



The College of Emergency Medicine

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## **CEM Clinical Audits 2011-12**

### **Severe Sepsis & Septic Shock**

## Introduction

This report shows the results from an audit of the treatment of severe sepsis and septic shock against the clinical standards published by the College of Emergency Medicine (CEM) Clinical Effectiveness Committee (CEC) in May 2009 and based on the guidelines and care bundles published by the Surviving Sepsis Campaign.

Nationally, 4469 cases from 160 EDs (including 74% of relevant EDs in England and Wales) were included in the audit.

### The CEM standards

1. In 95% of cases documented evidence in the notes of temperature, pulse rate, respiratory rate, blood pressure, mental status (AVPU or GCS) and capillary blood glucose on arrival.
2. In 95% of cases documented evidence in the notes that senior EM / ICU help was summoned.
3. In 95% of cases documented evidence in the notes that high flow O<sub>2</sub> via non-re-breathe mask was initiated (unless there is a documented reason to the contrary) prior to leaving the ED.
4. In 95% cases documented evidence that serum lactate measurement obtained prior to leaving the ED.
5. In 95% of cases documented evidence that blood cultures were obtained prior to leaving the ED.
6. Fluids - documented evidence that first intravenous crystalloid fluid bolus (up to 20mls/kg) was given:
  - o In 75% of cases within 1 hour of arrival
  - o In 90% of cases within 2 hours of arrival
  - o In 100% cases prior to leaving the ED
7. Antibiotics - documented evidence that antibiotics were administered
  - o In 50% of cases within 1 hour of arrival
  - o In 90% of cases within 2 hours of arrival
  - o In 100% cases prior to leaving the ED
8. In 90% of cases documented evidence that urine output measurements were instituted prior to leaving the ED.

### History of the audits

Severe sepsis and septic shock is one of three CEM clinical audit topics for 2011-12, the others being pain in children and consultant sign-off.

These audits follow on from the successful earlier audits of ED treatment of vital signs in majors, feverish children, renal colic, paracetamol overdose, fractured neck of femur, urinary retention and moderate/severe asthma in adults.

In August 2011, letters were sent to nominated Consultants and Audit Departments in each Trust asking them to participate in the latest round of audits. Audit tools were made available on the CEM website.

Participants were asked to collect data from ED notes on 30 cases of adults (18 years of age or older) who were diagnosed with either severe sepsis or septic shock between 1st August 2011 and 31st January 2012.

The audit tool summarised the data entered automatically and the summaries were then e-mailed to CEM for analysis.

### The format of this report

The table overleaf shows the national results.

By showing the lower and upper quartiles of performance as well as the median values, the table indicates the variations in performance between departments.

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.

