of the middle 50% of the data values). The grey line in this area shows the median.

The curved line shows the normal distribution of data.

SECTION 1: Initial Observations

Q4. Were the patient's vital signs measured and recorded in the ED?

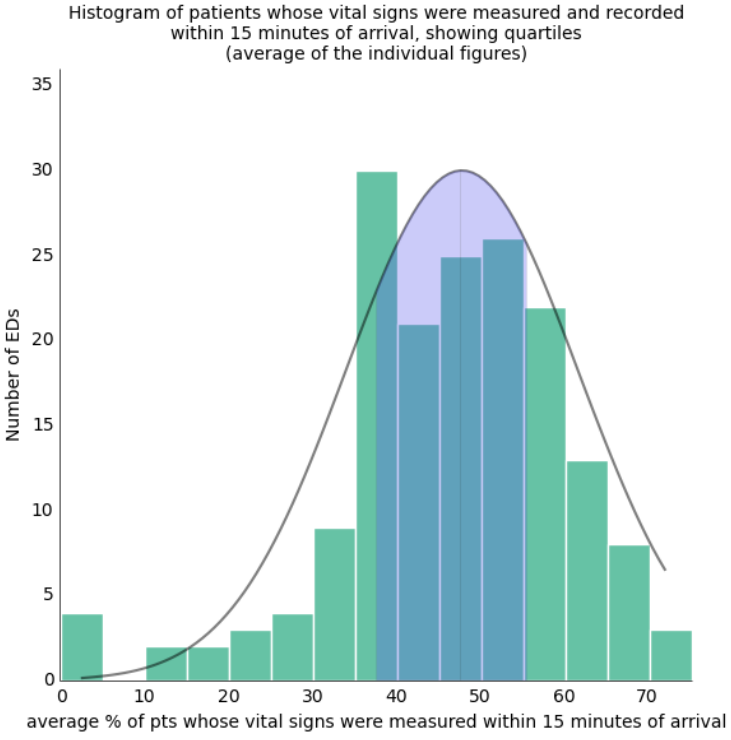
CHART 1: % of patients whose vital signs were measured and recorded



Only 1 ED measured and recorded all vital signs in all patients (respiratory rate, oxygen saturation, pulse, blood pressure, GCS or AVPU score, temperature and peak flow). This is equal to 0.6% of all participating EDs.

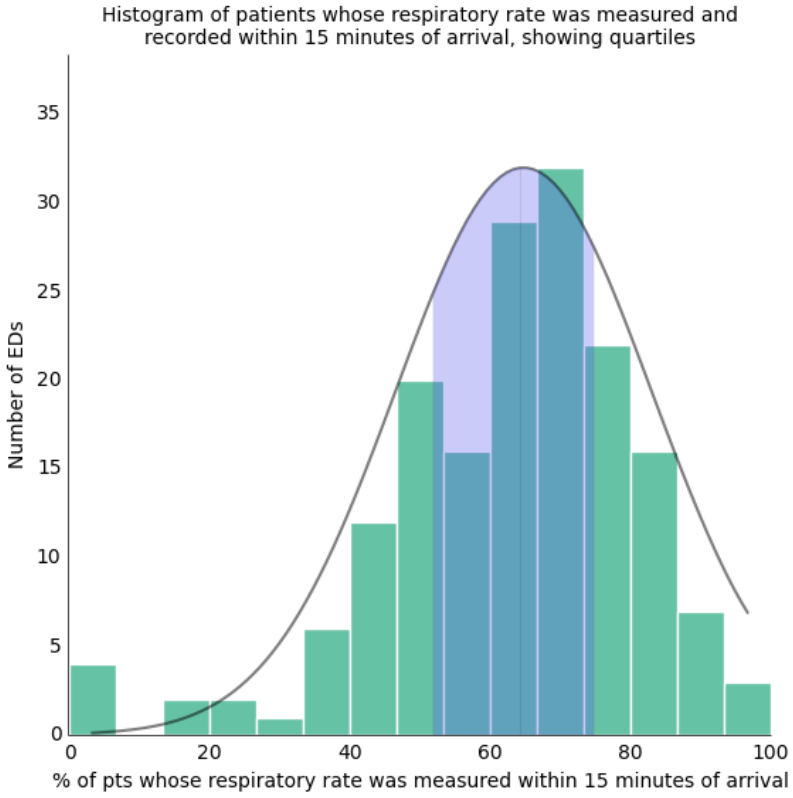
Q4. Were the patient's vital signs measured and recorded in the ED *within 15 minutes of arrival*?

CHART 2A: % of patients whose vital signs were measured and recorded within 15 minutes of arrival



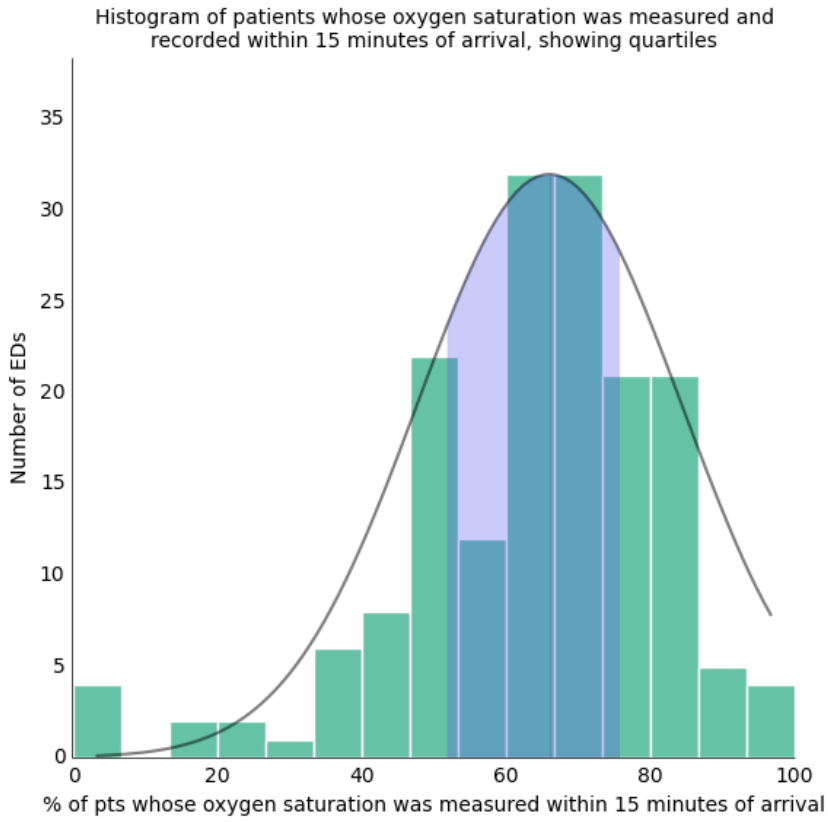
No ED managed to achieve the CEM standard of fully measuring and recording all vital signs for all patients within 15 minutes of arrival in the ED. The rate of overall vital signs measurement varied from 0% to 75%, with a median of 48%.

