

**National Clinical Quality Improvement Framework  
for Ambulance Services**

**Report on National Ambulance Service  
Clinical Performance Indicators**

**Cycle 8  
November 2011 – February 2012**

On behalf of the National Ambulance Service Clinical Quality Group (NASCCG)

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On behalf of the National Ambulance Services Clinical Quality Group

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## EXECUTIVE SUMMARY

### Background

1.1 This report gives the results of Cycle 8 of the National Clinical Performance Indicators.

### Results

1.2 The Ambulance Service Directors of Clinical Care group requested a change in the way exceptions are handled during analysis to bring the CPIs in line with the national Ambulance Quality Indicators (AQIs) Previously exceptions were excluded from the numerator and denominator for each criterion limiting the analysis to those cases with the potential to receive the aspect of care being measured (e.g. cases where a patient refused peak flow were excluded from the PEFR recorded before treatment criteria). From cycle 7 valid exceptions were included in the data as positives to the criterion. The rationale is that the patient has received the correct treatment. Exception data is still collected to show how many exceptions are included in the data.

1.3 Cycle dates are given in the table below. The Cardiac Arrest CPI was discontinued from cycle 7 as the criteria were not process based and cardiac arrest is to be audited more fully in the new national ambulance clinical quality indicators.

Cycle Dates	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
<b>STEMI</b>	May-08	Nov-08	May-09	Nov-09	May-10	Nov-10	Jun-11	Nov-11
<b>Cardiac Arrest</b>	Jun-08	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	N/A	
<b>Stroke</b>	Jul-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Dec-12
<b>Hypoglycaemia</b>	Aug-08	Feb-09	Aug-09	Feb-10	Aug-10	Feb-11	Aug-11	Jan-12
<b>Asthma</b>	Sep-08	Mar-09	Sep-09	Mar-10	Sep-10	Mar-11	Sep-11	Feb-12

### Quality Improvement

1.4 5 Trusts provided information on quality improvement activities.

## Comparison of cycle means

Indicator	Criterion	National Mean (%)								Increase in mean C1 v C8 (*C3 v c8)	Change in Performance (%)
		Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8		
<b>STEMI</b>	M1 Aspirin	83.3	86.4	87.4	94.0	96.9	95.2	96.5	96.0	Yes	12.7
	M2 GTN	76.7	80.6	81.1	90.0	92.2	91.7	92.7	95.9	Yes	19.2
	M3 Two pain Scores recorded	53.2	65.5	71.7	77.6	79.9	85.1	80.8	92.5	Yes	39.3
	M4 Morphine Given	N/A	N/A	55.3	64.9	72.1	69.3	81.3	87.5	Yes	32.2
	M5 Analgesia given	43.9	53.8	54.4	66.4	73.3	75.2	86.2	89.9	Yes	46.0
	M6 SPO2 recorded	N/A	N/A	90.1	94.3	97.2	97.1	97.9	96.9	Yes	6.8
	MC Care Bundle for STEMI (M1+M2+M3+M5)	N/A	N/A	45.5	53.0	56.7	59.4	66.9	78.8	Yes	33.3
<b>Asthma</b>	A1 Respiratory rate recorded	96.0	96.8	98.0	98.5	97.4	97.3	99.1	99.0	Yes	3.0
	A2 PEFr recorded (before treatment)	30.0	31.1	31.5	41.7	50.0	55.7	78.7	77.3	Yes	47.3
	A3 SpO2 recorded (before treatment)	80.9	85.2	88.6	90.8	92.8	94.8	92.7	92.9	Yes	12.0
	A4 Beta-2 agonist recorded	93.1	93.7	92.2	96.1	96.0	94.0	96.6	95.9	Yes	2.8
	A5 Oxygen Administered	89.1	88.9	89.4	92.9	93.6	95.7	95.8	95.6	Yes	6.5
	AC [Pilot] Care Bundle	N/A	N/A	27.8	39.6	45.3	48.5	72.4	72.1	Yes	47.7
<b>Stroke</b>	S1 Face, Arm, Speech Test (FAST) recorded	86.4	86.7	93.0	95.1	95.6	95.7	95.6	98.5	Yes	12.1
	S2 Blood glucose recorded	85.4	82.3	88.7	90.9	92.5	94.0	95.6	97.1	Yes	11.7
	S3 Blood pressure recorded	97.5	97.8	99.0	98.5	98.6	98.8	99.5	99.9	Yes	2.4
	S4 [pilot] Time of onset of Stroke recorded	N/A	N/A	51.1	66.7	72.4	80.6	85.8	90.2	Yes	39.1
	SC [pilot] Care bundle for stroke (S1+S2+S3)	N/A	N/A	83.4	86.2	87.2	89.8	92.0	95.9	Yes	12.5
<b>Hypoglycaemia</b>	H1 Blood Glucose before Treatment Recorded	98.9	96.9	98.1	98.1	98.8	99.2	98.8	99.5	Yes	0.6
	H2 Blood Glucose After Treatment	91.1	95.6	96.7	92.6	93.3	93.6	97.9	97.5	Yes	6.4
	H3 Treatment for hypoglycaemia recorded	94.9	97.8	97.5	96.9	95.3	98.4	97.9	98.4	Yes	3.5
	H4 Direct referral to an appropriate health professional	N/A	N/A	26.8	19.4	20.5	30.3	64.3	66.5	Yes	39.7
	HC Care bundle for Hypoglycaemia (H1+H2+H3)	N/A	N/A	92.3	90.5	89.8	92.3	95.4	96.4	Yes	4.1

\* All figures have been rounded to 1 decimal place

# NATIONAL AMBULANCE CLINICAL PERFORMANCE INDICATORS CYCLE 8 REPORT

## Introduction

- 2.1 This report summarises the results of the national ambulance services clinical performance indicator (CPI) audits for cycle 8.
- 2.2 The indicators were developed in line with the previously published framework<sup>1,2</sup> agreed by Chief Executives and Directors of Clinical Care together with Audit Leads and other members of the National Ambulance Service Clinical Quality Group (NASCCG) and in line with the conclusions from subsequent reports.

## Ambulance Clinical Performance Indicators - eighth cycle audits

- 2.3 The Ambulance Service Directors of Clinical Care group requested a change in the way exceptions are handled during analysis to bring the CPIs in line with the national Ambulance Quality Indicators (AQIs) Previously exceptions were excluded from the numerator and denominator for each criterion limiting the analysis to those cases with the potential to receive the aspect of care being measured (e.g. cases where a patient refused peak flow were excluded from the PEFR recorded before treatment criteria). From cycle 7 valid exceptions were included in the data as positives to the criterion. The rationale is that the patient has received the correct treatment. Exception data is still collected to show how many exceptions are included in the data.

## Data collection and analysis

- 2.4 For each data collection, the process agreed for sampling was that each trust would examine the first 300 records presenting across the whole trust relating to the clinical condition being studied during a specified one month time period and against the agreed criteria and exclusions. Data were entered on templates specifically developed for the CPIs.
- 2.5 Data were collected from each ambulance trust, coordinated through East Midlands Ambulance Service. The data were collated and tabulated using Excel. The precision of results was calculated using the formula  $p \pm (1.96 \times \text{SE of } p)$  where  $p$ =rate and  $n$ =number of cases in the sample. Standard Error was calculated using  $= \sqrt{(p(1-p)/n)}$ .
- 2.6 The denominator for each criterion was the number of cases reviewed in the audit.
- 2.7 Trust performance was analysed and compared using funnel plots.<sup>3</sup> These have the advantage of avoiding inappropriate ranking but demonstrating outliers above the binomial control limits calculated at three standard deviations (99.9%) above and below the mean.<sup>4</sup>
- 2.8 National means for criteria were calculated using all the available data from all trusts during a particular cycle.
- 2.9 It is recognised that, whilst every effort is made to ensure criteria and data collection instructions are explicit there will be limitations to the data due to variation in clinical procedures, data storage, collection systems and personnel involved across the Trusts. A technical manual for the CPIs has been produced to assist those involved in collating data and leading the audits.

Performance area	Inclusion (Denominator)	Indicator (Numerator)	Exception(s)	Anticipated outcome [Potential risk]	Evidence
Stroke [S]	Patients with suspected new stroke/TIA	S1 FAST assessment recorded	Patient unable Patient declined	Improved assessment and management of stroke	<ul style="list-style-type: none"> <li>• JRCALC 2006</li> <li>• Stroke Association (<a href="http://www.rcplondon.ac.uk/pubs/contents/6ad05aab-8400-494c-8cf4-9772d1d5301b.pdf">http://www.rcplondon.ac.uk/pubs/contents/6ad05aab-8400-494c-8cf4-9772d1d5301b.pdf</a>)</li> <li>• Royal College of Physicians National clinical guideline for stroke (<a href="http://www.rcplondon.ac.uk/pubs/contents/6ad05aab-8400-494c-8cf4-9772d1d5301b.pdf">http://www.rcplondon.ac.uk/pubs/contents/6ad05aab-8400-494c-8cf4-9772d1d5301b.pdf</a>)</li> <li>• NICE guideline for diagnosis and initial management of acute stroke and TIA (<a href="http://www.nice.org.uk/nicemedia/live/12018/41363/41363.pdf">http://www.nice.org.uk/nicemedia/live/12018/41363/41363.pdf</a>)</li> </ul>
		S2 Blood glucose recorded	Patient refusal		
		S3 Blood pressure (systolic and diastolic) recorded	Patient refusal Time critical features (airway problem, reduced consciousness)		
		S4 Time of onset of symptoms recorded	Time not known (specified on form)		
		SC Care bundle for stroke (S1+ S2 + S3)	Exception to any element recorded and all other elements delivered		

Performance area	Inclusion (Denominator)	Indicator (Numerator)	Exception(s)	Anticipated outcome [Potential risk]	Evidence
Pre-hospital ST elevation MI (STEMI) [M]	Patients with prehospital diagnosis of STEMI (confirmed on ECG)	M1 Aspirin	Patient refusal Contraindication to drug (specified)	Improved assessment and management of STEMI Improved survival from STEMI	<ul style="list-style-type: none"> <li>JRCALC 2006</li> <li>NSF for CHD</li> <li>National Cardiac Ambulance Audit Scoping Paper 2007</li> </ul>
		M2 GTN			
		M3 Two pain scores recorded	Patient refusal Patient unable Patient unconscious		
		M4 Morphine given	Patient refusal Patient not in pain/pain score = 0 Contraindication to drug (specified)		
		M5 Analgesia given (Morphine and/or Entonox)	Patient refusal Patient not in pain/pain score = 0 Contraindication to both drugs (specified)		
		M6 SpO2 recorded	Patient refusal		
		MC Care bundle for STEMI (M1 + M2 + M3 + M5)	Exception to any element recorded and all other elements delivered		

Performance area	Inclusion (Denominator)	Indicator (Numerator)	Exception(s)	Anticipated outcome [Potential risk]	Evidence
Asthma [A]	Patients with suspected diagnosis of asthma	A1 Respiratory rate recorded	No exceptions	Improved assessment and management of asthma	<ul style="list-style-type: none"> <li>JRCALC 2006</li> <li>British Guideline on the Management of Asthma 2003 updated (NICE/SIGN)</li> </ul>
		A2 PEFR recorded (before treatment)	Patient refused Patient unable Patient unconscious Patient does not understand Patient under 5		
		A3 SpO2 recorded (before treatment)	Patient refusal		
		A4 Beta-2 agonist given	Patient refused		
		A5 Oxygen administered	Contraindication to drug		
		AC Care bundle for asthma (A1+ A2 + A3 + A4)	Exception to any element recorded and all other elements delivered		
Hypoglycaemia [H]	Patients with crew diagnosis of hypoglycaemia	H1 Blood glucose before treatment	Patient refusal	Improved assessment and management of hypoglycaemia	JRCALC 2006
		H2 Blood glucose after treatment	Patient refusal Initial BM >5		
		H3 Treatment for hypoglycaemia recorded (oral carbohydrates, glucagon, iv glucose)			
		H4 Direct referral made to an appropriate health professional	Patient transported to hospital Patient refused		
		HC Care bundle for hypoglycaemia H1+ H2 + H3)	Exception to any element recorded and all other elements delivered		