**Results**

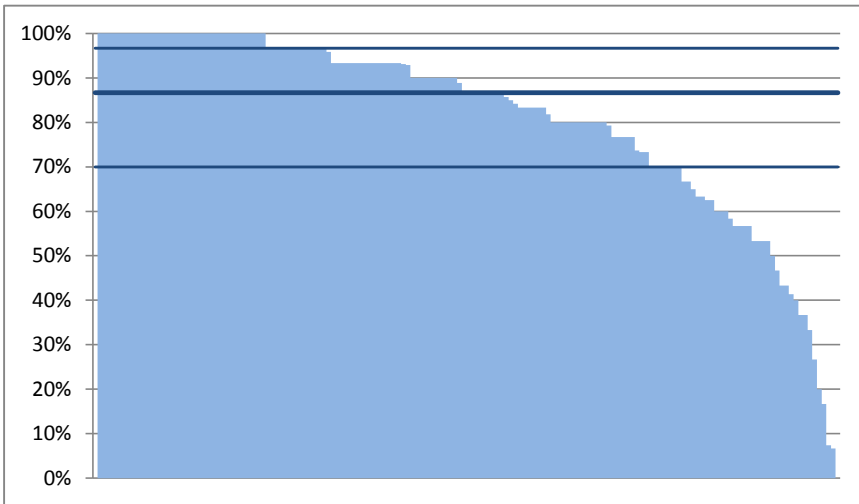
Chart		CEM Standard	National Results			
			Lower quartile	Median *	Upper quartile	
1	Were vital signs measured & recorded in the ED notes?	Yes, fully	95%	70%	87%	97%
		Fully / partially		100%	100%	100%
2	Was capillary blood glucose measured&recorded on arrival?	Within 20 mins #	95%	47%	60%	77%
3		Yes		66%	81%	93%
4	Is there evidence in the notes that high flow O2 was initiated in the ED?	At any time	95%	40%	50%	63%
		Within 2 hours		23%	37%	50%
		Within 1 hour		22%	33%	46%
		No, reasons recorded		3%	10%	20%
		Not recorded		20%	33%	47%
5	Is there evidence in the notes that first intravenous crystalloid fluid bolus was given in the ED?	At any time	100%	74%	83%	91%
		Within 2 hours	90%	49%	60%	72%
		Within 1 hour	75%	27%	40%	51%
		No, before arrival		0%	0%	3%
		Not recorded		7%	13%	20%
6	Is there evidence that serum lactate measurement was obtained in the ED?	At any time	95%	67%	80%	90%
		Within 2 hours		50%	60%	77%
		Within 1 hour		29%	47%	60%
7	Is there evidence in the notes that blood cultures were obtained in the ED?	At any time	95%	63%	77%	83%
		Within 2 hours		27%	50%	71%
		Within 1 hour		18%	32%	50%
8	Were blood cultures obtained prior to antibiotic administration?	Yes		38%	59%	77%
		Not known		9%	22%	48%
		No		4%	9%	18%
9	Were antibiotics administered in the ED?	Before leaving ED	100%	83%	90%	97%
		Within 2 hours	90%	43%	57%	70%
		Within 1 hour	50%	17%	27%	37%
10	Is there evidence that urine output measurements were instituted in the ED?	At any time	90%	17%	30%	47%
		Within 2 hours		3%	10%	23%
		Within 1 hour		0%	3%	10%
11	Was a urine catheter inserted before patient left the ED?	Yes		20%	30%	43%
		No, reasons recorded		0%	3%	10%
		Not recorded		47%	63%	74%

\* 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 the "national" results quoted in the body of this report which are mean (average) values calculated over all audited cases.

# The standard for measurement of capillary blood glucose does not specify precisely what is meant by "on arrival". For the purposes of the audit, "within 20 minutes of arrival" was suggested as a reasonable definition of this.

**Were appropriate measurements recorded on arrival in the ED?**

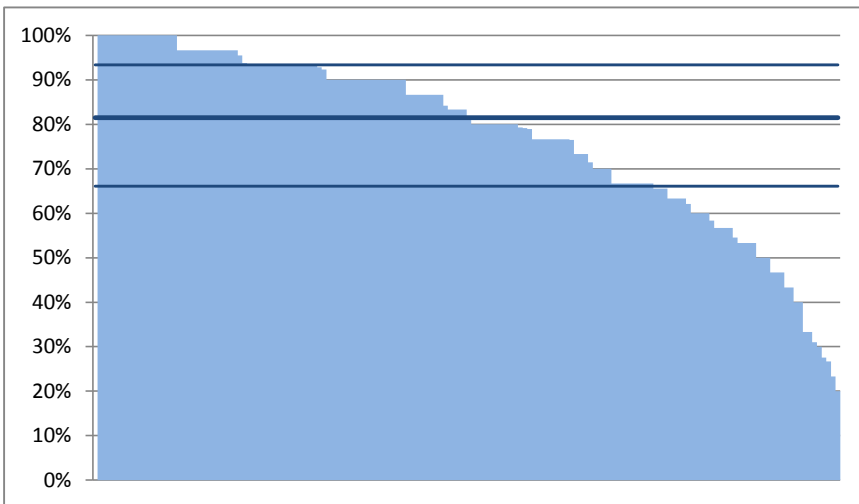
**Chart 1: % of patients whose vital signs were measured & recorded in the ED notes**



Nationally 81% of audited patients had their vital signs measured on arrival and recorded in the ED notes. In 99% of audited cases (not shown on the chart) vital signs were at least partially recorded.

The CEM standard is that 95% of these patients should have all vital signs measured and recorded. 32% of responding EDs achieved this standard.