CHART 2B: % of patients whose respiratory rate was measured and recorded within 15 minutes of arrival



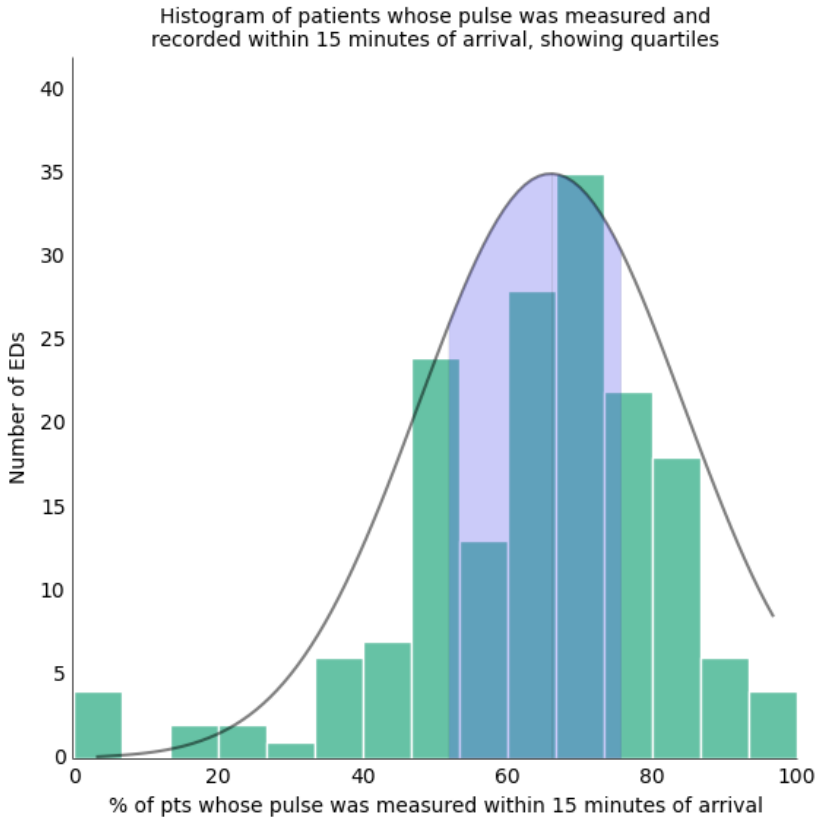
1 ED measured and recorded respiratory rate for all patients within 15 minutes of arrival in the ED. 3 EDs did not do this for any of their patients within the timeframe.

CHART 2C: % of patients whose oxygen saturation was measured and recorded within 15 minutes of arrival



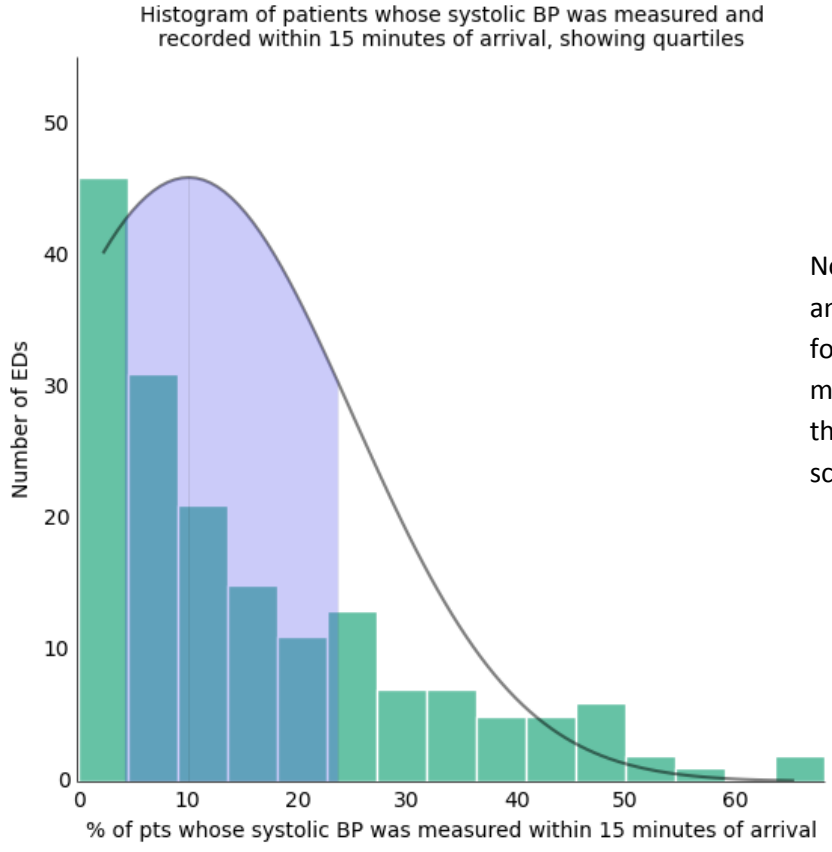
1 ED measured and recorded oxygen saturation for all patients within 15 minutes of arrival in the ED. The lowest for any ED was 0% patients within this timeframe.