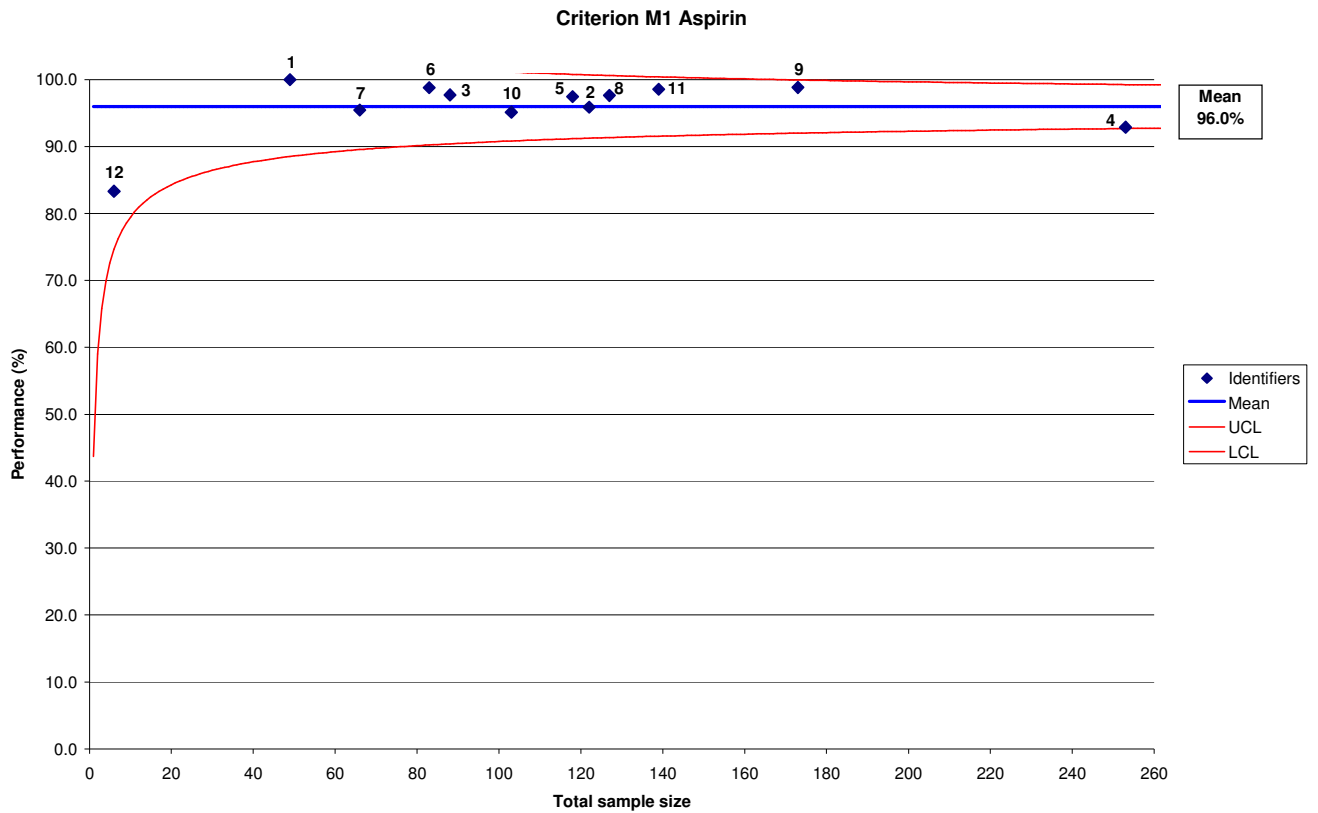


## Presentation of results

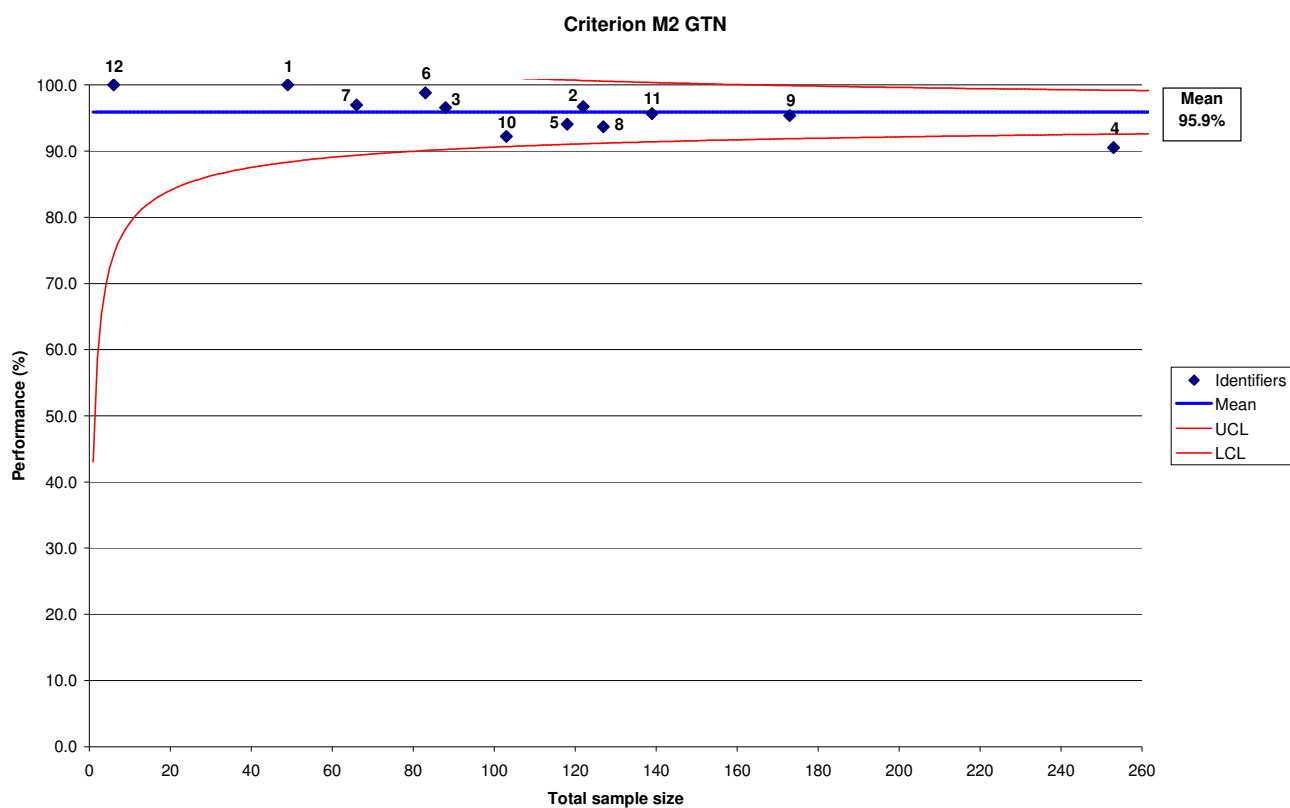
- 2.10 All twelve ambulance trusts in England participated in the audits.
- 2.11 The results from the audit are set out in tables and statistical process control (SPC) funnel plots or trombonograms. These are a useful graphical way of comparing organisational performance where this is stable over time, enabling trusts to compare their performance against others. They allow us to see where there may be real differences in systems or processes of care between organisations and by doing so can help to show where improvements in organisational performance can be gained. They also help to avoid wasting time in over-interpreting differences which could be expected as part of the naturally occurring or expected variation in processes of care.
- 2.12 The centre line on the chart shows the average of the underlying data and the outer curved lines (+/- 3 standard deviations) delineate the control limits (the bell of the 'trombone'). The upper and lower control limits (indicated in red on the charts) take into account the 'common cause' (natural or random) variation in the process being measured as well as potential variation due to differences in numbers of cases. They account for over 99.9% of the data and therefore the performance for most trusts should fall within those limits. Indicators which fall above or below the control limits indicate 'special cause' variation for which an explanation should be looked for. Points which fall above or below the control limits are known as outliers. Outliers do not necessarily mean that there is good or bad practice but do identify a need to look further for special causes. There are usually identifiable causes for special cause variation, for example differences in organisational systems or data quality. Interpretation depends on the indicator being measured. In cases where trusts are outliers showing higher performance, this could identify areas of good practice which could be shared with other trusts. By identifying these differences and looking for explanations we can begin to understand what might be possible in terms of improvement and to look at further ways of changing practice to improve performance.
- 2.13 Run charts showing the change in national means for the CPI cycles have also been included although there is not yet enough data to establish whether changes in those means are sustained improvements or common cause variation.
- 2.14 Each trust has been given an anonymised unique identifier and these are used in the charts and tables contained in this report.

**Results: funnel plots and tables**

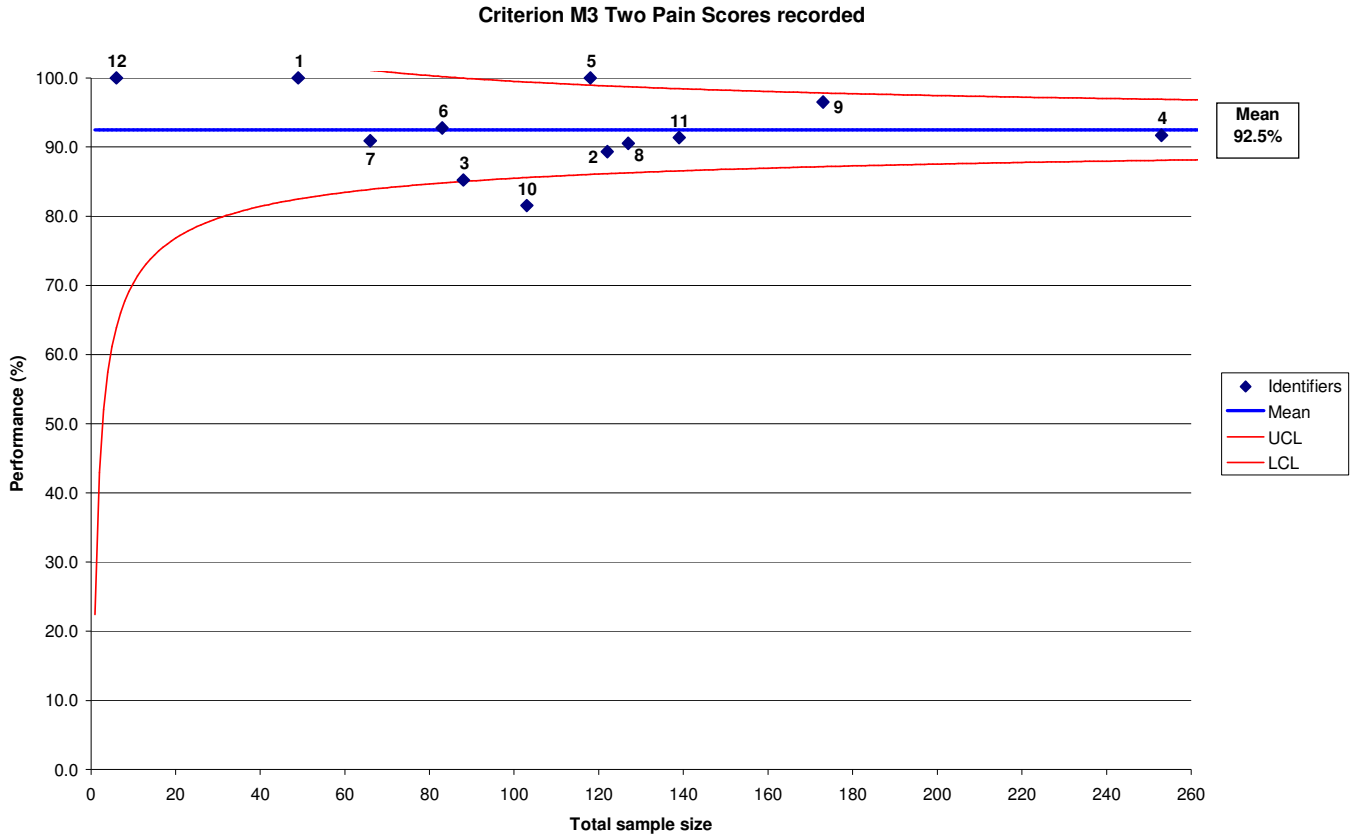
**STEMI (Data collection period: November 2011)**



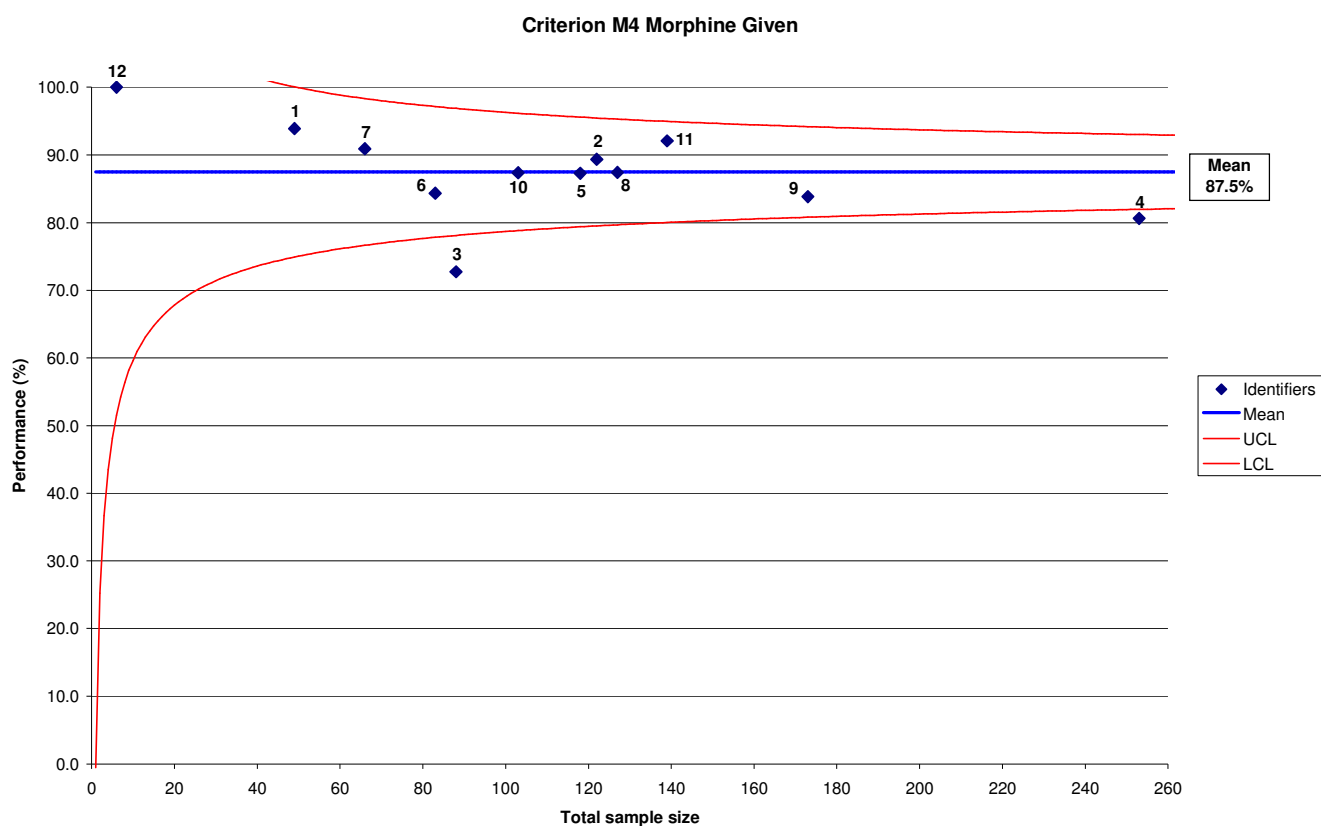
Criterion M1 Aspirin						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	49	100.0	100.0	100.0	2	97.6
2	122	95.9	99.4	92.4	7	100.0
3	88	97.7	100.0	94.6	5	97.0
4	253	92.9	96.1	89.7	21	94.8
5	118	97.5	100.0	94.6	4	94.9
6	83	98.8	101.0	96.4	17	100.0
7	66	95.5	100.0	90.4	3	94.9
8	127	97.6	100.0	95.0	8	95.5
9	173	98.8	100.0	97.3	13	93.5
10	103	95.1	99.3	91.0	4	94.8
11	139	98.6	100.0	96.6	18	95.0
12	6	83.3	100.0	53.5	0	100.0



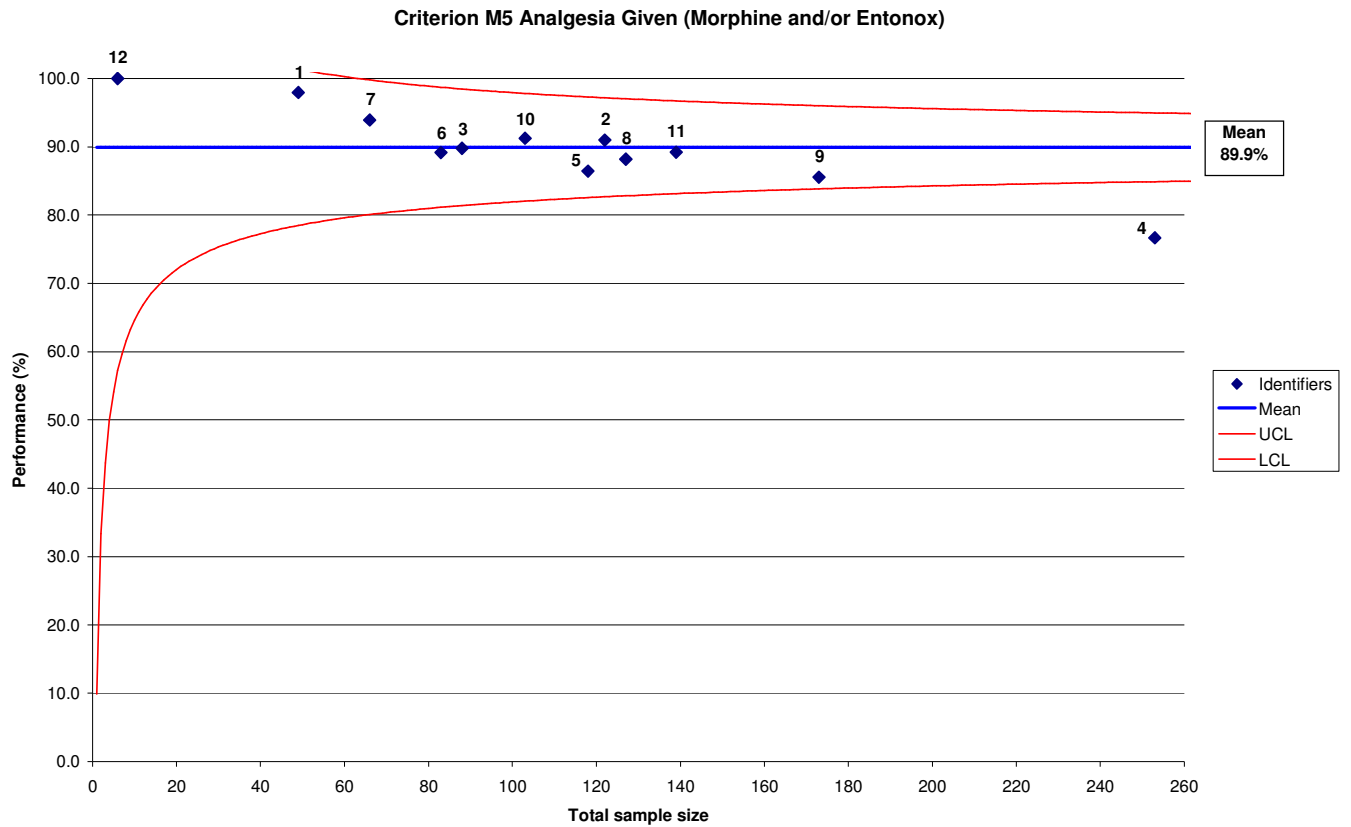
<b>Criterion M2 GTN</b>						
<b>Cycle 8</b>						<i>Comparison Cycle 7</i>
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Performance (%)</b>	<b>Upper 95% CI</b>	<b>Lower 95% CI</b>	<b>Total Exceptions (included in performance figure)</b>	<i>Performance (%)</i>
<b>1</b>	49	<b>100.0</b>	100.0	100.0	2	<i>100.0</i>
<b>2</b>	122	<b>96.7</b>	99.9	93.6	13	<i>100.0</i>
<b>3</b>	88	<b>96.6</b>	100.0	92.8	7	<i>93.1</i>
<b>4</b>	253	<b>90.5</b>	94.1	86.9	27	<i>89.6</i>
<b>5</b>	118	<b>94.1</b>	98.3	89.8	7	<i>86.0</i>
<b>6</b>	83	<b>98.8</b>	100.0	96.4	22	<i>98.0</i>
<b>7</b>	66	<b>97.0</b>	100.0	92.8	3	<i>88.5</i>
<b>8</b>	127	<b>93.7</b>	97.9	89.5	11	<i>88.8</i>
<b>9</b>	173	<b>95.4</b>	98.5	92.2	10	<i>86.5</i>
<b>10</b>	103	<b>92.2</b>	97.4	87.1	4	<i>84.9</i>
<b>11</b>	139	<b>95.7</b>	99.1	92.3	19	<i>97.5</i>
<b>12</b>	6	<b>100.0</b>	100.0	100.0	1	<i>100.0</i>