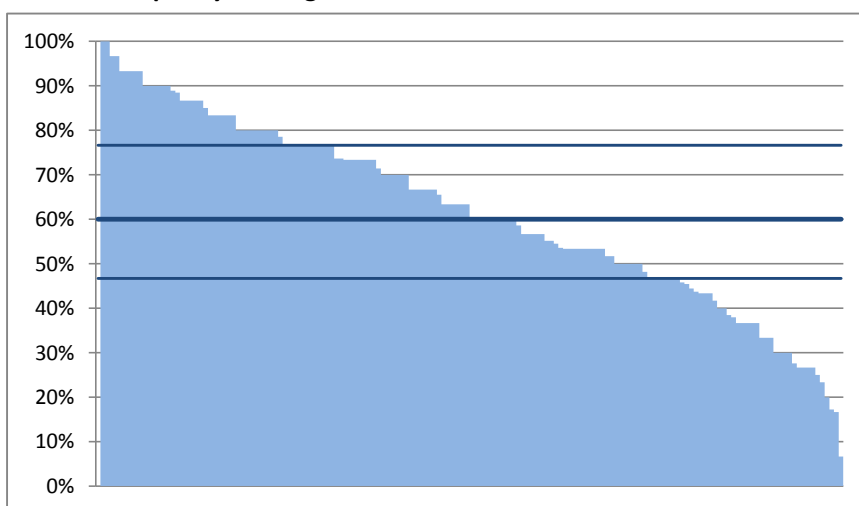
**Chart 2: % capillary blood glucose measured & recorded upon arrival**



Nationally 77% of audited patients had their capillary blood glucose measured and recorded in the ED notes (chart 2). In 62% of cases this measurement was done within 20 minutes of the patient's arrival (chart 3).

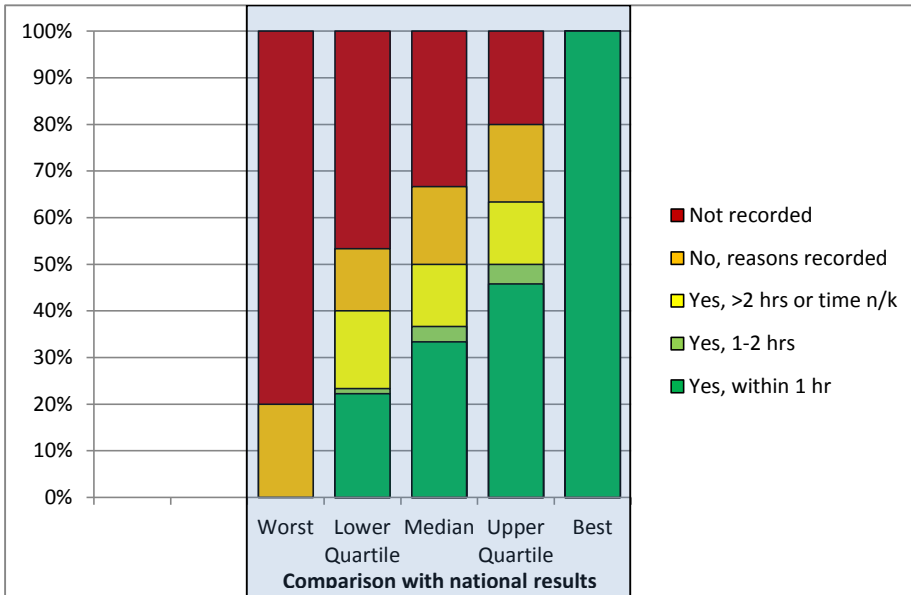
The CEM standard is that 95% of these patients should have their capillary blood glucose measured and recorded. 19% of responding EDs achieved this standard.