CHART 2D: % of patients whose pulse was measured and recorded within 15 minutes of arrival



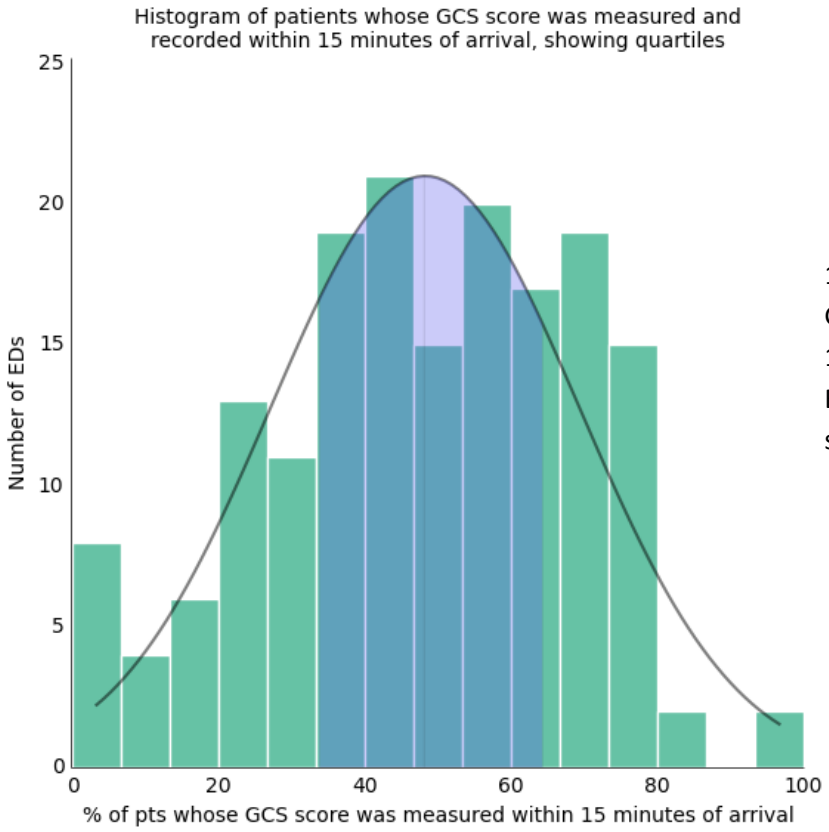
1 ED measured and recorded pulse for all patients within 15 minutes of arrival. The lowest for any ED was 0%.

CHART 2E: % of patients whose systolic BP was measured and recorded within 15 minutes of arrival



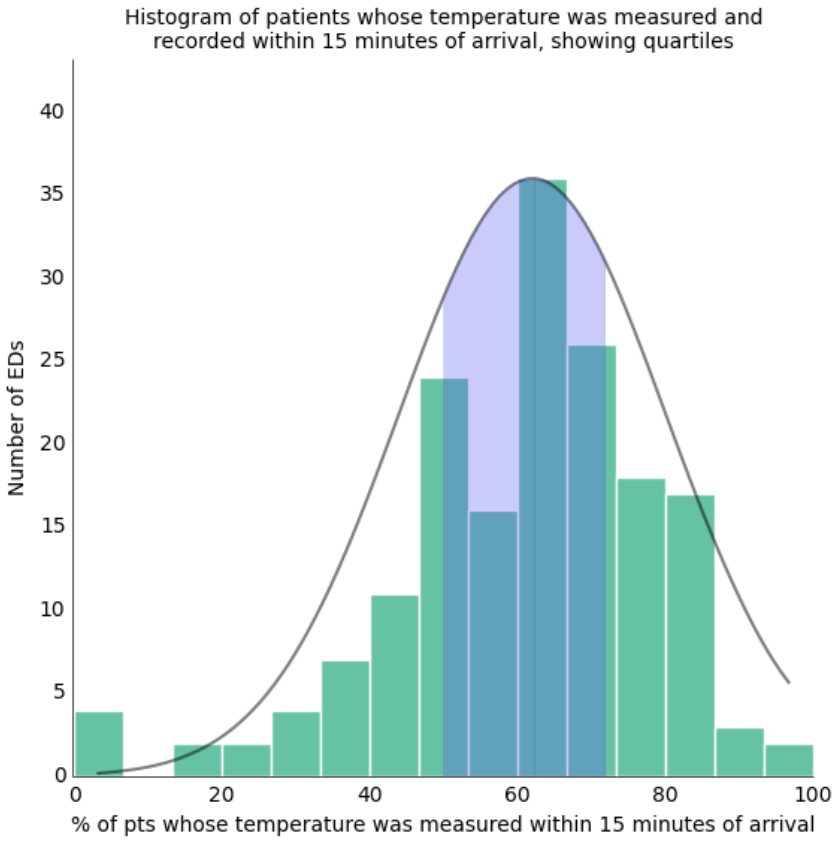
None of the EDs measured and recorded blood pressure for 100% patients within 15 minutes of arrival in the ED, the highest being 68%. 20 EDs scored 0% in this section.

CHART 2F: % of patients whose GCS score was measured and recorded within 15 minutes of arrival



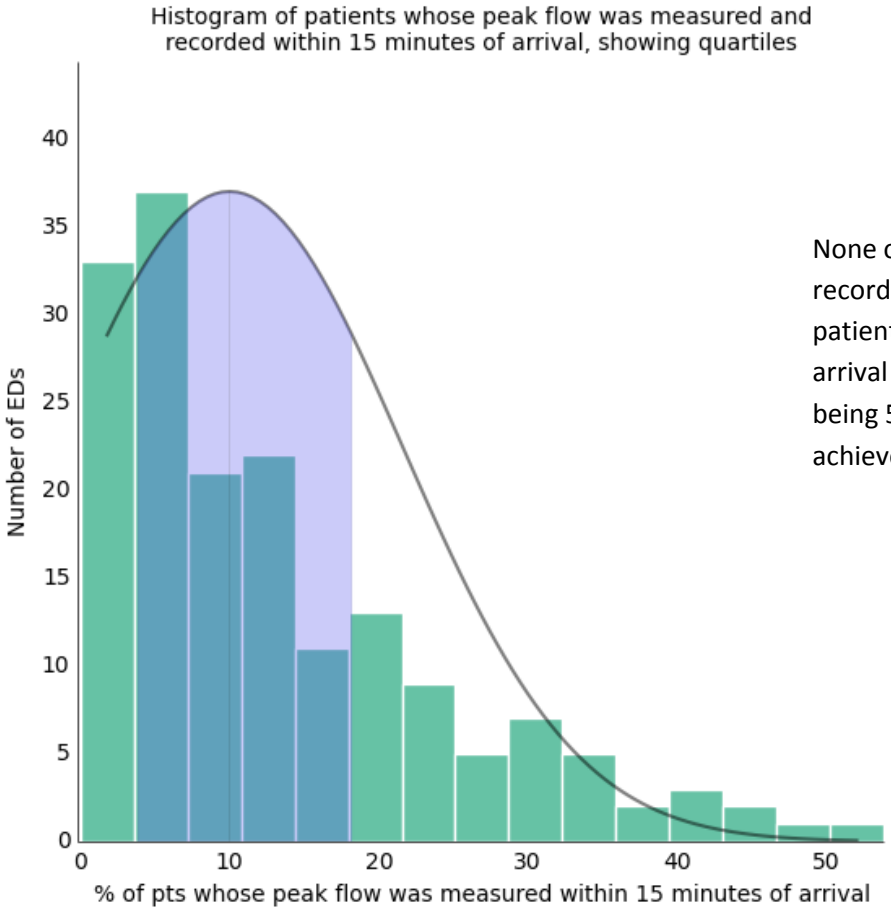
1 ED measured and recorded GCS for 100% patients within 15 minutes of arrival in the ED. 5 EDs scored 0% in this section.