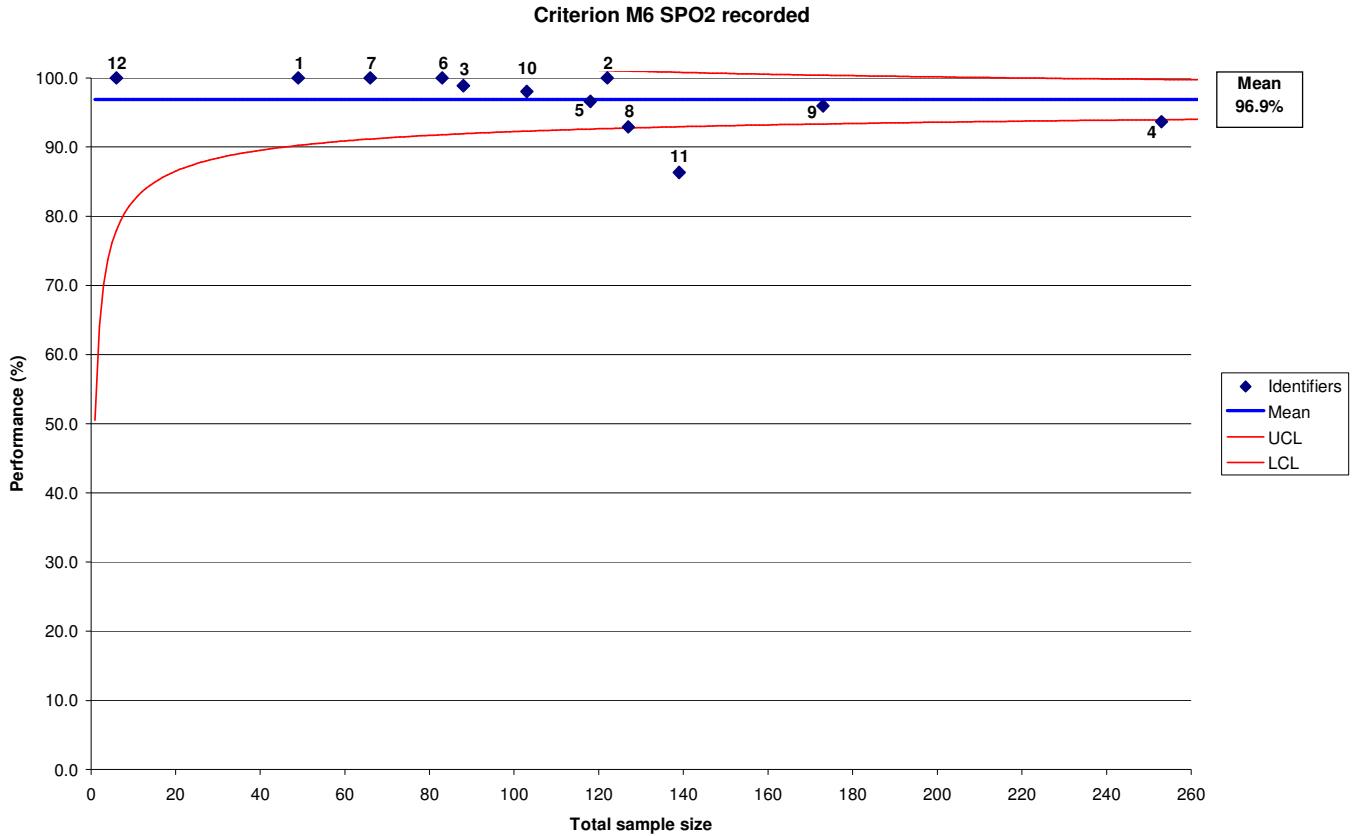
<b>Criterion M3 Two Pain Scores recorded</b>						
<b>Cycle 8</b>						<i>Comparison Cycle 7</i>
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Performance (%)</b>	<b>Upper 95% CI</b>	<b>Lower 95% CI</b>	<b>Total Exceptions (included in performance figure)</b>	<i>Performance (%)</i>
<b>1</b>	49	<b>100.0</b>	100.0	100.0	0	<i>95.2</i>
<b>2</b>	122	<b>89.3</b>	94.8	83.9	11	<i>88.5</i>
<b>3</b>	88	<b>85.2</b>	92.6	77.8	1	<i>92.1</i>
<b>4</b>	253	<b>91.7</b>	95.1	88.3	15	<i>91.7</i>
<b>5</b>	118	<b>100.0</b>	100.0	100.0	9	<i>84.1</i>
<b>6</b>	83	<b>92.8</b>	98.3	87.2	9	<i>86.7</i>
<b>7</b>	66	<b>90.9</b>	97.8	84.0	2	<i>85.9</i>
<b>8</b>	127	<b>90.6</b>	95.6	85.5	4	<i>90.2</i>
<b>9</b>	173	<b>96.5</b>	99.3	93.8	11	<i>91.6</i>
<b>10</b>	103	<b>81.6</b>	89.0	74.1	2	<i>82.1</i>
<b>11</b>	139	<b>91.4</b>	96.0	86.7	15	<i>81.7</i>
<b>12</b>	6	<b>100.0</b>	100.0	100.0	0	<i>0.0</i>



Criterion M4 Morphine Given						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	49	93.9	100.0	87.2	10	88.1
2	122	89.3	94.8	83.9	34	97.4
3	88	72.7	82.0	63.4	22	61.4
4	253	80.6	85.5	75.8	104	76.1
5	118	87.3	93.3	81.3	36	71.3
6	83	84.3	92.2	76.5	47	77.6
7	66	90.9	97.8	84.0	15	80.8
8	127	87.4	93.2	81.6	23	85.7
9	173	83.8	89.3	78.3	44	89.8
10	103	87.4	93.8	81.0	27	62.3
11	139	92.1	96.6	87.6	49	85.0
12	6	100.0	100.0	100.0	1	100.0

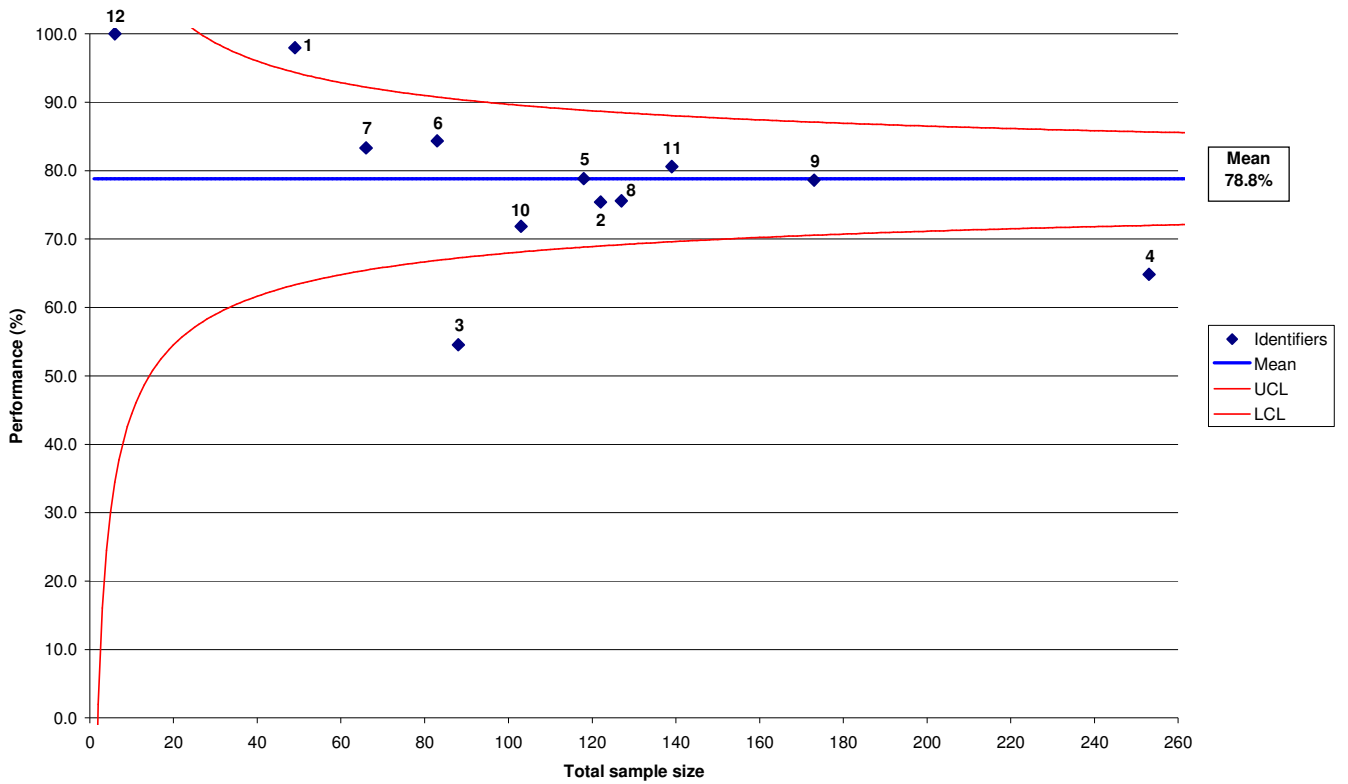


<b>Criterion M5 Analgesia Given (Morphine and/or Entonox)</b>						
<b>Cycle 8</b>					<i>Comparison Cycle 7</i>	
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Performance (%)</b>	<b>Upper 95% CI</b>	<b>Lower 95% CI</b>	<b>Total Exceptions (included in performance figure)</b>	<i>Performance (%)</i>
<b>1</b>	49	<b>98.0</b>	100.0	94.0	10	<i>90.5</i>
<b>2</b>	122	<b>91.0</b>	96.1	85.9	33	<i>98.7</i>
<b>3</b>	88	<b>89.8</b>	96.1	83.4	23	<i>74.3</i>
<b>4</b>	253	<b>76.7</b>	81.9	71.5	79	<i>84.3</i>
<b>5</b>	118	<b>86.4</b>	92.6	80.3	23	<i>82.2</i>
<b>6</b>	83	<b>89.2</b>	95.8	82.5	38	<i>98.0</i>
<b>7</b>	66	<b>93.9</b>	99.7	88.2	15	<i>85.9</i>
<b>8</b>	127	<b>88.2</b>	93.8	82.6	21	<i>87.1</i>
<b>9</b>	173	<b>85.5</b>	90.8	80.3	38	<i>88.8</i>
<b>10</b>	103	<b>91.3</b>	96.7	85.8	26	<i>67.5</i>
<b>11</b>	139	<b>89.2</b>	94.4	84.1	39	<i>76.7</i>
<b>12</b>	6	<b>100.0</b>	100.0	100.0	1	<i>100.0</i>



<b>Criterion M6 SPO2 recorded</b>						
<b>Cycle 8</b>						<i>Comparison Cycle 7</i>
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Performance (%)</b>	<b>Upper 95% CI</b>	<b>Lower 95% CI</b>	<b>Total Exceptions (included in performance figure)</b>	<i>Performance (%)</i>
<b>1</b>	49	<b>100.0</b>	100.0	100.0	0	<i>97.6</i>
<b>2</b>	122	<b>100.0</b>	100.0	100.0	0	<i>98.7</i>
<b>3</b>	88	<b>98.9</b>	100.0	96.6	0	<i>99.0</i>
<b>4</b>	253	<b>93.7</b>	96.7	90.7	0	<i>99.1</i>
<b>5</b>	118	<b>96.6</b>	99.9	93.3	0	<i>98.7</i>
<b>6</b>	83	<b>100.0</b>	100.0	100.0	1	<i>100.0</i>
<b>7</b>	66	<b>100.0</b>	100.0	100.0	0	<i>97.4</i>
<b>8</b>	127	<b>92.9</b>	97.4	88.5	0	<i>95.1</i>
<b>9</b>	173	<b>96.0</b>	98.9	93.0	1	<i>99.1</i>
<b>10</b>	103	<b>98.1</b>	100.0	95.4	0	<i>98.1</i>
<b>11</b>	139	<b>86.3</b>	92.0	80.6	0	<i>91.7</i>
<b>12</b>	6	<b>100.0</b>	100.0	100.0	0	<i>100.0</i>

Criterion MC Care Bundle for STEMI (M1+M2+M3+M5)



Criterion MC Care Bundle for STEMI (M1+M2+M3+M5)						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	49	98.0	100.0	94.0	12	83.3
2	122	75.4	83.1	67.8	32	87.2
3	88	54.5	64.9	44.1	19	67.3
4	253	64.8	70.7	58.9	69	78.3
5	118	78.8	86.2	71.4	25	65.6
6	83	84.3	92.2	76.5	42	85.7
7	66	83.3	92.3	74.3	13	70.5
8	127	75.6	83.1	68.1	23	74.1
9	173	78.6	84.7	72.5	44	76.3
10	103	71.8	80.5	63.2	15	54.7
11	139	80.6	87.2	74.0	46	60.0
12	6	100.0	100.0	100.0	1	0.0



## Comparison of STEMI criteria means

Criterion	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
	%	%	%	%	%	%	%	%
M1 Aspirin	84.6	87.6	88.2	94.4	97.2	95.9	96.5	96.0
M2 GTN	77.9	81.8	82.2	90.5	92.7	92.1	92.7	95.9
M3 Two pain Scores recorded	54.3	64.4	72.8	78.7	80.6	85.5	80.8	92.5
M4 Morphine Given	51.4	52.7	67.7	73.8	80.0	78.0	81.3	87.5
M5 Analgesia Given	53.9	60.6	65.9	73.9	79.8	81.8	86.2	89.9
M7 (Pilot) SPO2 recorded	N/A	N/A	90.2	94.3	97.2	97.1	97.9	96.9
MC (Pilot) Care Bundle for STEMI (M1+M2+M3+M5)	N/A	N/A	57.4	64.3	65.9	69.6	66.9	78.8

The national means show evidence of improvement over the cycles for all criteria.

## Breakdown of Exception Reporting

Criterion M1 Aspirin			
Ambulance service identifier	Total sample size	Patient refusals	Contra-indication to drug
1	49	0	2
2	122	0	7
3	88	3	2
4	253	5	16
5	118	0	4
6	83	11	6
7	66	0	3
8	127	1	7
9	173	2	11
10	103	0	4
11	139	5	13
12	6	0	0

Criterion M2 GTN			
Ambulance service identifier	Total sample size	Patient refusals	Contra-indication to drug
1	49	0	2
2	122	0	13
3	88	1	6
4	253	4	23
5	118	1	6
6	83	14	8
7	66	1	2
8	127	0	11
9	173	3	7
10	103	0	4
11	139	4	15
12	6	0	1

Criterion M3 Two Pain Scores Recorded				
Ambulance service identifier	Total sample size	Patient refusals	Patient unable	Patient unconscious
1	49	0	0	0
2	122	0	11	0
3	88	0	1	0
4	253	2	8	5
5	118	0	9	0
6	83	5	1	3
7	66	0	2	0
8	127	0	0	4
9	173	2	8	1
10	103	0	2	0
11	139	1	14	0
12	6	0	0	0

Criterion M4 Morphine Given				
Ambulance service identifier	Total sample size	Patient refusals	Patient not in pain/ Pain score 0	Contra-indication to drug (specified)
1	49	2	8	0
2	122	4	11	19
3	88	3	9	10
4	253	23	47	34
5	118	9	14	13
6	83	14	27	6
7	66	2	11	2
8	127	3	12	8
9	173	15	22	7
10	103	3	21	3
11	139	14	26	9
12	6	0	1	0

Criterion M5 Analgesia Given (Morphine and/or Entonox)				
Ambulance service identifier	Total sample size	Patient refusals	Patient not in pain/ Pain score 0	Contra-indication to drugs (specified)
1	49	2	8	0
2	122	4	11	18
3	88	4	10	9
4	253	24	47	8
5	118	8	14	1
6	83	15	22	1
7	66	2	11	2
8	127	4	12	5
9	173	15	22	1
10	103	3	22	1
11	139	9	26	4
12	6	0	1	0

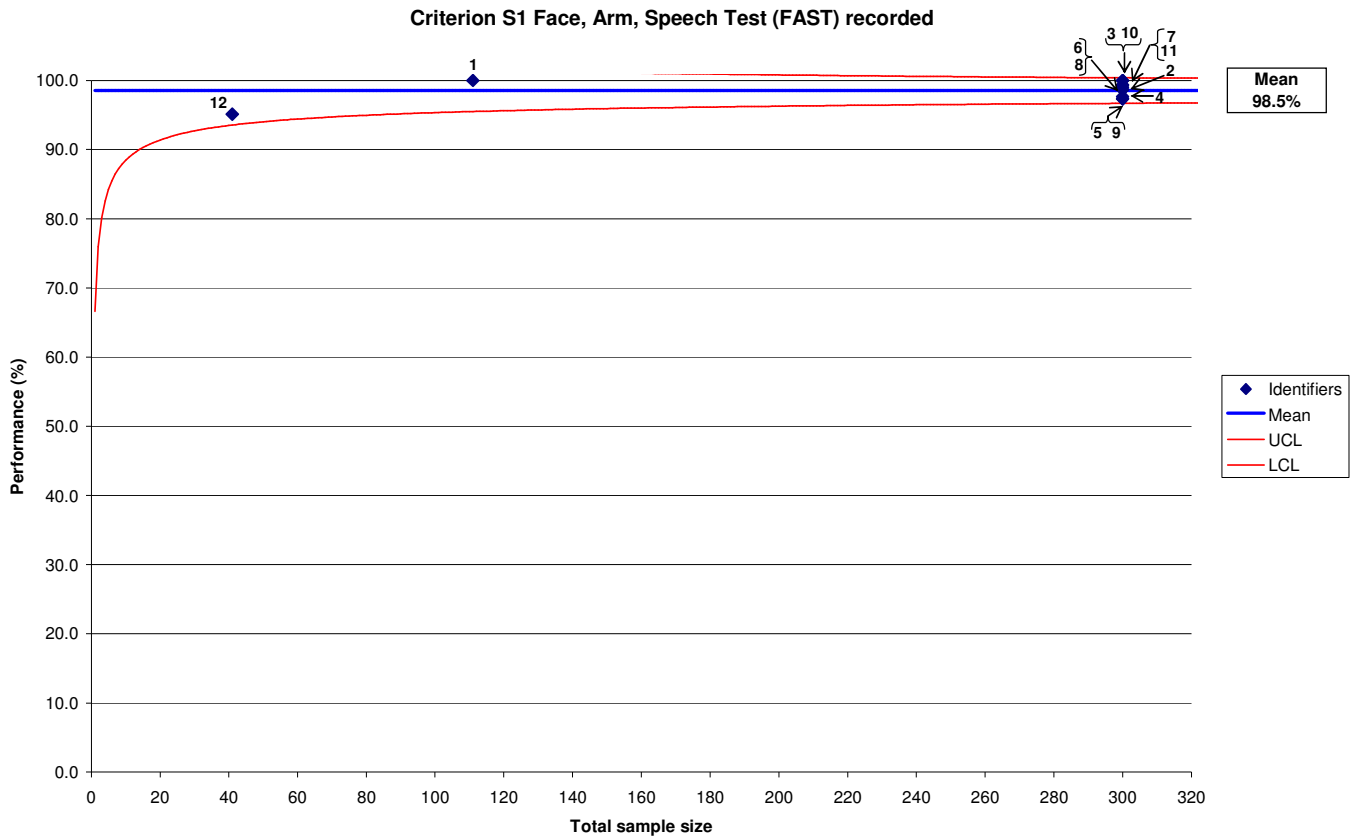
Criterion M6 SPO2 Recorded		
Ambulance service identifier	Total sample size	Patient refusals
1	49	0
2	122	0
3	88	0
4	253	0
5	118	0
6	83	1
7	66	0
8	127	0
9	173	1
10	103	0
11	139	0
12	6	0