**Chart 3: % Capillary blood glucose measured within 20 mins of arrival**



**Initial treatment**

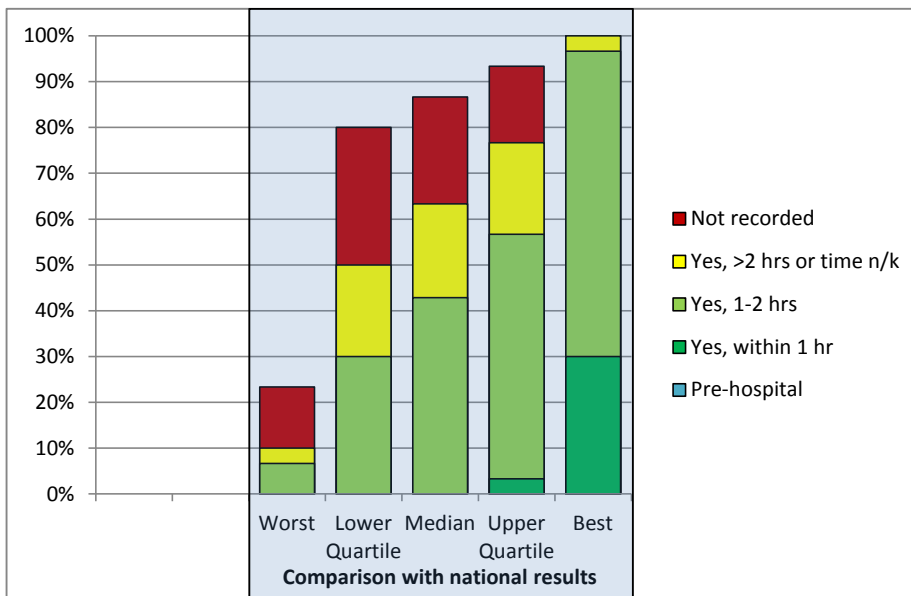
**Chart 4: High flow O2 initiated in the ED**



The CEM standard is that in 95% of cases there should be evidence in the notes that high flow O2 via a non-rebreathe mask was initiated in the ED unless there is a documented reason to the contrary.

Nationally, high flow O2 was initiated for 51% of audited cases. In a further 14% of cases the reason why it was not was recorded in the notes. In the remaining 35% of cases there was no comment in the notes.

**Chart 5: First intravenous crystalloid fluid bolus given in the ED**



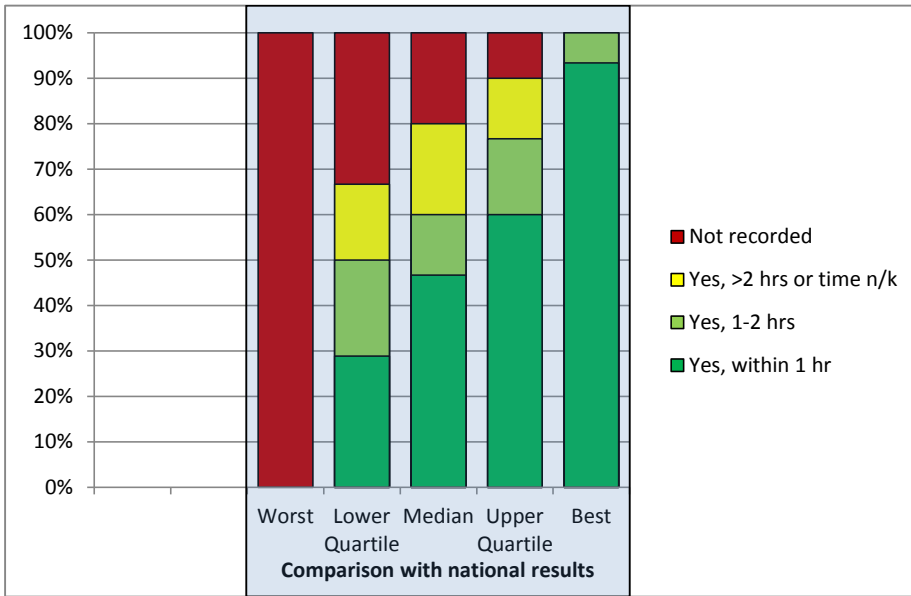
The CEM standard is that in 100% of cases there should be documented evidence that a first intravenous crystalloid fluid bolus (up to 20mls/kg) was given before the patient left the ED. In 75% of cases this should be within one hour of arrival and in 90% within two hours.