CHART 2G: % of patients whose temperature was measured and recorded within 15 minutes of arrival



1 ED measured and recorded temperature for 100% patients within 15 minutes of arrival in the ED. The minimum score was 0% in 3 EDs.

CHART 2H: % of patients whose peak flow was measured and recorded within 15 minutes of arrival



None of the EDs measured and recorded peak flow for 100% patients within 15 minutes of arrival in the ED, the highest being 54%. The minimum achieved was 0% for 19 EDs.

Measurement and recording of vital signs - commentary and recommendations

This is the first time that this audit has been undertaken by CEM so there are no previous years to directly compare the results with. However, vital signs management has been measured in previous feverish children audits.

Notable practice included that the respiratory rate was recorded in 98% of all children audited and this was measured within 15 minutes in 65% of children, rising to 75% in the highest performing departments.

As with previous audits looking at vital signs, measurement of systolic BP was the poorest. However there was a notable improvement in the measurement of GCS or AVPU score, up from 18% within 20 minutes in 2012 (feverish illness in children audit) to 48% within 15 minutes in this audit.

The joint SIGN and BTS guidelines (2014)[1] states that peak expiratory flow rate improves recognition of asthma severity and helps with decisions about management in hospital. Only 17% of departments measured a peak flow with 10% doing this within 15 minutes. Only 3% of departments recorded that this was due to it being unable to be measured. EDs should review their practice and make changes where required.

If your ED is in the lower quartile for vital signs recording you should assess the reasons for this and take appropriate actions where necessary.

[1]*British Guideline on the Management of Asthma*, Scottish Intercollegiate Guidelines Network and British Thoracic Society (2014)

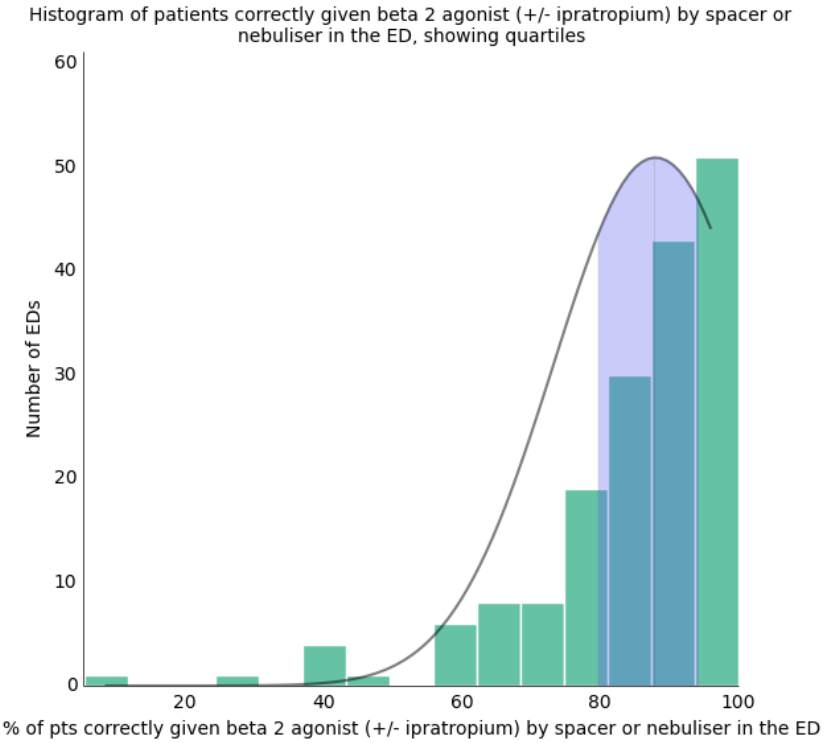
The following resource may be useful for your ED:

Standards for assessing, measuring and monitoring vital signs in infants, children and young people, Royal College of Nursing (2013)

SECTION 2: Treatment

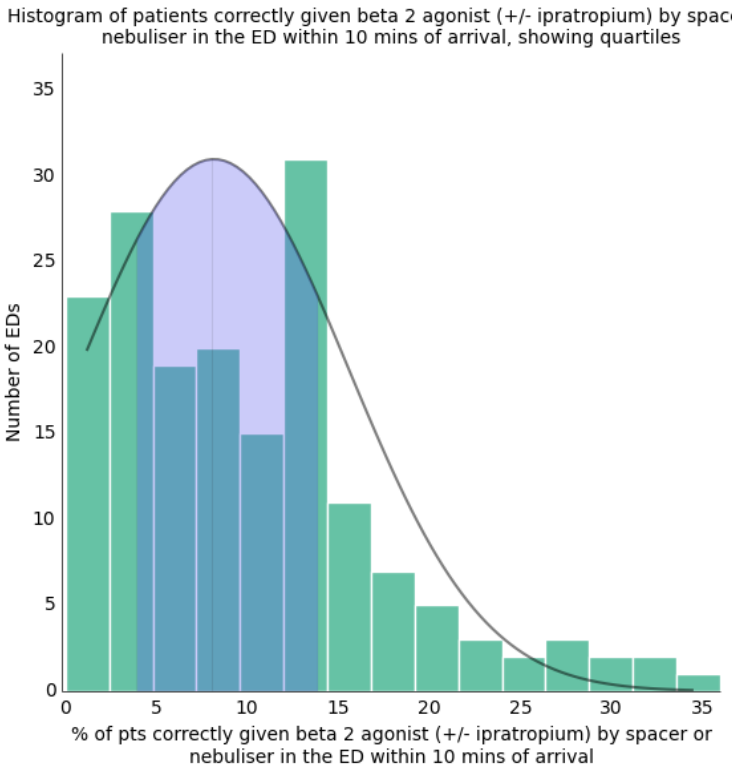
Q5. Was beta 2 agonist (+/- ipratropium) given by spacer or nebuliser in the ED?