Criterion MC Care Bundle		
Ambulance service identifier	Total sample size	Exceptions
1	49	12
2	122	32
3	88	19
4	253	69
5	118	25
6	83	42
7	66	13
8	127	23
9	173	44
10	103	15
11	139	46
12	6	1

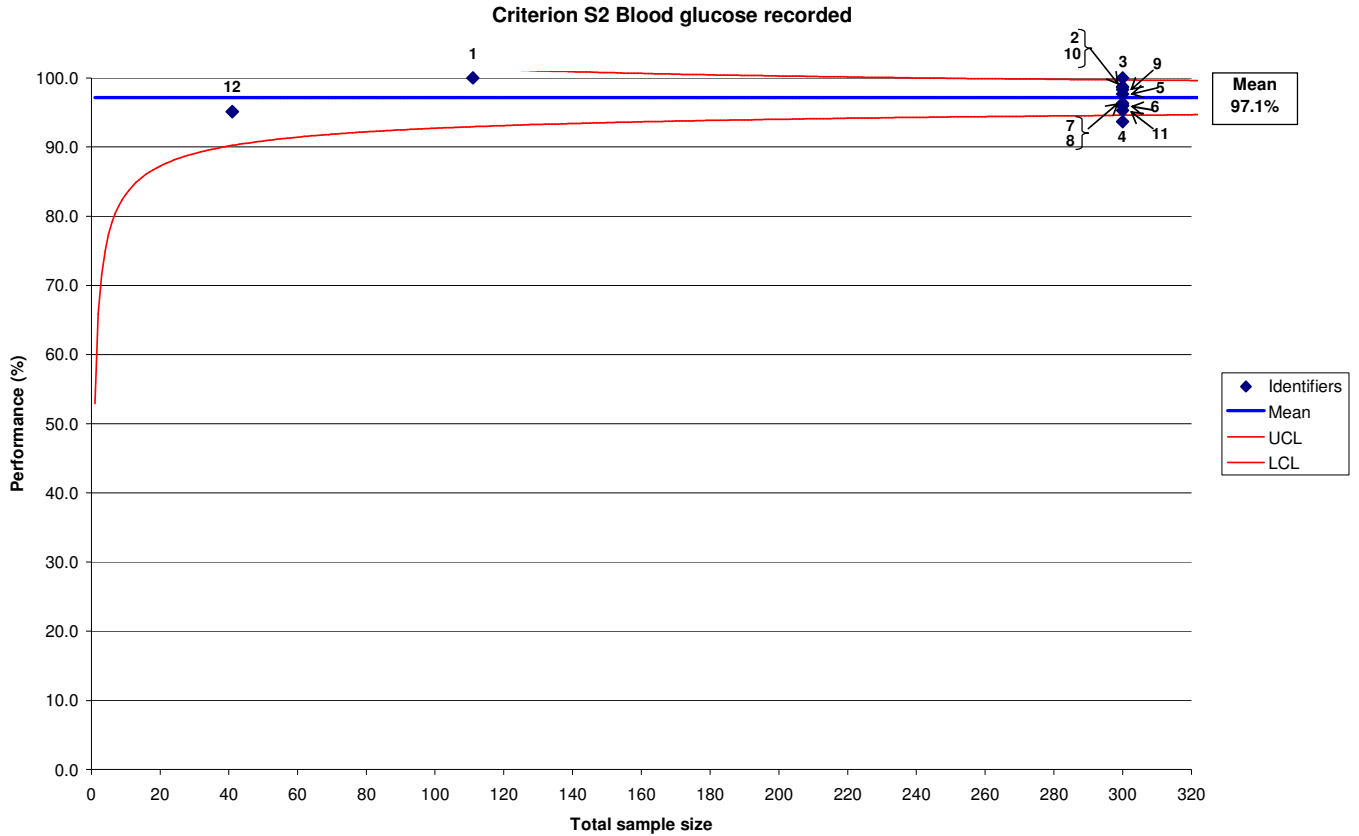
### Data Collection Method

Ambulance service identifier	Data Collection Method	Whole or part of Trust
1	Manual	Whole
2	Mixed	Whole
3	Scanned	Whole
4	Mixed	Whole
5	Mixed	Whole
6	Mixed	Whole
7	Manual	Whole
8	Mixed	Whole
9	Manual	Whole
10	Mixed	Part
11	Mixed	Whole
12	Electronic (ePRF)	Whole

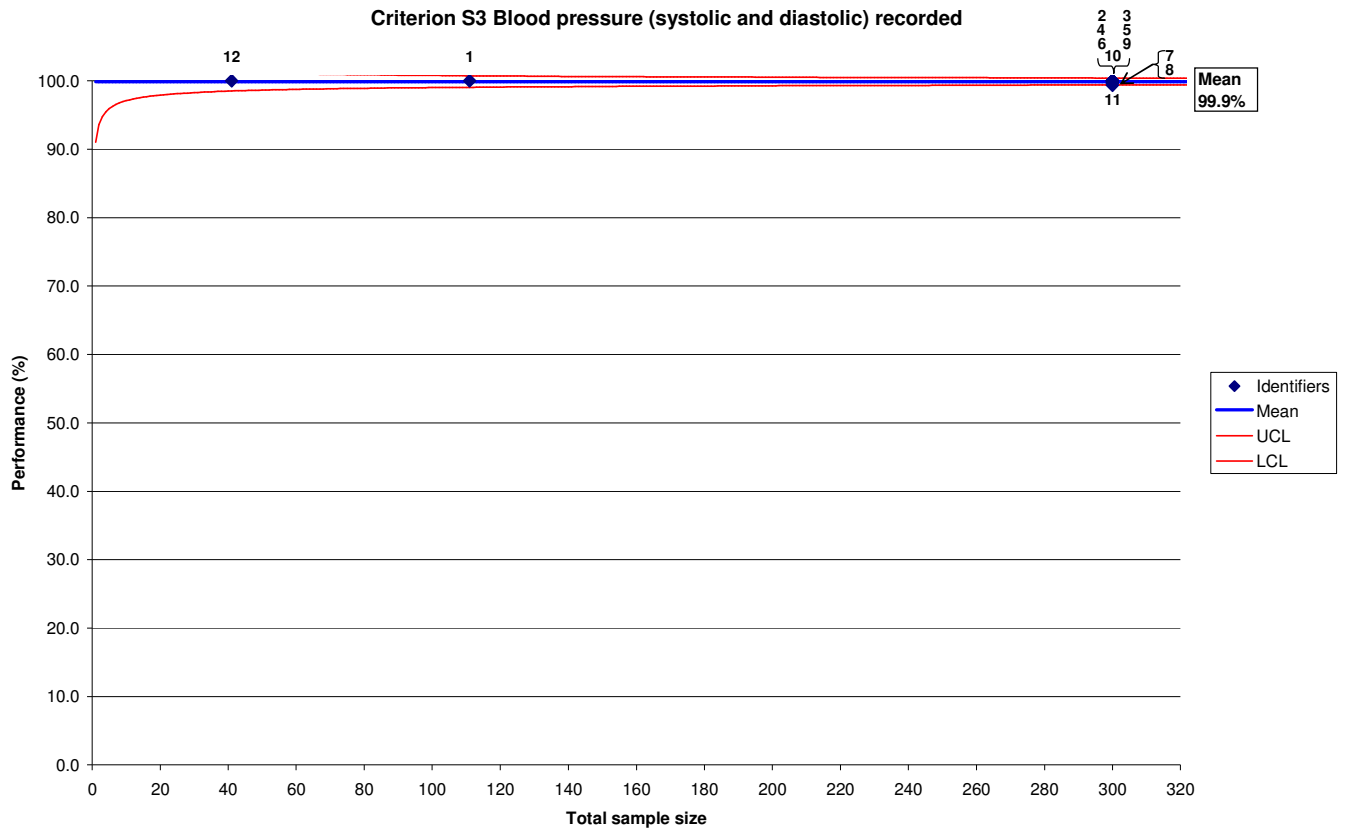
**Stroke (Data collection period: December 2011)**



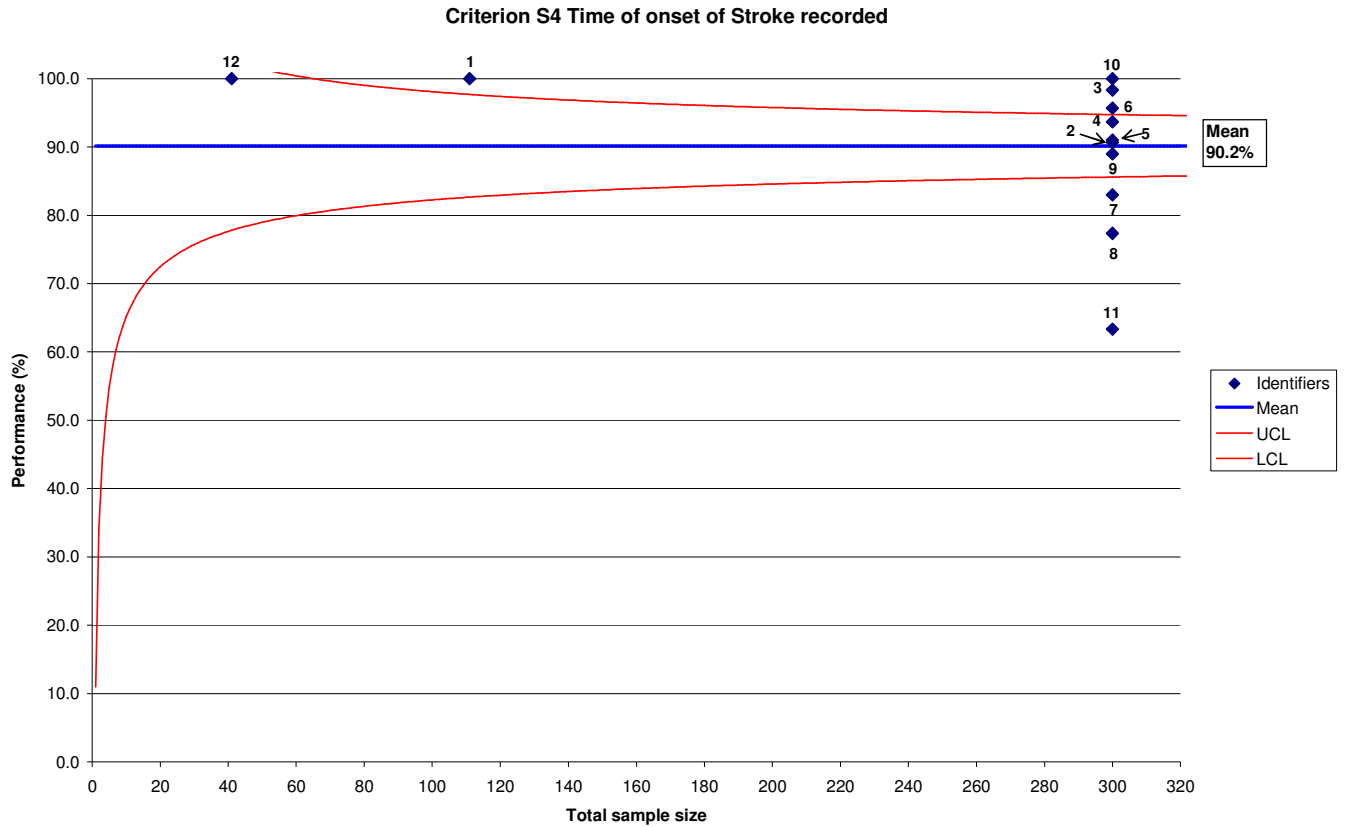
<b>Criterion S1 Face, Arm, Speech Test (FAST) recorded</b>						
<b>Cycle 8</b>						<i>Comparison Cycle 7</i>
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Performance (%)</b>	<b>Upper 95% CI</b>	<b>Lower 95% CI</b>	<b>Total Exceptions (included in performance figure)</b>	<i>Performance (%)</i>
<b>1</b>	111	<b>100.0</b>	100.0	100.0	0	<i>100.0</i>
<b>2</b>	300	<b>99.0</b>	100.0	97.9	29	<i>98.3</i>
<b>3</b>	300	<b>100.0</b>	100.0	100.0	11	<i>100.0</i>
<b>4</b>	300	<b>97.7</b>	99.4	96.0	55	<i>89.0</i>
<b>5</b>	300	<b>97.3</b>	99.2	95.5	18	<i>94.3</i>
<b>6</b>	300	<b>98.7</b>	100.0	97.4	6	<i>99.4</i>
<b>7</b>	300	<b>99.3</b>	100.0	98.4	0	<i>98.7</i>
<b>8</b>	300	<b>98.7</b>	100.0	97.4	15	<i>96.3</i>
<b>9</b>	300	<b>97.3</b>	99.2	95.5	30	<i>97.7</i>
<b>10</b>	300	<b>100.0</b>	100.0	100.0	3	<i>99.3</i>
<b>11</b>	300	<b>99.3</b>	100.0	98.4	8	<i>89.3</i>
<b>12</b>	41	<b>95.1</b>	100.0	88.5	3	<i>84.8</i>



Criterion S2 Blood glucose recorded						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	111	100.0	100.0	100.0	0	100.0
2	300	98.7	100.0	97.4	0	98.7
3	300	100.0	100.0	100.0	0	99.3
4	300	93.7	96.4	90.9	2	96.0
5	300	97.7	99.4	96.0	2	96.3
6	300	96.3	98.5	94.2	3	98.1
7	300	96.0	98.2	93.8	0	94.0
8	300	96.0	98.2	93.8	0	93.3
9	300	98.3	99.8	96.9	1	98.3
10	300	98.7	100.0	97.4	1	96.7
11	300	95.3	97.7	92.9	1	94.3
12	41	95.1	100.0	88.5	0	81.8

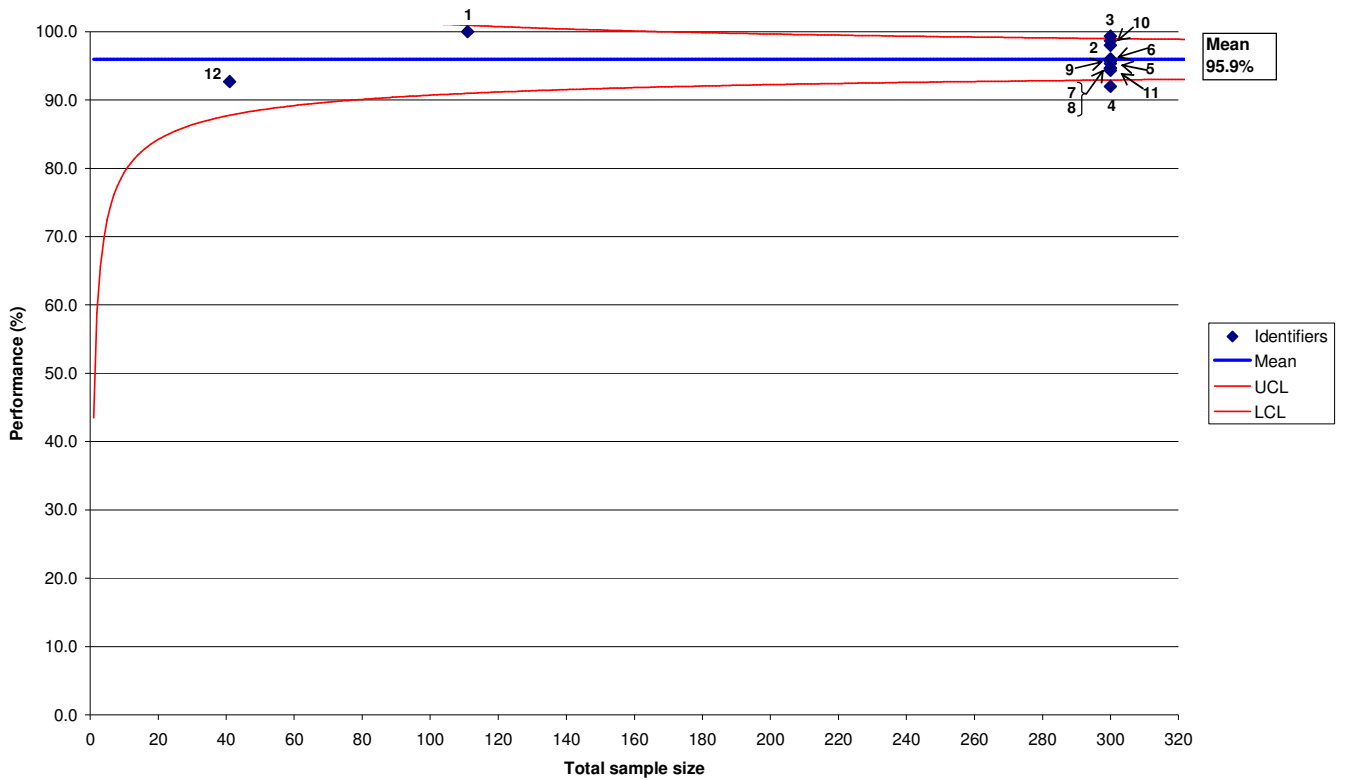


Criterion S3 Blood pressure (systolic and diastolic) recorded						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	111	100.0	100.0	100.0	0	100.0
2	300	100.0	100.0	100.0	0	100.0
3	300	100.0	100.0	100.0	0	100.0
4	300	100.0	99.8	96.9	1	99.7
5	300	100.0	100.0	100.0	1	99.3
6	300	100.0	100.0	100.0	3	100.0
7	300	99.7	100.0	99.0	1	99.7
8	300	99.7	100.0	99.0	0	98.3
9	300	100.0	100.0	100.0	3	99.3
10	300	100.0	100.0	100.0	1	99.3
11	300	99.3	100.0	98.4	1	99.0
12	41	100.0	100.0	100.0	3	100.0