Nationally, a fluid bolus was given before the patient left the ED in 81% of audited cases. In a further 3% of cases an appropriate fluid bolus was given before the patient arrived in the ED. In the remaining 16% of cases fluid administration was not recorded.

In 40% of cases fluids were given within one hour of arrival and in 59% within 2 hours of arrival.

**Tests and measurements**

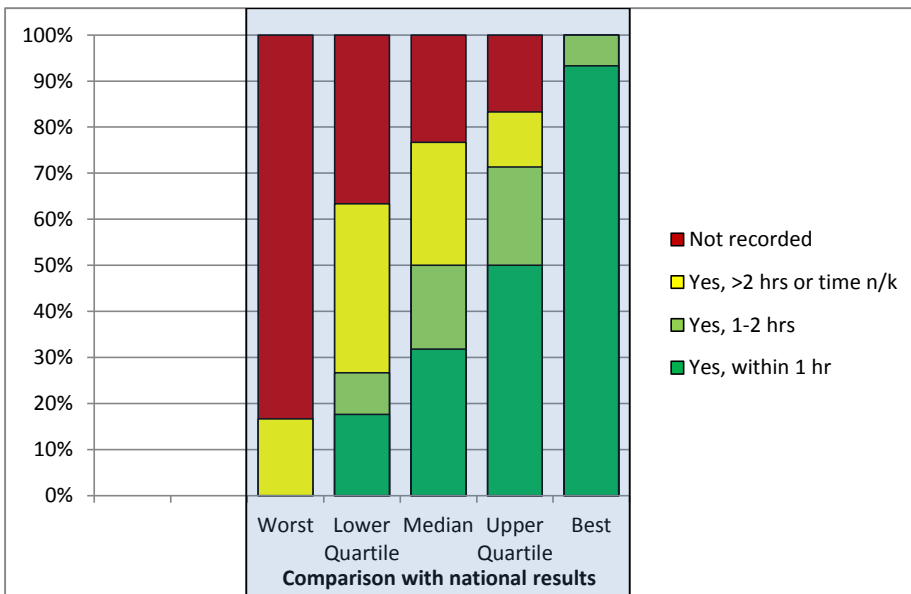
**Chart 6: Serum lactate measurement obtained prior to leaving ED**



The CEM standard is that in 95% of cases there should be documented evidence that serum lactate was measured before the patient left the ED. This occurred in 76% of all audited cases.

In 60% of cases, it is known that serum lactate was measured within two hours of the patient's arrival in the ED and in 46% of cases within one hour of arrival. However, results varied significantly between responding departments.

**Chart 7: Blood cultures obtained prior to leaving ED**



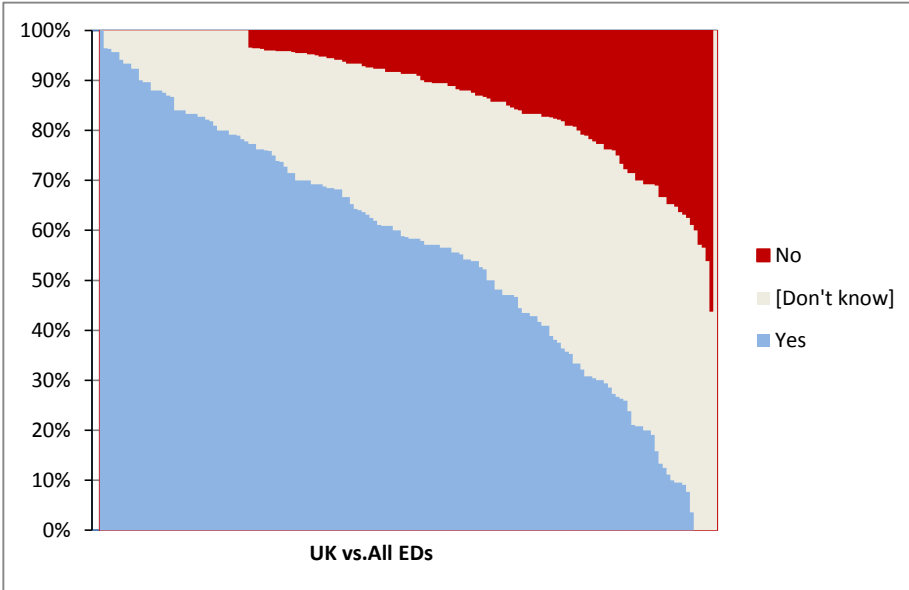
The CEM standard is that in 95% of cases there should be documented evidence that blood cultures were obtained before the patient left the ED. This occurred in 72% of all audited cases.