CHART 3: Beta 2 agonist (+/- ipratropium) given by spacer or nebuliser in the ED



15 EDs gave the recommended dose of beta 2 agonist by spacer or nebuliser to 100% patients. The minimum number in any ED was 6%.

CHART 4: Beta 2 agonist (+/- ipratropium) given by spacer or nebuliser in the ED within 10 minutes of arrival



None of the EDs met the CEM standards for giving the recommended dose of beta 2 agonist by spacer or nebuliser to 100% patients within 10 minutes. The number of cases varied from 0% to 36%.

Beta 2 agonist (+/- ipratropium) administration – commentary and recommendations

The evidence[2] gathered in this area suggests that '*continuous beta 2 agonist treatment or the addition of ipratropium bromide appears to reduce the number of people hospitalized with a severe asthma exacerbation*' (NICE Clinical Knowledge Summary, 2010).

Overall results for giving a beta 2 agonist were encouraging. However, there were a significant number of departments where the recommended dose was not given. Departments in the lower quartile should look at their practice and make changes as appropriate

The number of patients given treatment within 10 minutes was overall poor. No department achieved this in 100% of patients and in the majority of departments the standard was achieved in less than 10% of eligible patients.

All departments should review their practice in relation to this standard.

[2]*Clinical Knowledge Summary – Evidence for Inhaled Beta 2 Agonist*, National Institute for Health and Care Excellence 2011)

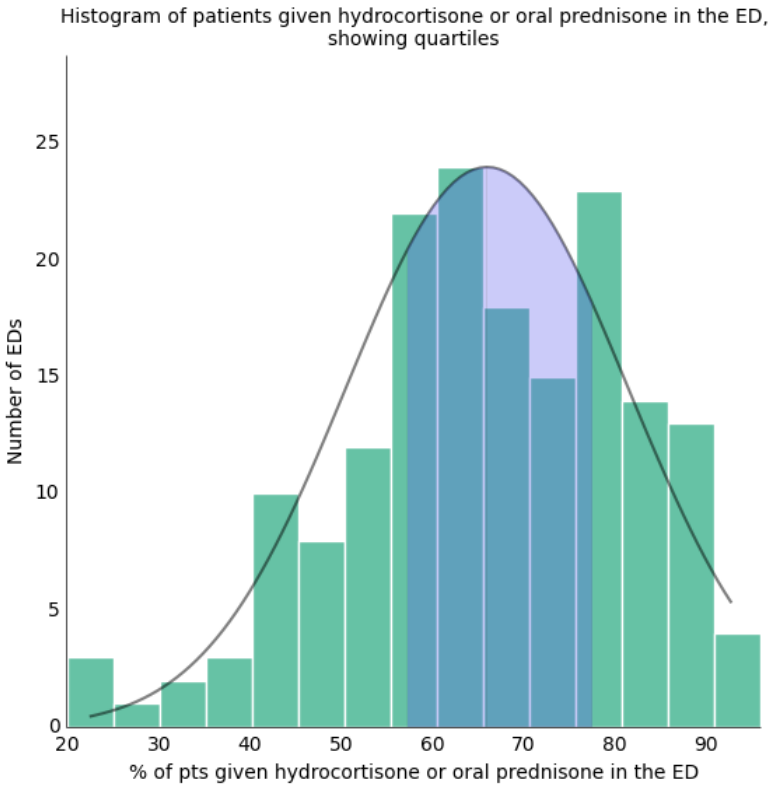
Useful resources:

British Guideline on the Management of Asthma, Scottish Intercollegiate Guidelines Network and British Thoracic Society (2014)

Clinical Knowledge Summaries – Asthma, National Institute for Health and Care Excellence (2011)

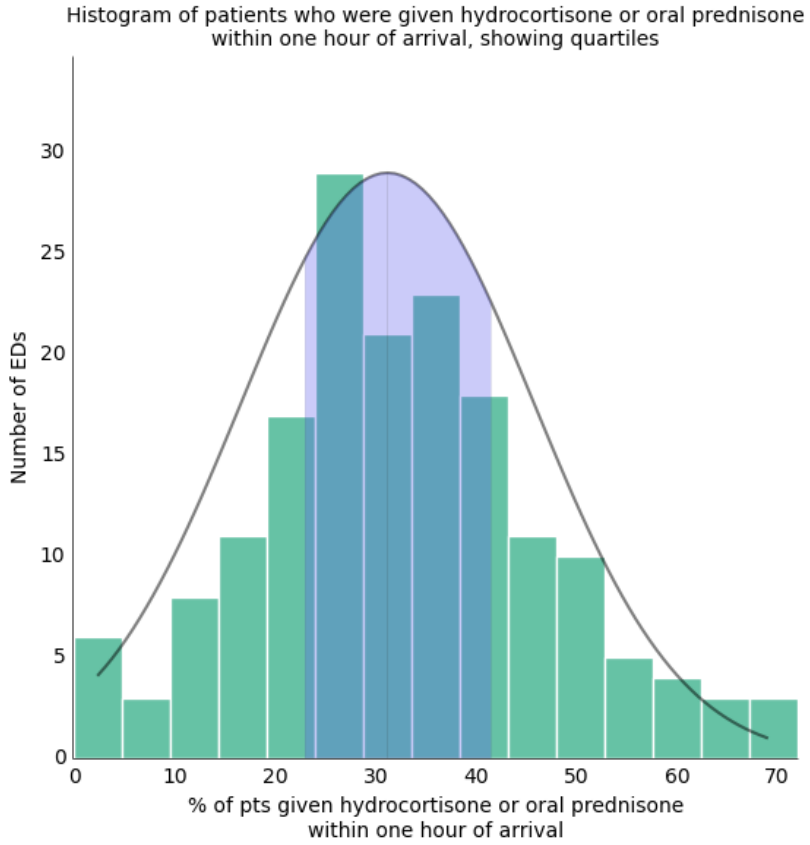
Q6. Was IV hydrocortisone or oral prednisone given in the ED?