<b>Criterion S4 Time of onset of Stroke recorded</b>						
<b>Cycle 8</b>						<i>Comparison Cycle 7</i>
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Performance (%)</b>	<b>Upper 95% CI</b>	<b>Lower 95% CI</b>	<b>Total Exceptions (included in performance figure)</b>	<i>Performance (%)</i>
<b>1</b>	111	<b>100.0</b>	100.0	100.0	23	<i>100.0</i>
<b>2</b>	300	<b>90.7</b>	94.0	87.4	70	<i>90.7</i>
<b>3</b>	300	<b>98.3</b>	99.8	96.9	5	<i>99.0</i>
<b>4</b>	300	<b>93.7</b>	96.4	90.9	37	<i>92.0</i>
<b>5</b>	300	<b>91.0</b>	94.2	87.8	46	<i>85.3</i>
<b>6</b>	300	<b>95.7</b>	98.0	93.4	12	<i>86.8</i>
<b>7</b>	300	<b>83.0</b>	87.3	78.7	17	<i>75.7</i>
<b>8</b>	300	<b>77.3</b>	82.1	72.6	20	<i>75.0</i>
<b>9</b>	300	<b>89.0</b>	92.5	85.5	42	<i>87.7</i>
<b>10</b>	300	<b>100.0</b>	100.0	100.0	105	<i>78.0</i>
<b>11</b>	300	<b>63.3</b>	68.8	57.9	5	<i>60.0</i>
<b>12</b>	41	<b>100.0</b>	100.0	100.0	3	<i>100.0</i>

Criterion SC Care bundle for stroke (S1 + S2 + S3)



Criterion SC Care bundle for stroke (S1 + S2 + S3)

Criterion SC Care bundle for stroke (S1 + S2 + S3)						Comparison
Cycle 8						Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	111	100.0	100.0	100.0	0	100.0
2	300	98.0	99.6	96.4	28	97.0
3	300	99.3	100.0	98.4	11	99.7
4	300	92.0	95.1	88.9	51	85.0
5	300	95.3	97.7	92.9	20	90.7
6	300	96.0	98.2	93.8	9	97.5
7	300	94.7	97.2	92.1	1	92.7
8	300	94.7	97.2	92.1	16	91.0
9	300	95.7	98.0	93.4	33	95.7
10	300	98.7	100.0	97.4	4	95.7
11	300	94.3	96.9	91.7	9	83.3
12	41	92.7	100.0	84.7	6	75.8

## Comparison of Stroke criteria means

Criterion	National Mean (%)							
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
S1 Face, Arm, Speech Test (FAST) recorded	87.0	87.2	93.6	95.5	95.8	96.0	95.6	98.5
S2 Blood glucose recorded	85.6	82.5	88.9	91.0	92.6	94.0	95.6	97.1
S3 Blood pressure (systolic and diastolic) recorded	97.6	97.9	99.1	98.5	98.7	98.8	99.6	99.9
S4 Time of onset of Stroke recorded	N/A	N/A	59.9	69.0	74.3	82.5	85.8	90.2
SC Care bundle for stroke (S1 + S2 + S3)	N/A	N/A	85.2	87.4	87.8	90.7	92.0	95.9

The national means show improvement across all criteria over the eight cycles.

## Breakdown of exception reporting

Criterion S1 Face, Arm, Speech Test (FAST) recorded			
Ambulance service identifier	Total sample size	Patient unable	Patient declined
1	111	0	0
2	300	29	0
3	300	11	0
4	300	50	5
5	300	18	0
6	300	4	2
7	300	0	0
8	300	14	1
9	300	28	2
10	300	3	0
11	300	8	0
12	41	3	0

Criterion S2 Blood glucose recorded		
Ambulance service identifier	Total sample size	Patient refusals
1	111	0
2	300	0
3	300	0
4	300	2
5	300	2
6	300	3
7	300	0
8	300	0
9	300	1
10	300	1
11	300	1
12	41	0

Criterion S3 Blood pressure (systolic and diastolic) recorded			
Ambulance service identifier	Total sample size	Patient refusal	Time critical features (airway problem, reduced consciousness)
1	111	0	0
2	300	0	0
3	300	0	0
4	300	0	1
5	300	1	0
6	300	3	0
7	300	0	1
8	300	0	0
9	300	2	1
10	300	0	1
11	300	1	0
12	41	0	3

Criterion S4 Time of onset of Stroke recorded		
Ambulance service identifier	Total sample size	Time 'Not Known' (specified on form)
1	111	23
2	300	70
3	300	5
4	300	37
5	300	46
6	300	12
7	300	17
8	300	20
9	300	42
10	300	105
11	300	5
12	41	3

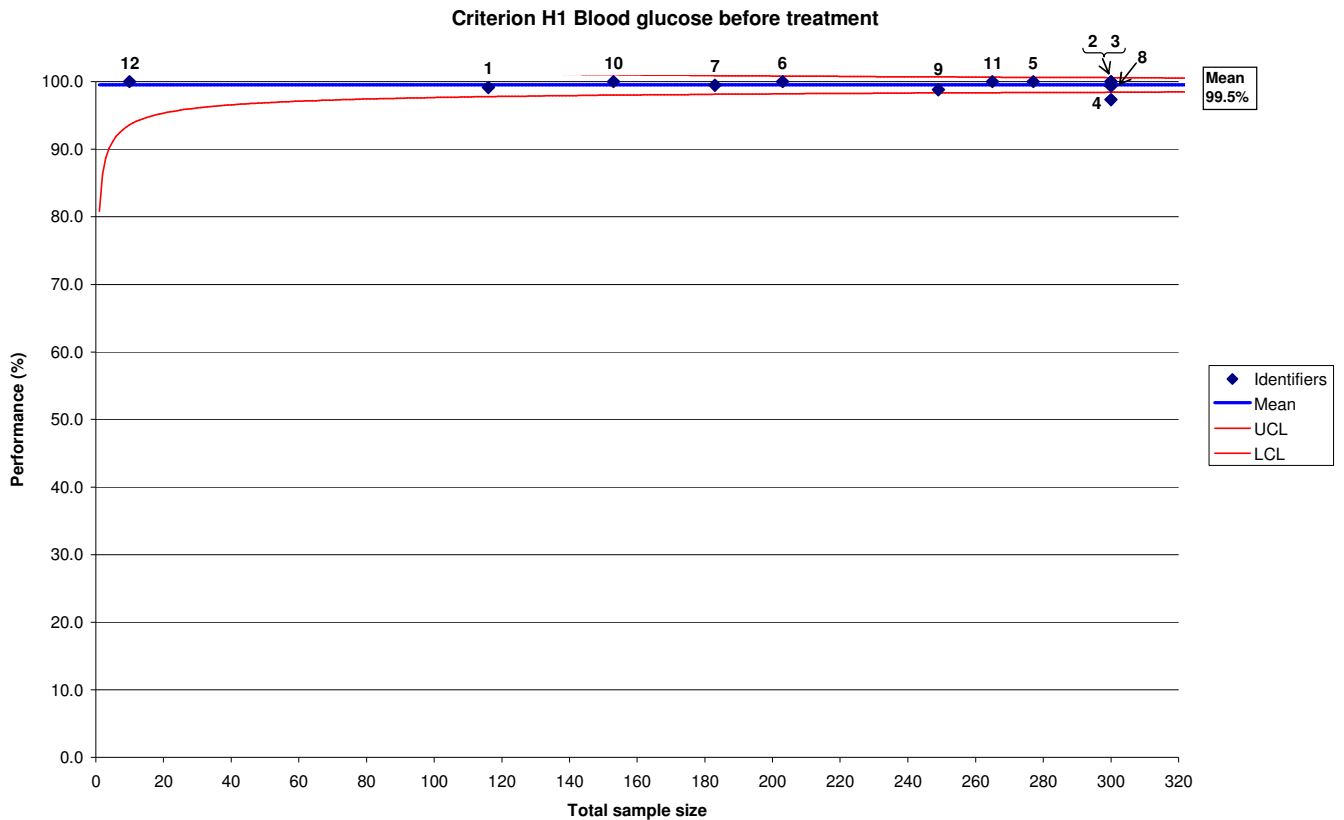


<b>Criterion SC Care bundle for stroke (S1 + S2 + S3)</b>		
<b>Ambulance service identifier</b>	<b>Total sample size</b>	<b>Exceptions</b>
1	111	0
2	300	28
3	300	11
4	300	51
5	300	20
6	300	9
7	300	1
8	300	16
9	300	33
10	300	4
11	300	9
12	41	6

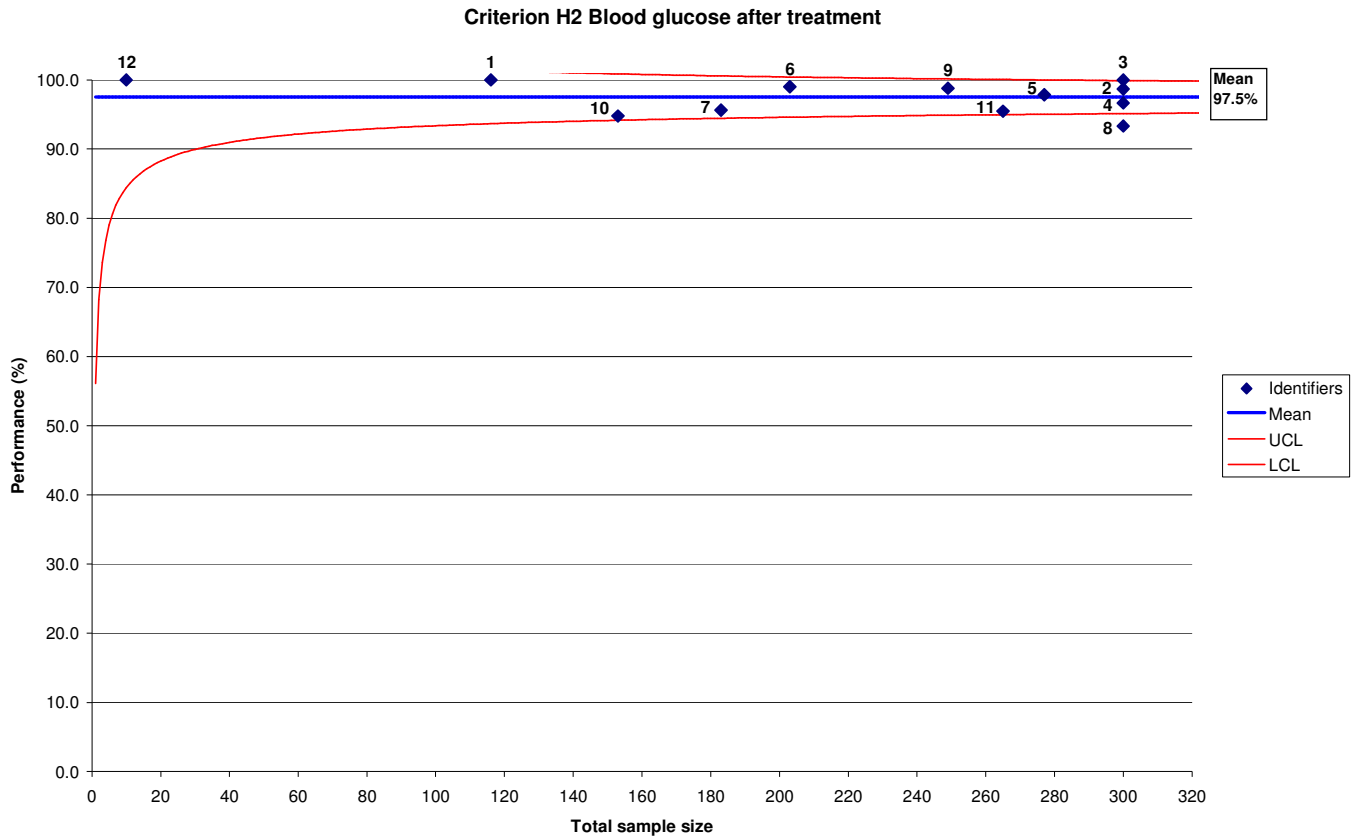
### **Stroke data collection method**

<b>Ambulance service identifier</b>	<b>Data Collection Method</b>	<b>Whole or part of Trust</b>
1	Manual	Yes
2	Mixed	Yes
3	Scanned	Yes
4	Manual	Yes
5	Mixed	Yes
6	Mixed	Yes
7	Manual	Yes
8	Mixed	Yes
9	Manual	Yes
10	Mixed	No
11	Mixed	Yes
12	Electronic (ePRF)	Yes

## Hypoglycaemia (Data collection period: January 2012)

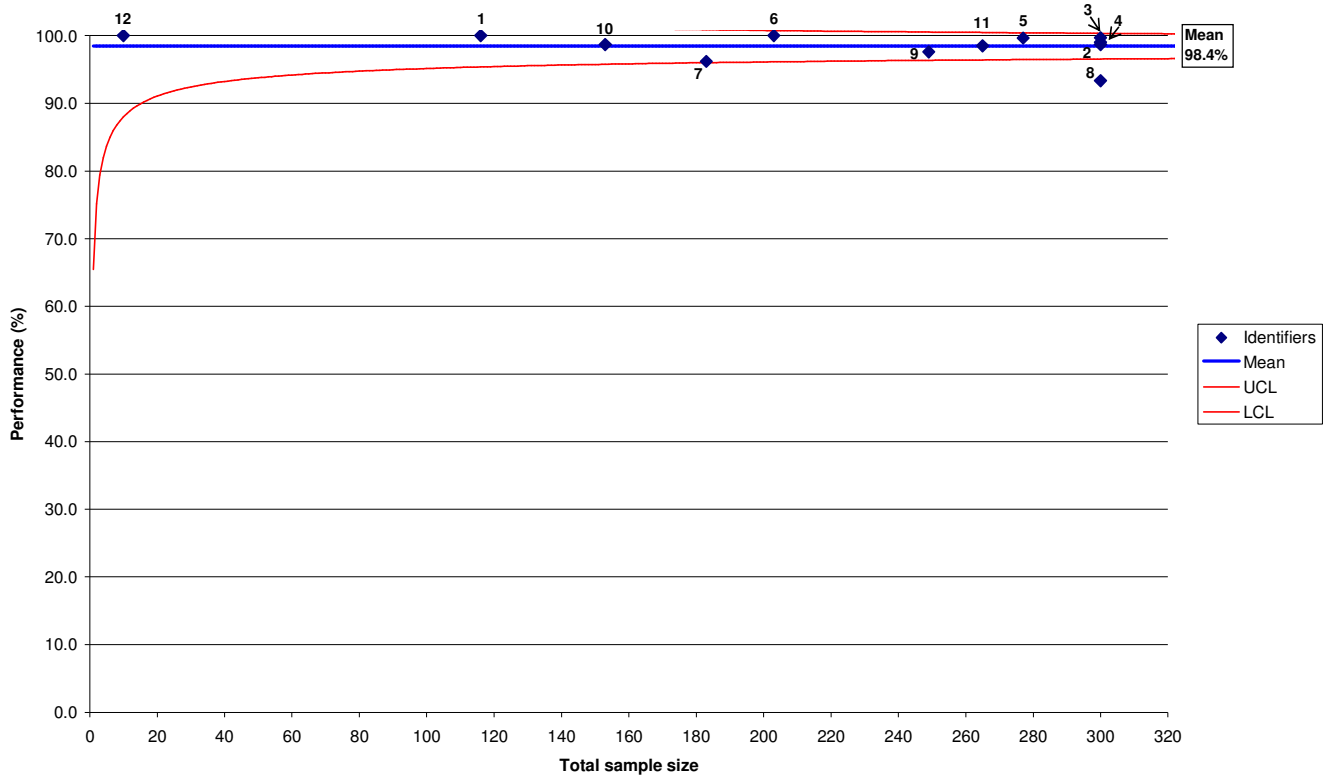


Criterion H1 Blood glucose before treatment						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	116	99.1	100.0	97.5	0	99.3
2	300	100.0	100.0	100.0	0	100.0
3	300	100.0	100.0	100.0	0	99.7
4	300	97.3	99.2	95.5	0	95.3
5	277	100.0	100.0	100.0	0	97.4
6	203	100.0	100.0	100.0	0	100.0
7	183	99.5	100.0	98.4	1	100.0
8	300	99.3	100.0	98.4	0	98.7
9	249	98.8	100.0	97.4	1	100.0
10	153	100.0	100.0	100.0	0	98.6
11	265	100.0	100.0	100.0	0	96.0
12	10	100.0	100.0	100.0	0	100.0