In 36% of cases blood cultures were obtained within one hour of arrival and in 49% of cases within two hours. The results varied significantly between responding departments.

**Were antibiotics administered appropriately in the ED?**

**Chart 8: Blood cultures obtained before an antibiotic was administered**

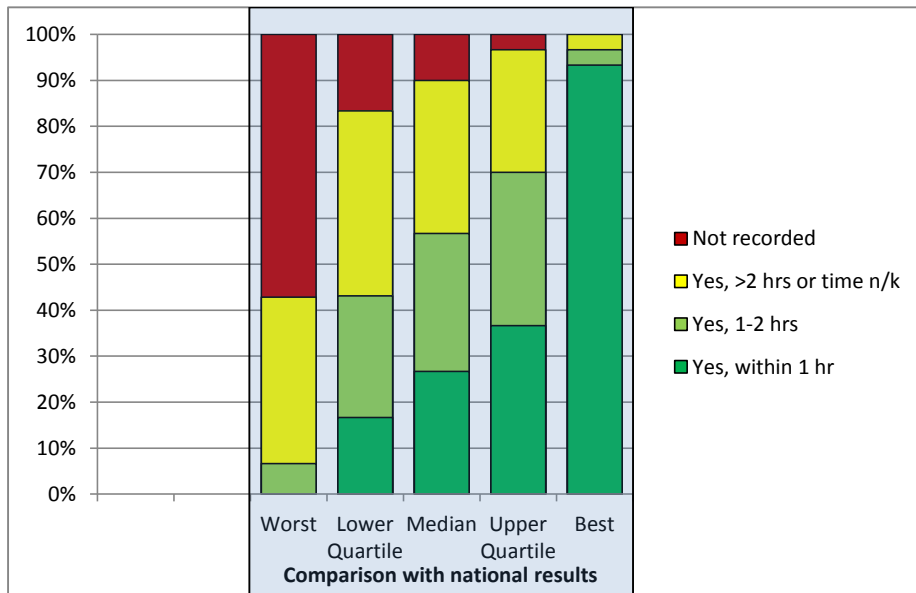
*The bottom left section of chart 8 shows the extent to which EDs obtained blood cultures before administering an antibiotic. The top right of the chart compares the percentages of cases where this was not the case. Some EDs had more missing data than others, so the bars representing departments will not necessarily "line up" on the top and bottom sections of the chart.*



Nationally, in 58% of audited cases blood cultures were obtained before an antibiotic was administered, but not so in 12% of cases. In the remaining 30% of cases it was not possible to determine this from the records.

64% of EDs were able to show from the records that blood cultures had been obtained in at least half of audited cases before antibiotic administration.