CHART 5: IV hydrocortisone or oral prednisone given in the ED



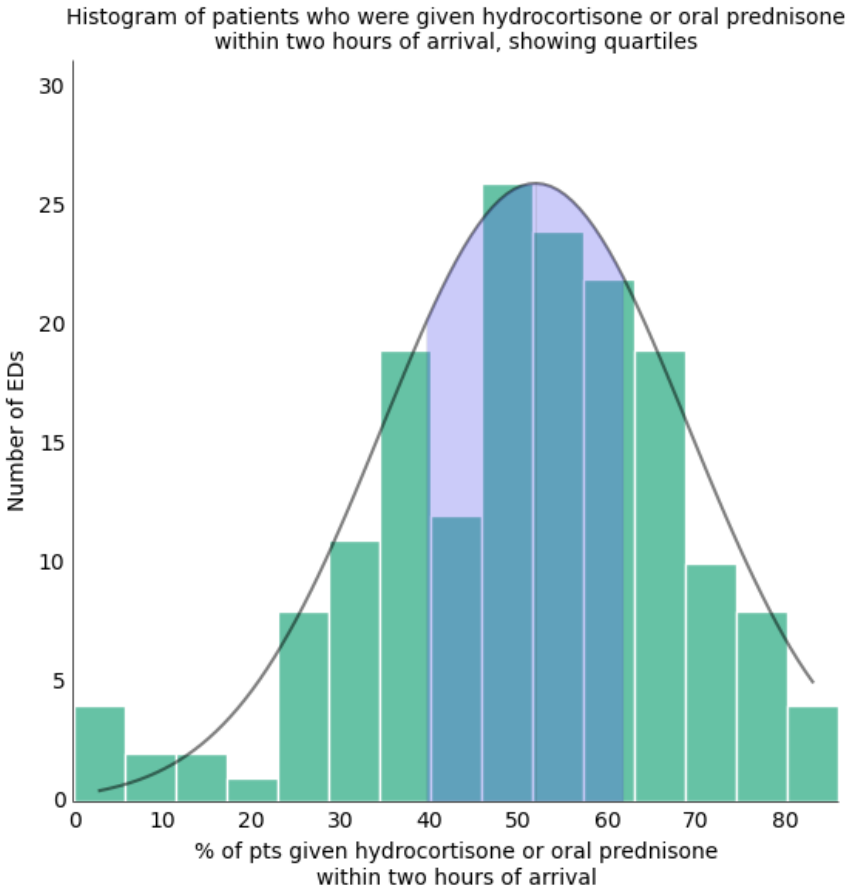
The percentages of patients given the recommended dose of hydrocortisone or oral prednisone in the ED varied from 2% to 96%. The CEM standard is 100%.

CHART 6A: Time to IV hydrocortisone or oral prednisone administration within 1 hour of arrival



Patients given the recommended dose of hydrocortisone or oral prednisone in the ED within 1 hour of arrival varied from 0% to 72% between EDs.

CHART 6B: Time to IV hydrocortisone or oral prednisone administration within 2 hours of arrival



The percentage of patients given the recommended dose of hydrocortisone or oral prednisone in the ED within 2 hours of arrival varied from 0% to 86%.

IV hydrocortisone or oral prednisone administration – commentary and recommendations

Some studies[3] have shown that 'oral corticosteroids reduce mortality, relapse, subsequent hospital admission, and requirement for beta 2 agonist therapy. The earlier oral corticosteroids are given in an acute attack, the better the outcome' (NICE Clinical Knowledge Summary, 2010).

The results for administration of steroids indicate that there is room for improvement for this measure in most departments.

[3] *Clinical Knowledge Summaries – Oral Corticosteroids Evidence*, National Institute for Health and Care Excellence (2010)

Useful resources:

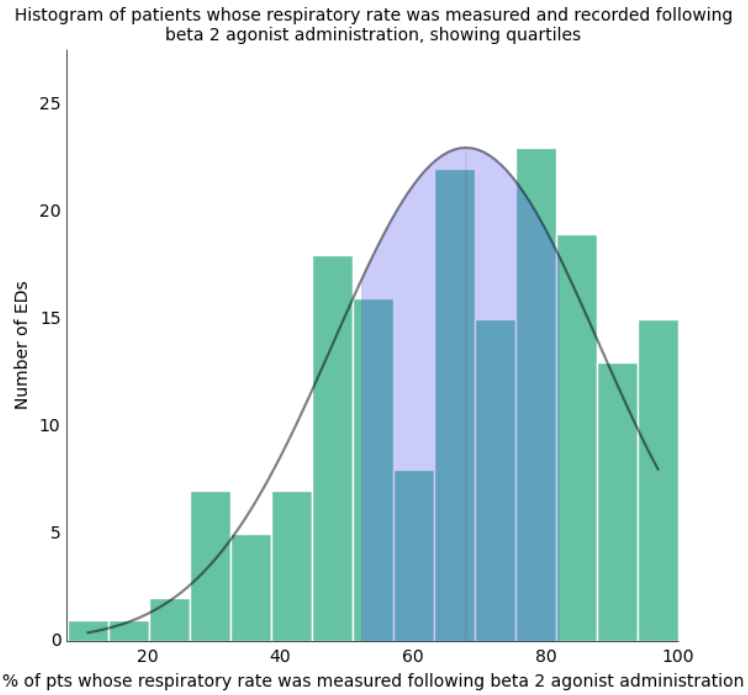
Clinical Knowledge Summaries: Corticosteroids – Oral, National Institute for Health and Care Excellence (2010)

Clinical Knowledge Summaries – Asthma, National Institute for Health and Care Excellence (2011)