Criterion H2 Blood glucose after treatment						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	116	100.0	100.0	100.0	0	99.3
2	300	98.7	100.0	97.4	5	100.0
3	300	100.0	100.0	100.0	27	99.3
4	300	96.7	98.7	94.6	1	94.3
5	277	97.8	99.5	96.1	1	98.1
6	203	99.0	100.0	97.7	5	100.0
7	183	95.6	98.6	92.7	6	95.9
8	300	93.3	96.2	90.5	12	95.7
9	249	98.8	100.0	97.4	10	98.6
10	153	94.8	98.3	91.2	0	96.4
11	265	95.5	98.0	93.0	5	97.0
12	10	100.0	100.0	100.0	0	100.0

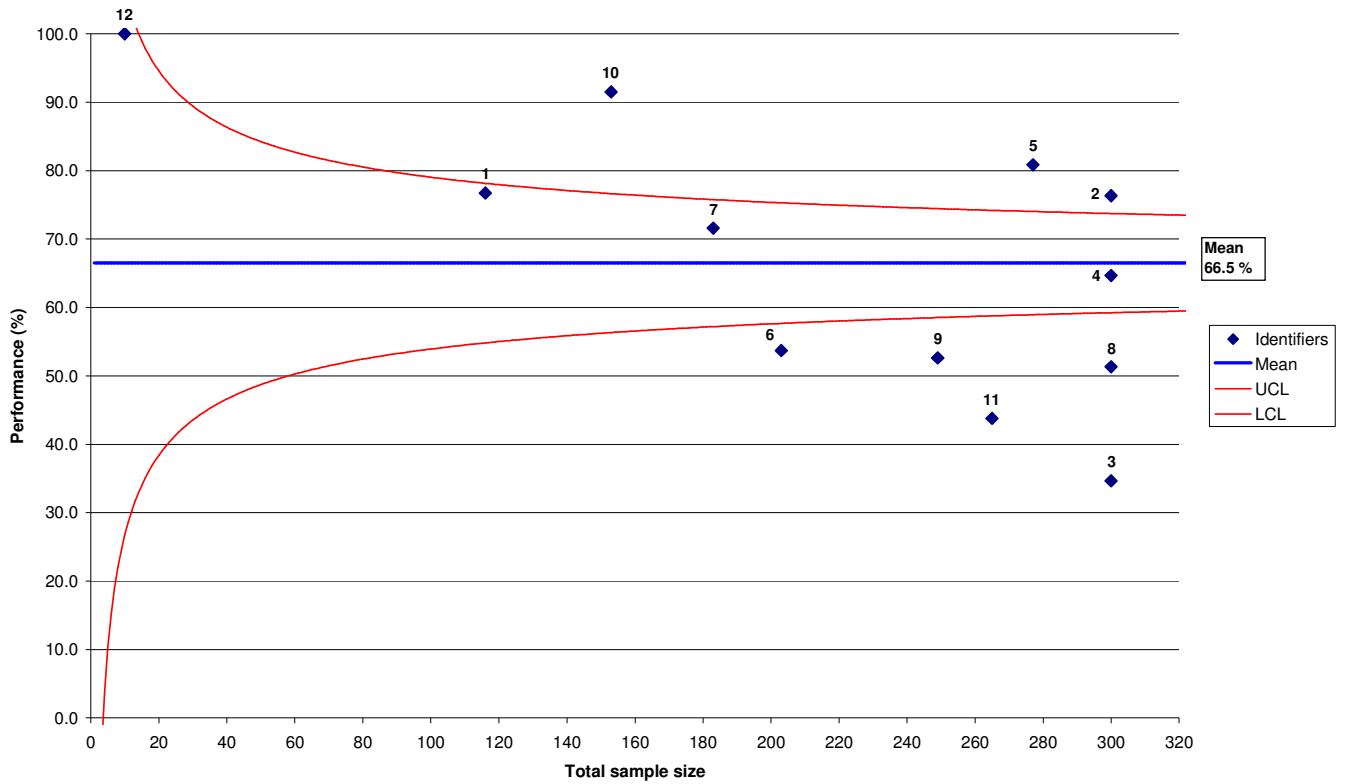
Criterion H3 Treatment for hypoglycaemia recorded (oral carbohydrates, glucagon, IV glucose)



Criterion H3 Treatment for hypoglycaemia recorded (oral carbohydrates, glucagon, IV glucose)

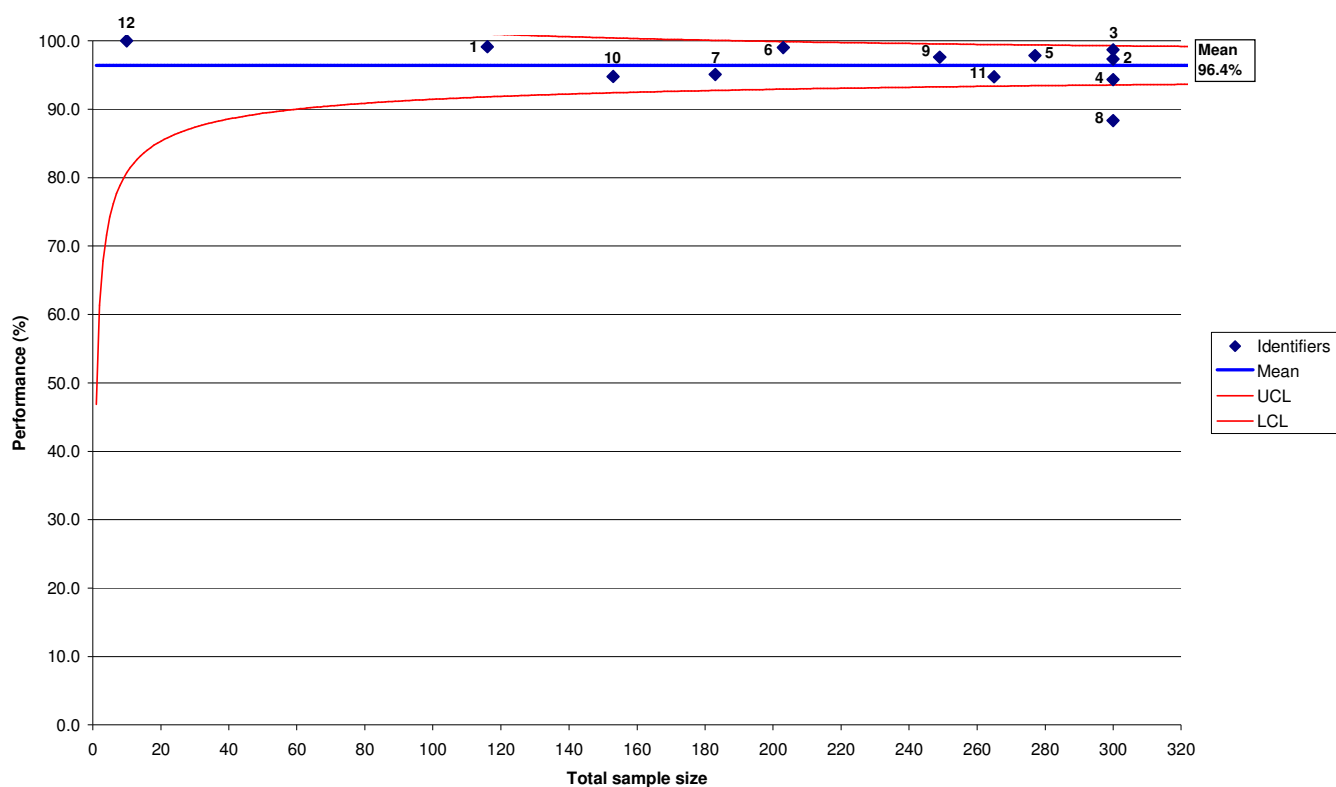
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	116	100.0	100.0	100.0	0	100.0
2	300	98.7	100.0	97.4	3	100.0
3	300	99.7	100.0	99.0	25	99.0
4	300	99.0	100.0	97.9	1	98.3
5	277	99.6	100.0	98.9	1	99.6
6	203	100.0	100.0	100.0	26	100.0
7	183	96.2	99.0	93.4	6	100.0
8	300	93.3	96.2	90.5	11	93.0
9	249	97.6	99.5	95.7	14	99.0
10	153	98.7	100.0	96.9	2	97.7
11	265	98.5	100.0	97.0	3	98.7
12	10	100.0	100.0	100.0	0	90.0

Criterion H4 Direct referral made to an appropriate health professional



Criterion H4 Direct referral made to an appropriate health professional						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	116	76.7	84.4	69.0	57	90.2
2	300	76.3	81.1	71.5	188	79.3
3	300	34.7	40.1	29.3	94	35.3
4	300	64.7	70.1	59.3	158	58.3
5	277	80.9	85.5	76.2	142	98.5
6	203	53.7	60.6	46.8	93	52.3
7	183	71.6	78.1	65.1	85	68.4
8	300	51.3	57.0	45.7	123	43.0
9	249	52.6	58.8	46.4	65	42.1
10	153	91.5	95.9	87.1	118	86.4
11	265	43.8	49.7	37.8	96	57.7
12	10	100.0	100.0	100.0	4	60.0

Criterion HC Care Bundle for Hypoglycaemia (H1 + H2 + H3)



Criterion HC Care Bundle for Hypoglycaemia (H1 + H2 + H3)						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions (included in performance figure)	Performance (%)
1	116	99.1	100.0	97.5	0	98.6
2	300	97.3	99.2	95.5	5	100.0
3	300	98.7	100.0	97.4	27	98.0
4	300	94.3	96.9	91.7	2	90.3
5	277	97.8	99.5	96.1	1	96.3
6	203	99.0	100.0	97.7	31	100.0
7	183	95.1	98.2	91.9	7	95.9
8	300	88.3	92.0	84.7	11	90.7
9	249	97.6	99.5	95.7	16	97.9
10	153	94.8	98.3	91.2	2	94.5
11	265	94.7	97.4	92.0	6	92.0
12	10	100.0	100.0	100.0	0	90.0

## Comparison of Hypoglycaemia criteria means

Criterion	National Mean (%)							
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
Criterion H1 Blood glucose before treatment	98.9	96.9	98.1	98.9	98.8	99.2	98.8	99.5
Criterion H2 Blood glucose after treatment	91.5	95.6	96.8	97.1	93.7	93.7	97.9	97.5
Criterion H3 Treatment for hypoglycaemia recorded	95.0	97.8	97.5	97.3	95.4	98.4	97.9	98.4
Criterion H4 Direct referral made to an appropriate health professional	N/A	N/A	<i>Pilot</i> 63.0	<i>Pilot</i> 60.4	<i>Pilot</i> 59.5	<i>Pilot</i> 64.4	64.3	66.5
Criterion HC Care Bundle for Hypoglycaemia (H1 + H2 + H3)	N/A	N/A	<i>Pilot</i> 92.6	<i>Pilot</i> 92.1	<i>Pilot</i> 90.3	<i>Pilot</i> 92.4	95.4	96.4

## Analysis of exception reporting

Criterion H1 Blood glucose before treatment		
Ambulance service identifier	Total sample size	Number: Patient refusals
1	116	0
2	300	0
3	300	0
4	300	0
5	277	0
6	203	0
7	183	1
8	300	0
9	249	1
10	153	0
11	265	0
12	10	0

Criterion H2 Blood glucose after treatment			
Ambulance service identifier	Total sample size	Patient refusals	Initial BM greater than 5
1	116	0	0
2	300	1	4
3	300	2	25
4	300	1	0
5	277	0	1
6	203	0	5
7	183	0	6
8	300	1	11
9	249	2	8
10	153	0	0
11	265	0	5
12	10	0	0

Criterion H3 Treatment for hypoglycaemia recorded (oral carbohydrates, glucagon, IV glucose)			
Ambulance service identifier	Total sample size	Patient refusals	Initial BM greater than 5
1	116	0	0
2	300	1	2
3	300	0	25
4	300	1	0
5	277	0	1
6	203	0	26
7	183	0	6
8	300	2	9
9	249	1	13
10	153	2	0
11	265	1	2
12	10	0	0

Criterion H4 Direct referral made to an appropriate health professional			
Ambulance service identifier	Total sample size	Transported to hospital	Patient refused referral
1	116	42	15
2	300	85	103
3	300	93	1
4	300	9	149
5	277	134	8
6	203	72	21
7	183	85	0
8	300	98	25
9	249	62	3
10	153	69	49
11	265	93	3
12	10	4	0

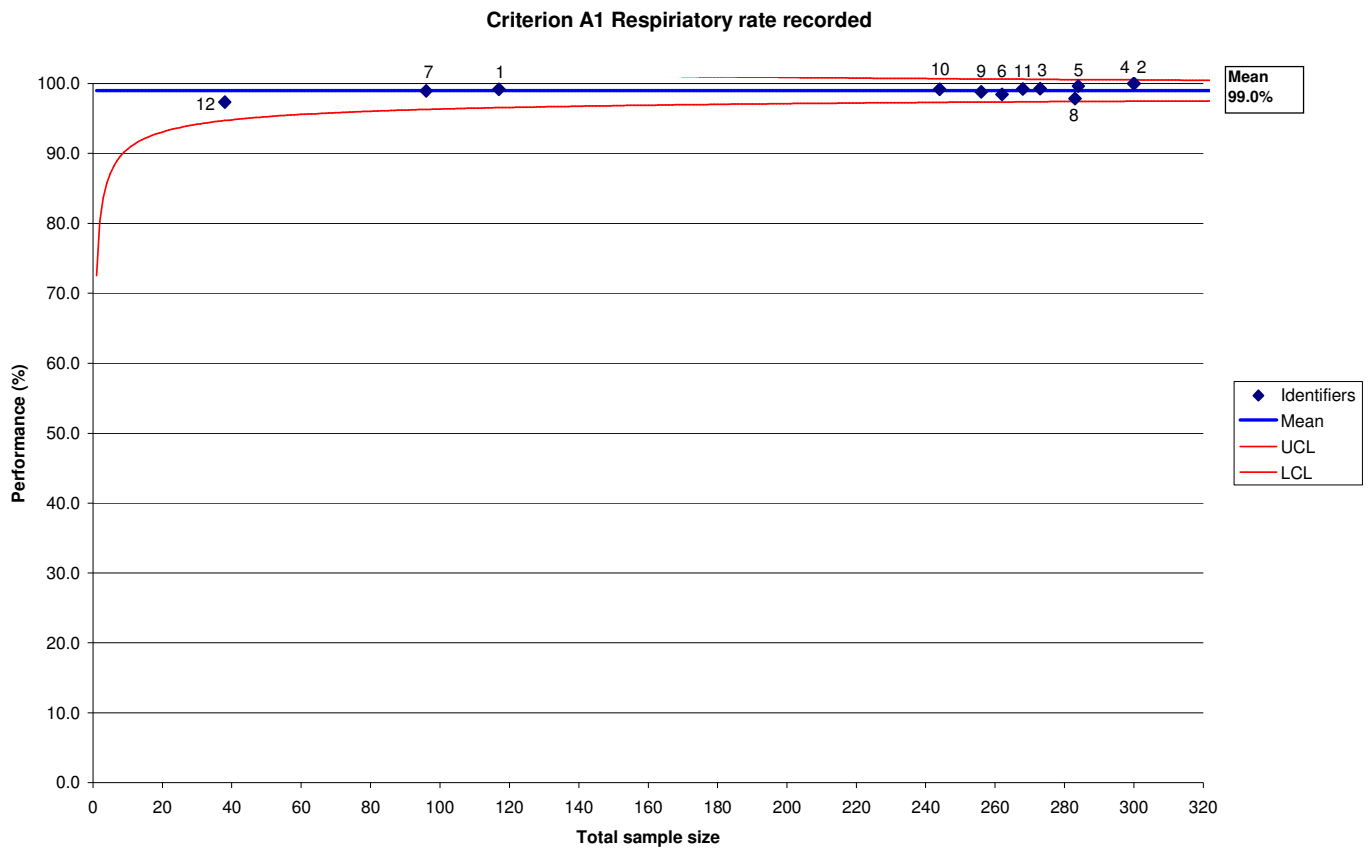
Criterion HC Care Bundle for Hypoglycaemia (H1 + H2 + H3)		
Ambulance service identifier	Total sample size	Exceptions
1	116	0
2	300	5
3	300	27
4	300	2
5	277	1
6	203	31
7	183	7
8	300	11
9	249	16
10	153	2
11	265	6
12	10	0