**Chart 9: Antibiotics administered in the ED**

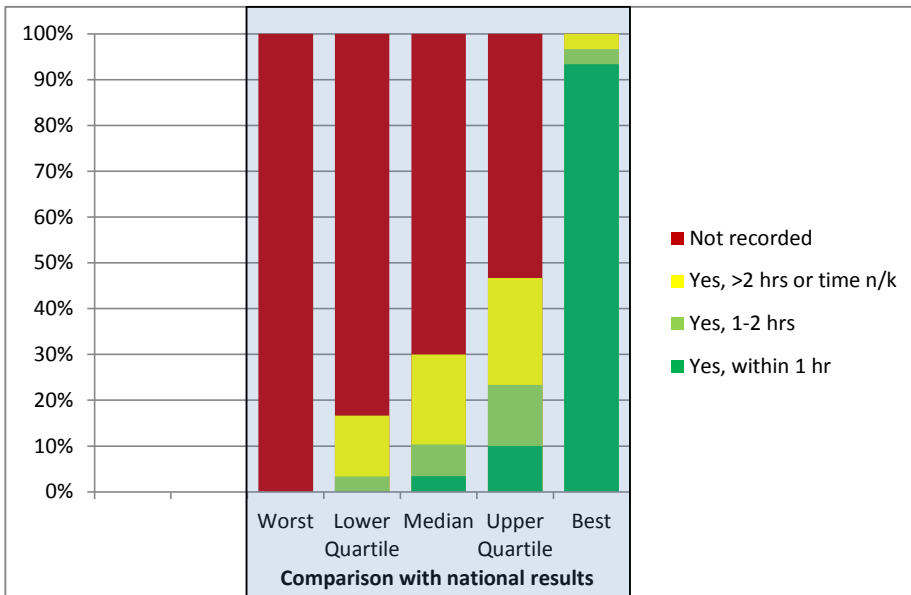


The CEM standard is that in 100% of cases antibiotics should be administered before the patient leaves the ED. In 50% of cases this should be within one hour of arrival and in 90% within two hours.

Nationally, antibiotics were administered in the ED in 89% of audited cases. In 28% of cases this was within one hour of arrival and in 56% within two hours. Three participating EDs met the CEM standard in full.

**Urine**

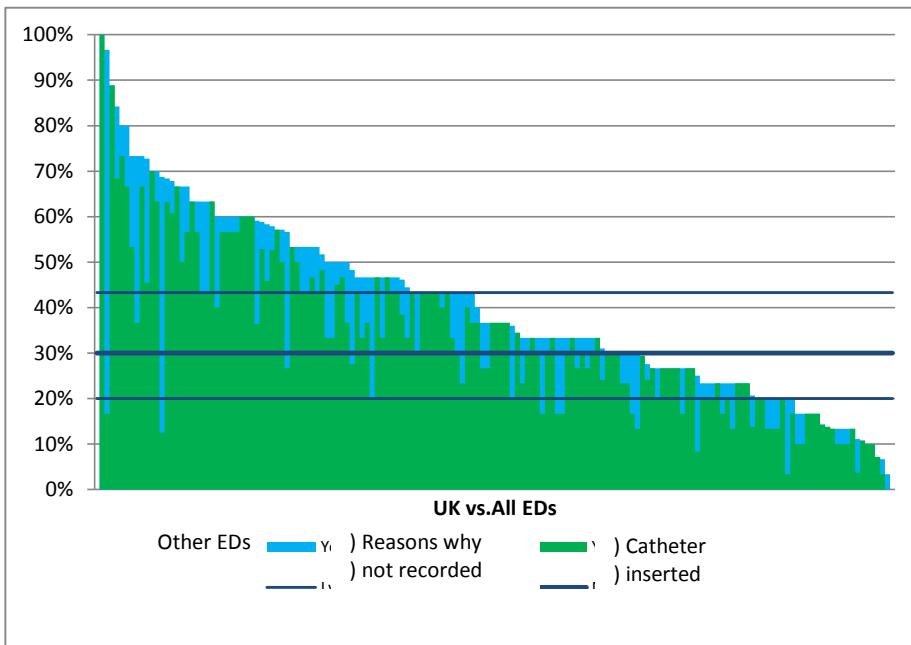
**Chart 10: Urine output measurements instituted prior to leaving the ED**



The CEM standard is that in 90% of cases there should be documented evidence that urine output measurements were instituted before the patient left the ED.

Nationally, evidence was found that this had been done in 33% of audited cases. In 17% of cases measurements were instituted within two hours of arrival and in 9% within one hour of arrival.

**Chart 11: Urinary catheter put in**



Nationally, a urinary catheter was inserted in 33% of audited cases. In 7% of cases the reasons why this was not done were recorded. In the remaining 60% of cases this could not be determined from the notes.

**Thank you**

for taking part in this national audit. We hope that you find the results useful.

However, should you feel that any of the figures or charts in this report misrepresent the results of your audit, please contact the CEM by e-mailing [philip.mcmillan@collemergencymed.ac.uk](mailto:philip.mcmillan@collemergencymed.ac.uk) or telephoning 020 7067 1269.

Details of the CEM national audit programmes can be found at: <http://www.collemergencymed.ac.uk/Shop-Floor/Clinical Audit/Current Audits>