SECTION 3: Subsequent observations

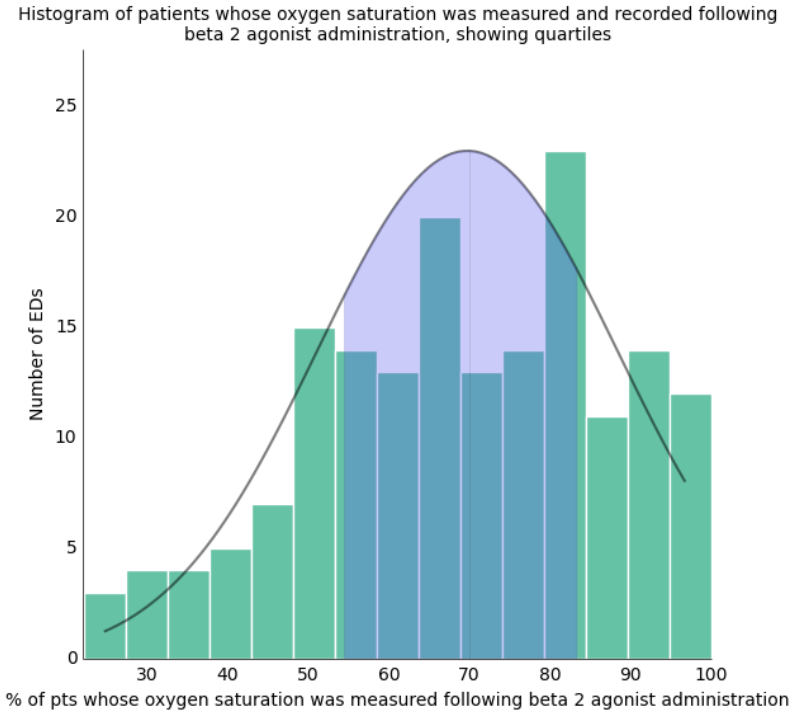
Q7. Were the patient's vital signs measured and recorded following beta 2 agonist administration?

CHART 7A: % of patients whose respiratory rate was measured and recorded following beta 2 agonist administration



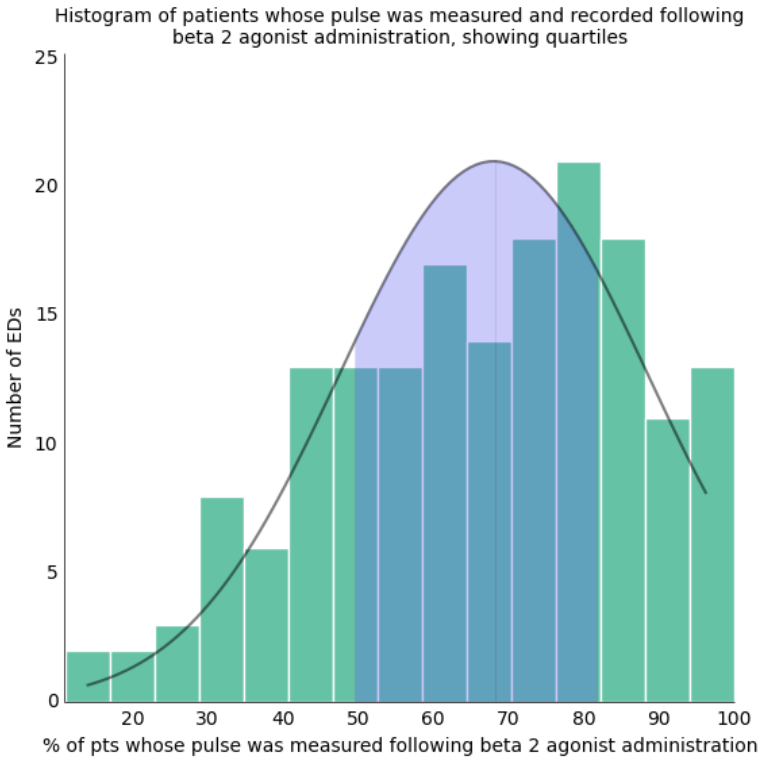
4 EDs measured and recorded respiratory rate in 100% patients following beta 2 agonist administration. The lowest figure for any ED was 8%.

CHART 7B: % of patients whose oxygen saturation was measured and recorded following beta 2 agonist administration



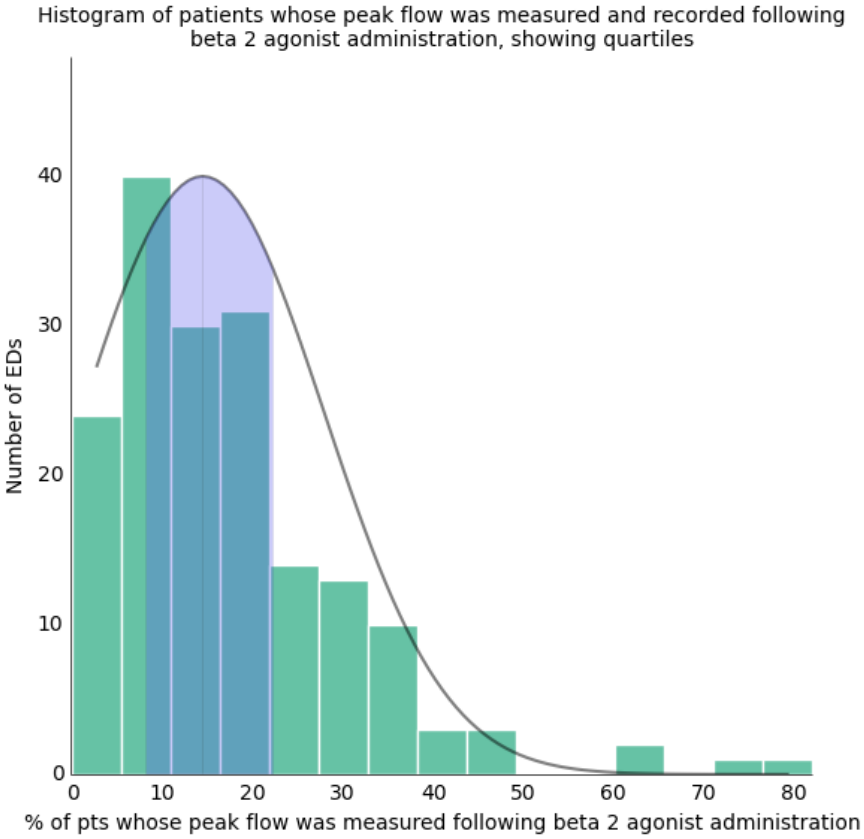
100% patients had their oxygen saturation measured and recorded following beta 2 agonist administration by 4 EDS. The lowest in any ED was 22%.