### Data Collection Method

Ambulance service identifier	Data Collection Method	Whole or part of Trust
1	Manual	Whole
2	Mixed	Whole
3	Scanned	Whole
4	Mixed	Whole
5	Manual	Whole
6	Mixed	Whole
7	Manual	Whole
8	Mixed	Whole
9	Manual	Whole
10	Mixed	Part
11	Mixed	Whole
12	Electronic (ePRF)	Whole

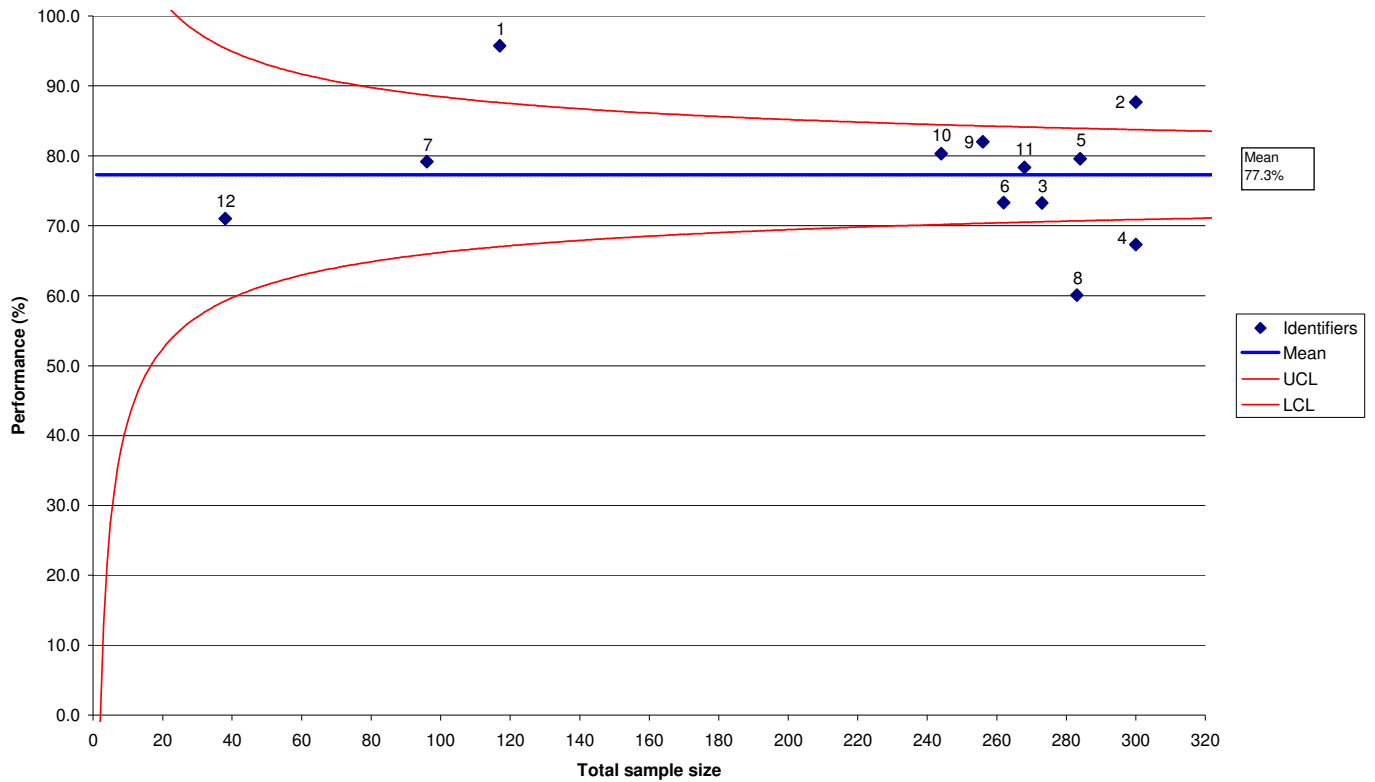


## Asthma (Data collection period: February 2012)



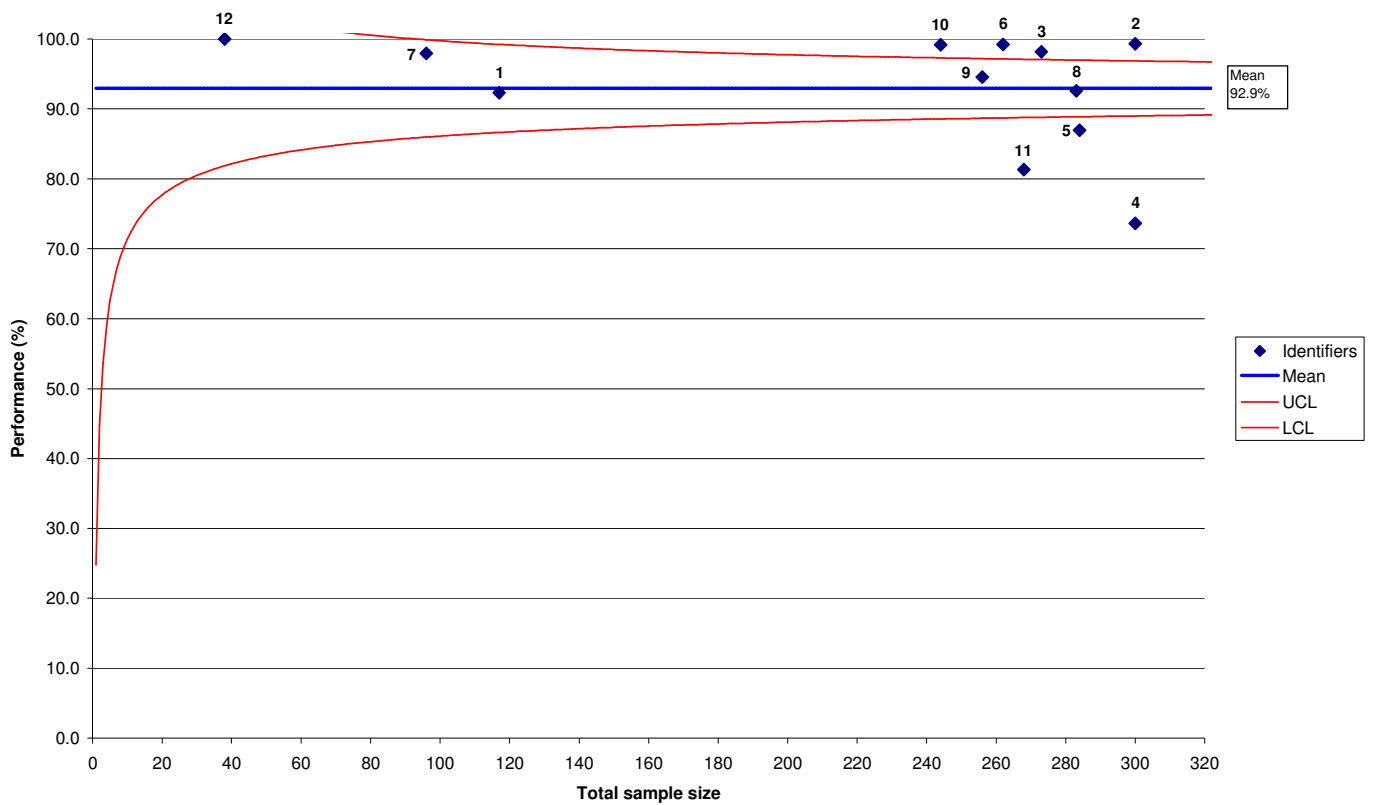
Criterion A1 Respiratory rate recorded						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions	Performance (%)
1	117	99.1	100.0	97.5	0	99.1
2	300	100.0	100.0	100.0	0	100.0
3	273	99.3	100.0	98.3	0	99.6
4	300	100.0	100.0	100.0	0	99.3
5	284	99.6	100.0	99.0	0	99.7
6	262	98.5	100.0	97.0	0	98.5
7	96	99.0	100.0	96.9	0	99.0
8	283	97.9	99.6	96.2	0	96.7
9	256	98.8	100.0	97.5	0	98.5
10	244	99.2	100.0	98.0	0	99.0
11	268	99.3	100.0	98.2	0	99.3
12	38	97.4	100.0	92.3	0	100.0

Criterion A2 PEFR recorded (before treatment)



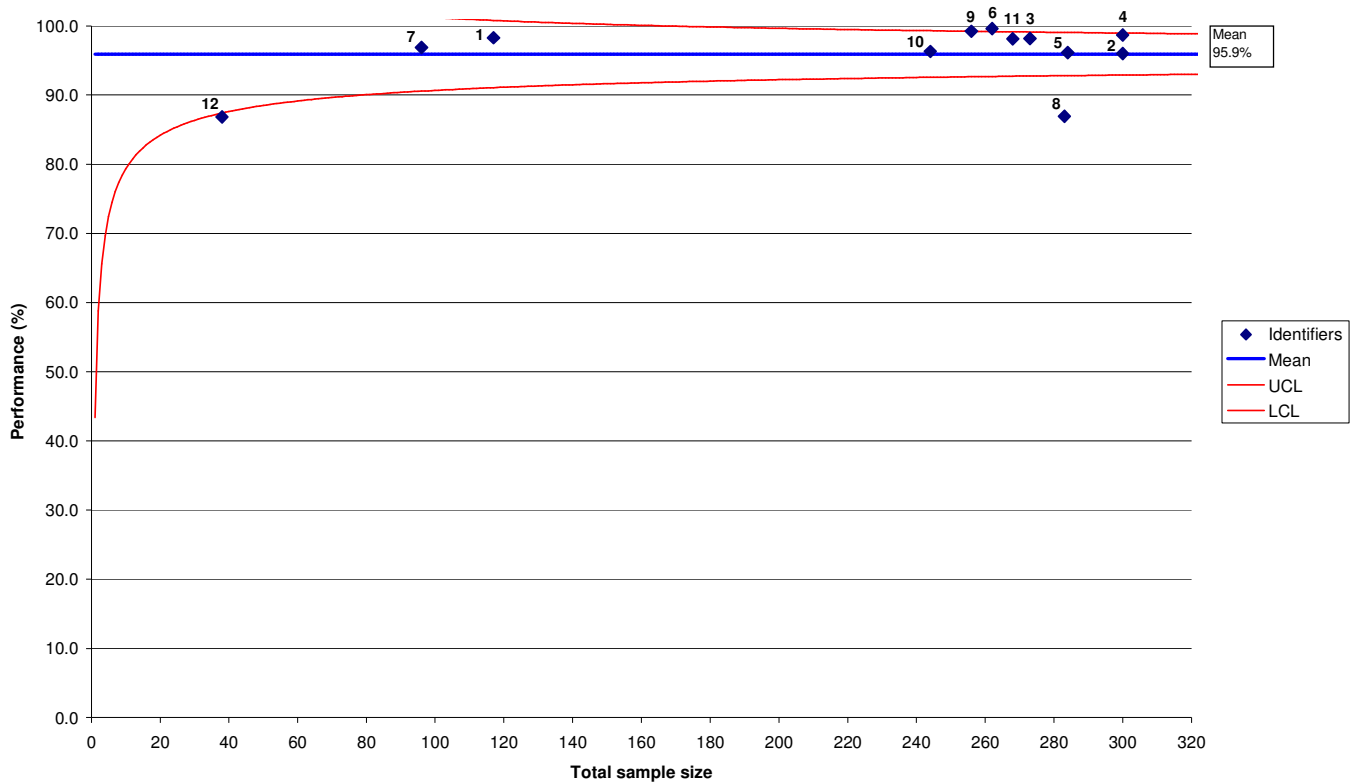
Criterion A2 PEFR recorded (before treatment)						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions	Performance (%)
1	117	95.7	99.4	92.1	53	97.2
2	300	87.7	91.4	83.9	133	94.0
3	273	73.3	78.5	68.0	120	78.0
4	300	67.3	72.6	62.0	102	71.7
5	284	79.6	84.3	74.9	139	84.3
6	262	73.3	78.6	67.9	38	82.4
7	96	79.2	87.3	71.0	67	61.3
8	283	60.1	65.8	54.4	88	66.0
9	256	82.0	86.7	77.3	71	73.7
10	244	80.3	85.3	75.3	100	84.8
11	268	78.4	83.3	73.4	88	84.0
12	38	71.1	85.5	56.6	15	66.7

Criterion A3 SpO2 recorded (before treatment)



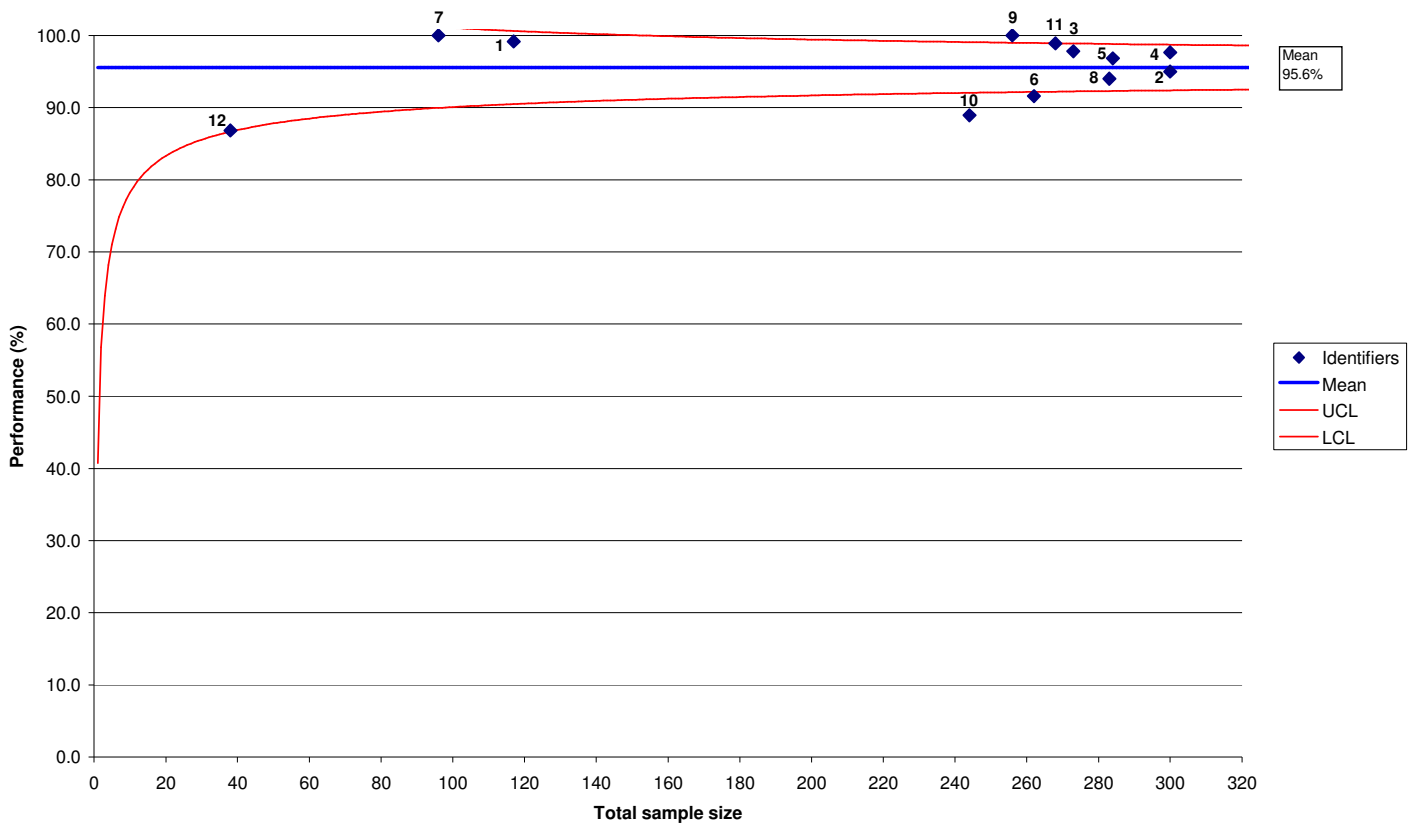
Criterion A3 SpO2 recorded (before treatment)						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions	Performance (%)
1	117	92.3	97.1	87.5	2	88.0
2	300	99.3	100.0	98.4	0	97.3
3	273	98.2	99.8	96.6	0	98.5
4	300	73.7	78.7	68.7	1	74.0
5	284	87.0	90.9	83.1	0	90.9
6	262	99.2	100.0	98.2	2	97.1
7	96	97.9	100.0	95.1	1	100.0
8	283	92.6	95.6	89.5	1	90.3
9	256	94.5	97.3	91.7	0	89.8
10	244	99.2	100.0	98.0	3	100.0
11	268	81.3	86.0	76.7	0	87.0
12	38	100.0	100.0	100.0	0	100.0