CHART 7C: % of patients whose pulse was measured and recorded following beta 2 agonist administration



4 EDs measured and recorded pulse in 100% patients following beta 2 agonist administration. The lowest by any ED was 11%.

CHART 7D: % of patients whose peak flow was measured and recorded following beta 2 agonist administration



The percentage of patients whose peak flow was measured and recorded following beta 2 agonist administration ranged from 0% to 82%.

Subsequent observations following beta 2 agonist administration - commentary and recommendations

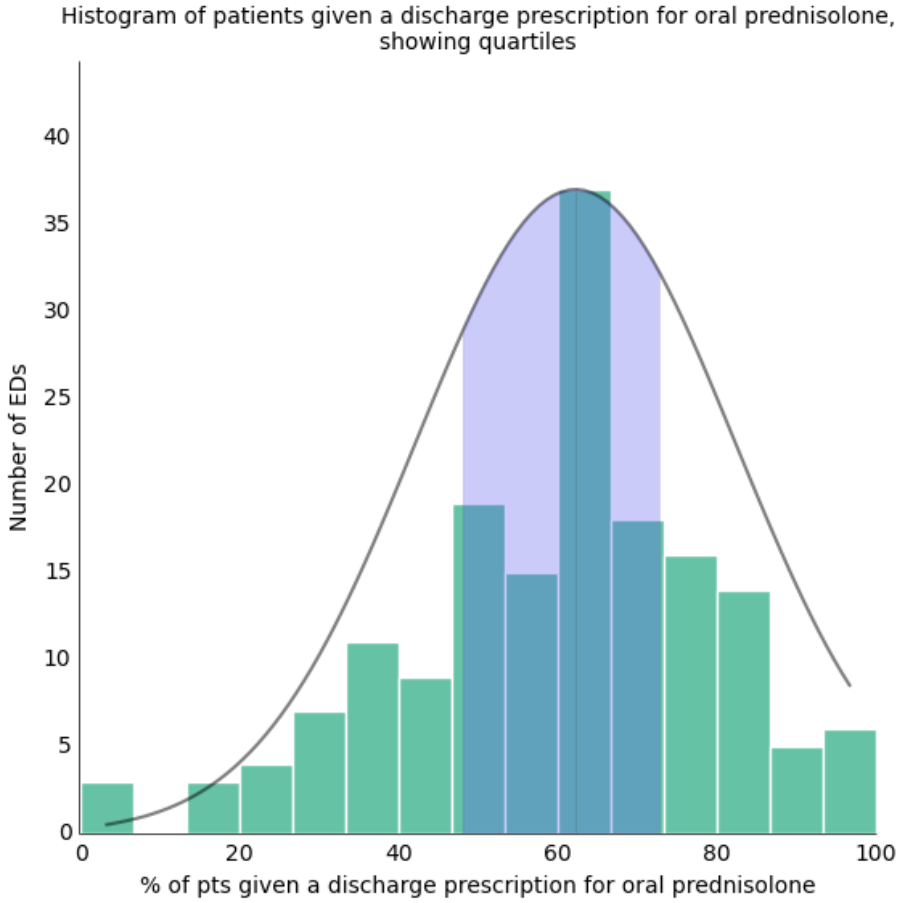
Vital signs should be measured and noted following beta 2 agonist administration to check the patient's response to the treatment, and to decide if further action is needed. It is important to observe if a patient's condition deteriorates despite treatment, as they will normally require hospital admission.

The results for vital signs measurement post beta 2 agonist administration were poorer all round than for initial vital signs measurement. All departments should consider their processes for repeating vital signs in all patients especially after an intervention that may have a significant effect on those vital signs after administration.

SECTION 4: Discharged patients

Q8. Was a discharge prescription for oral prednisolone given?

CHART 8: Discharge prescriptions for oral prednisolone



9 EDs met the CEM standard of providing at least 90% of discharged patients with a prescription for oral prednisone. The lowest for any ED was 14%.

Discharge prescription for oral prednisolone – commentary and recommendations

All departments should have a standard discharge proforma including advice / discharge medications and follow up advice for these patients. Patients need to be made aware of how to manage their condition following discharge to prevent relapse.

If your department does not then this should be considered.

Examples of discharge letters and patient discharge leaflets can be found in the Emergency Asthma Care and After your Asthma Attack documents produced by Asthma UK.

Summary of Recommendations

- If your ED is in the lower quartile for vital signs recording you should assess the reasons for this and take appropriate actions where necessary.
- Regarding the measurement and recording of peak flow, many EDs should review their practice and make changes where required.
- Departments in the lower quartile for beta agonist administration should look at their practice and make changes as appropriate.
- All departments should review their practice in relation to giving beta agonists to patients within 10 minutes of arrival.
- There is room for improvement regarding the administration of IV hydrocortisone or oral prednisone in most departments.
- All departments should consider their processes for repeating vital signs in all patients especially after an intervention that may have a significant effect on those vital signs has been given.
- All departments should have a standard discharge proforma including advice / discharge medications and follow up advice for these patients.
- All EDs should consider improving the detail and accuracy of data in patient records.

Further Information

Thank you for taking part in this audit. We hope that you find the results helpful.

If you have any queries about the report please e-mail audit@collemergencymed.ac.uk or phone 020 7400 6108.

Details of the CEM Clinical Audit Programme can be found under the Clinical Audit section of the College Website (www.collemergencymed.ac.uk).

Additional Resources:

1. *Barriers to Effective Emergency Asthma Care,* Asthma UK (March 2013)
2. *BTS Paediatric Asthma Audit 2011*, British Thoracic Society (July 2012)
3. *Report on Enquiry into Respiratory Deaths*, APPG on Respiratory Health (June 2014)
4. *Why Asthma Still Kills*, National Review of Asthma Deaths (May 2014)