Criterion A4 Beta-2 agonist recorded



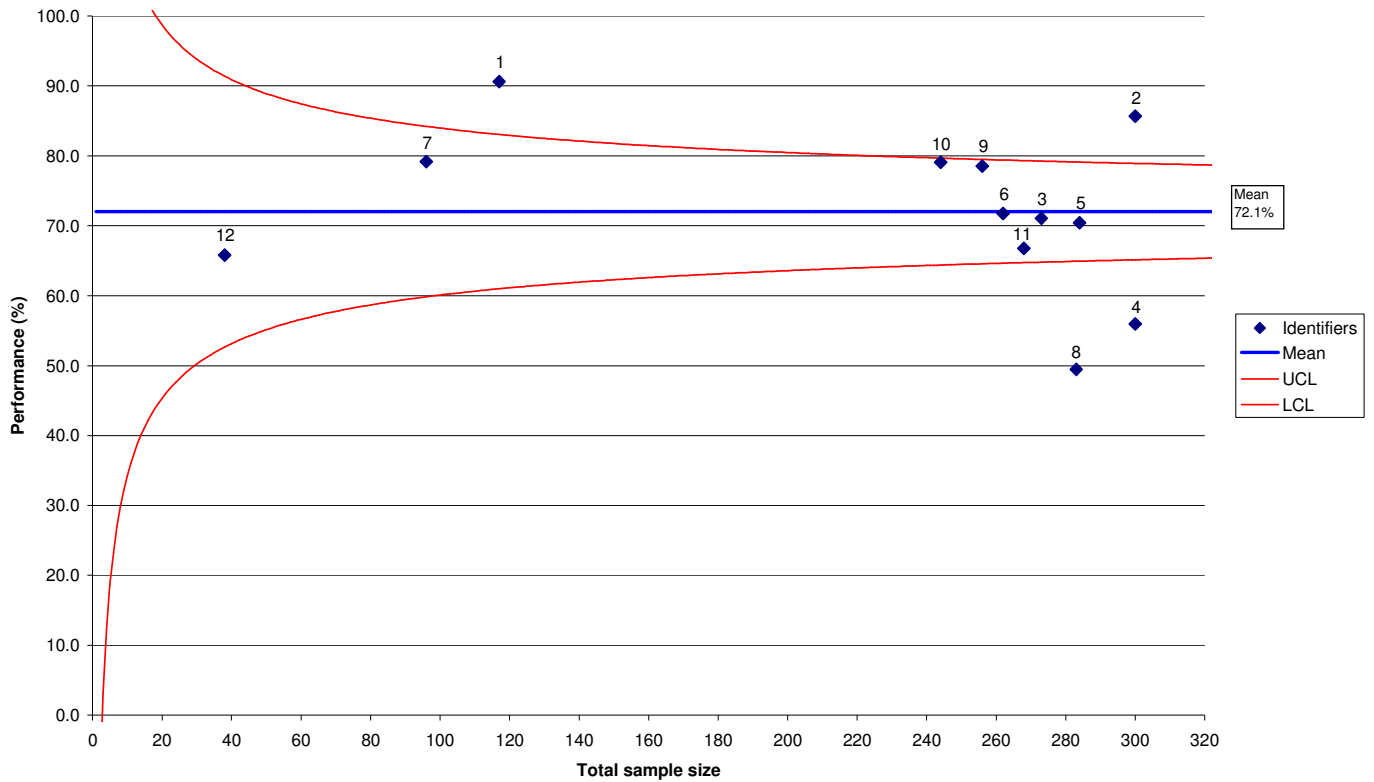
Criterion A4 Beta-2 agonist recorded						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions	Performance (%)
1	117	98.3	100.0	95.9	0	100.0
2	300	96.0	98.2	93.8	1	99.3
3	273	98.2	99.8	96.6	14	99.6
4	300	98.7	100.0	97.4	16	97.7
5	284	96.1	98.4	93.9	4	93.4
6	262	99.6	100.0	98.9	1	97.1
7	96	96.9	100.0	93.4	6	100.0
8	283	86.9	90.9	83.0	0	93.0
9	256	99.2	100.0	98.1	0	98.5
10	244	96.3	98.7	93.9	8	97.5
11	268	98.1	99.8	96.5	14	97.0
12	38	86.8	97.6	76.1	0	86.7

Criterion A5 Oxygen administered



Criterion A5 Oxygen administered						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions	Performance (%)
1	117	99.1	100.0	97.5	0	99.1
2	300	95.0	97.5	92.5	1	99.3
3	273	97.8	99.5	96.1	19	97.7
4	300	97.7	99.4	96.0	24	99.0
5	284	96.8	98.9	94.8	9	95.8
6	262	91.6	95.0	88.2	48	91.9
7	96	100.0	100.0	100.0	11	100.0
8	283	94.0	96.8	91.2	25	98.0
9	256	100.0	100.0	100.0	4	99.0
10	244	88.9	92.9	85.0	4	84.3
11	268	98.9	100.0	97.6	19	99.3
12	38	86.8	97.6	76.1	0	86.7

Criterion AC Care bundle for asthma (A1 + A2 + A3 + A4)



Criterion AC Care bundle for asthma (A1 + A2 + A3 + A4)						
Cycle 8						Comparison Cycle 7
Ambulance service identifier	Total sample size	Performance (%)	Upper 95% CI	Lower 95% CI	Total Exceptions	Performance (%)
1	117	90.6	95.9	85.3	51	93.5
2	300	85.7	89.6	81.7	133	90.7
3	273	71.1	76.4	65.7	131	75.3
4	300	56.3	61.9	50.7	92	54.3
5	284	70.4	75.7	65.1	116	76.7
6	262	71.8	77.2	66.3	37	78.7
7	96	79.2	87.3	71.0	67	60.3
8	283	49.5	55.3	43.6	72	56.3
9	256	78.5	83.5	73.5	64	65.4
10	244	79.1	84.2	74.0	99	83.2
11	268	66.8	72.4	61.2	69	74.3
12	38	65.8	80.9	50.7	15	60.0

## Comparison of Asthma criteria means

Criterion	National Mean (%)							
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Cycle 8
A1 Respiratory rate recorded	96.0	96.8	98.0	98.5	97.4	97.3	99.1	99.0
A2 PEFR recorded (before treatment)	49.4	46.5	52.4	59.0	67.2	70.4	78.7	77.3
A3 SpO2 recorded (before treatment)	80.9	85.2	88.6	90.8	92.8	94.8	92.7	92.9
A4 Beta-2 agonist recorded	93.2	93.7	91.8	96.0	96.1	94.0	96.6	95.9
A5 Oxygen administered	89.1	89.0	89.5	93.4	93.7	95.8	95.8	95.6
AC Care bundle for asthma (A1 + A2 + A3 + A4)	N/A	N/A	49.0	56.0	61.9	65.0	72.4	72.1

(N/A = cycles not comparable or not collected in cycles 1/2)

There has been an increase in the national means across all criteria over the seven cycles; the greatest improvement has been in the mean for PEFR before treatment.

## Analysis of asthma exception reporting

Criterion A2 PEFR recorded (before treatment)						
Ambulance service identifier	Total sample size	Patient refusal	Patient unable	Patient unconscious	Patient does not understand	Patient under 5 years old
1	117	4	39	0	0	10
2	300	1	116	0	1	15
3	273	5	85	5	1	24
4	300	10	71	0	5	16
5	284	12	105	0	4	18
6	262	7	16	1	1	13
7	96	0	54	1	0	12
8	283	2	64	1	2	19
9	256	9	47	2	0	13
10	244	5	91	0	1	3
11	268	7	66	0	0	15
12	38	0	15	0	0	0

Criterion A3 SpO2 recorded (before treatment)		
Ambulance service identifier	Total sample size	Patient refusals
1	117	2
2	300	0
3	273	0
4	300	1
5	284	0
6	262	2
7	96	1
8	283	1
9	256	0
10	244	3
11	268	0
12	38	0

Criterion A4 Beta-2 agonist recorded			
Ambulance service identifier	Total sample size	Patient refusals	Contra-indication to drug (specified)
1	117	0	0
2	300	1	0
3	273	0	14
4	300	1	15
5	284	3	1
6	262	1	0
7	96	0	6
8	283	0	0
9	256	0	0
10	244	2	6
11	268	1	13
12	38	0	0

Criterion A5 Oxygen administered			
Ambulance service identifier	Total sample size	Patient refusals	Contraindication to drugs (specified)
1	117	0	0
2	300	1	0
3	273	0	19
4	300	0	24
5	284	0	9
6	262	2	46
7	96	0	11
8	283	0	25
9	256	0	4
10	244	2	2
11	268	1	18
12	38	0	0

Criterion AC Care bundle for asthma (A1 + A2 + A3 + A4)		
Ambulance service identifier	Total sample size	Exceptions
1	117	51
2	300	133
3	273	131
4	300	92
5	284	116
6	262	37
7	96	67
8	283	72
9	256	64
10	244	99
11	268	69
12	38	15

### Data collection method for asthma

Ambulance service identifier	Data Collection Method	Whole or part of Trust
1	Manual	Whole
2	Mixed	Whole
3	Scanned	Yes
4	Manual	Whole
5	Mixed	Whole
6	Mixed	Whole
7	Manual	Whole
8	Mixed	Whole
9	Manual	Whole
10	Mixed	Part
11	Mixed	Whole
12	Electronic (ePRF)	Whole

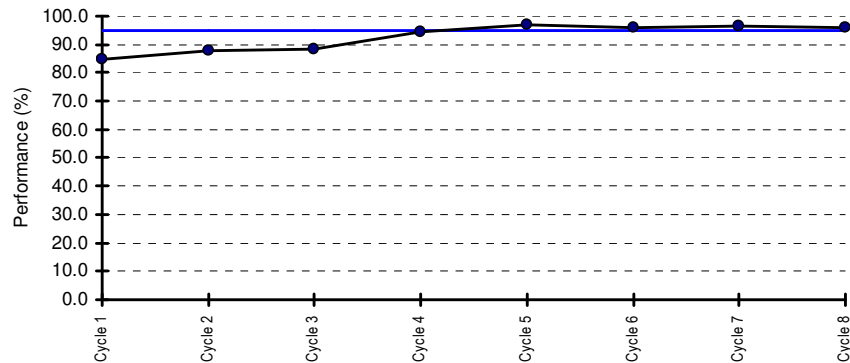


## Cycle means comparison run charts

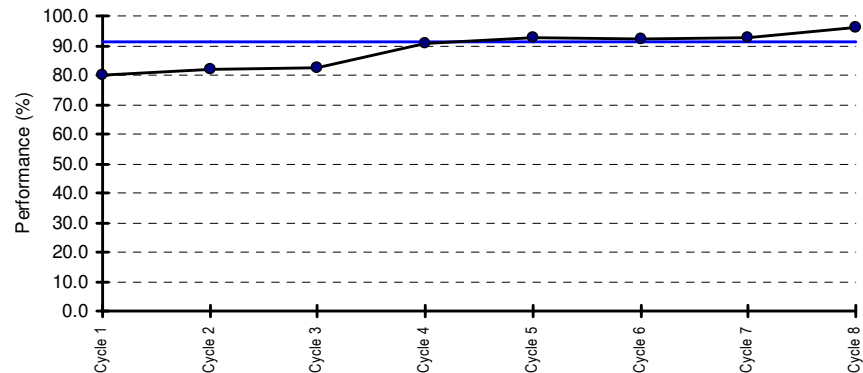
2.15 The following run charts show the national means for each criterion over the 8 cycles undertaken so far. The information has been displayed using run charts rather than control charts as there is no comparison baseline and, due to QI work being undertaken by Trusts, the processes measured are not necessarily stable. The centre lines on the charts show the median (rather than the mean as used in control charts). There are not yet enough data points to draw firm conclusions about whether the charts are displaying real, sustained improvement or common cause variation but the data are encouraging, suggesting that the work being undertaken is having a positive effect on most indicators. The chart for M5 Analgesia Given shows an upward trend of 7 data points

## STEMI

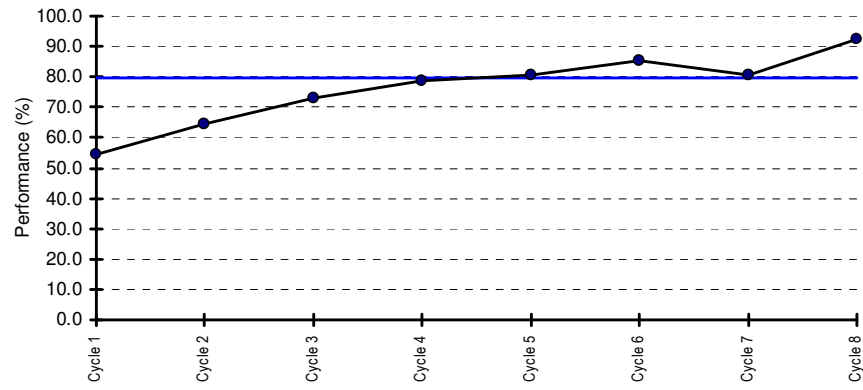
M1 Aspirin



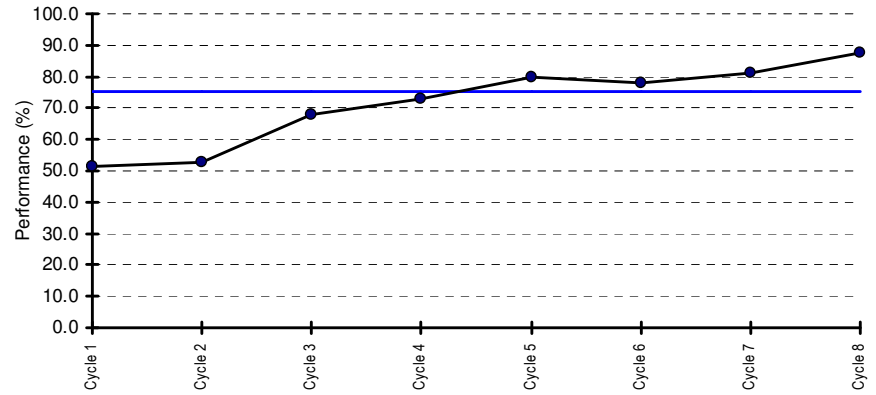
M2 GTN



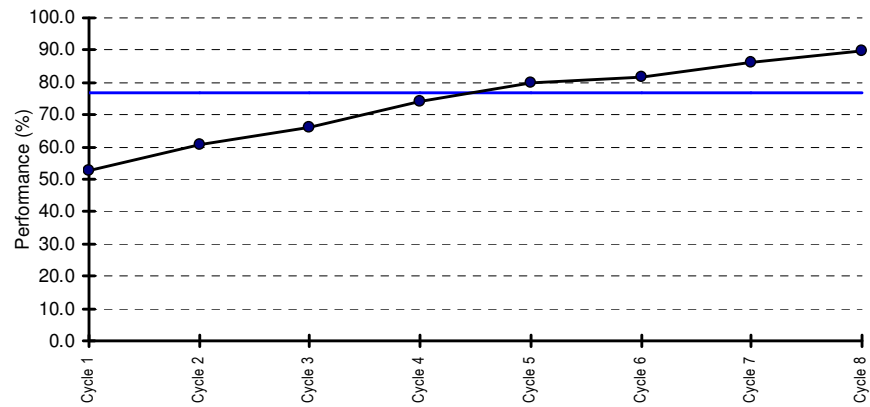
M3 Two pain Scores recorded



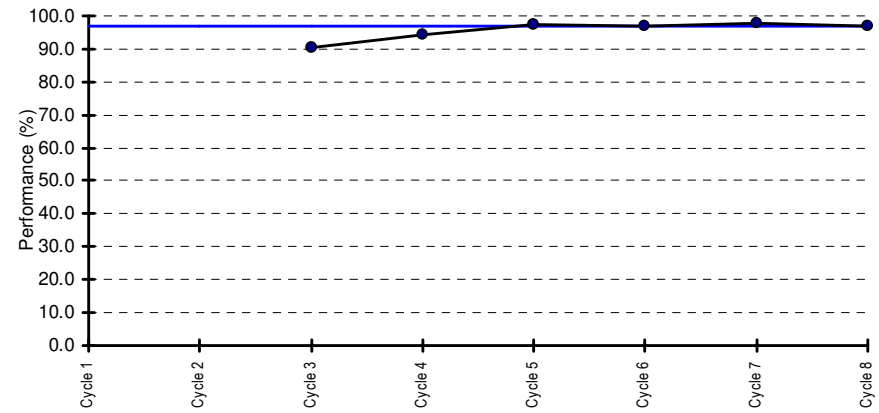
M4 Morphine Given



M5 Analgesia given

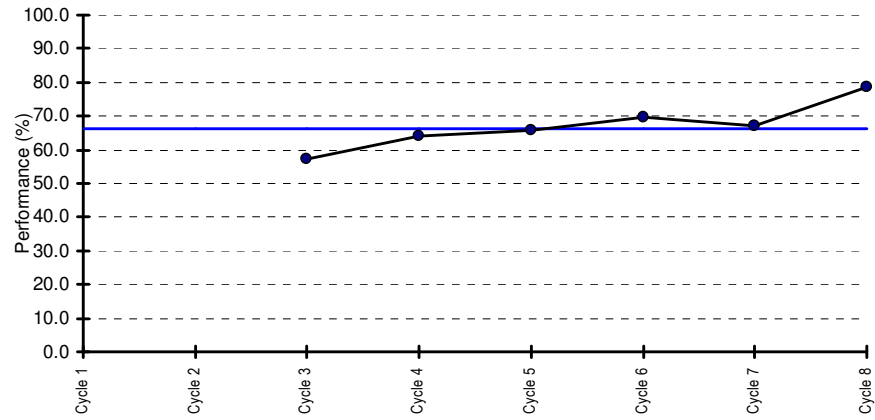


M6 SPO2 recorded



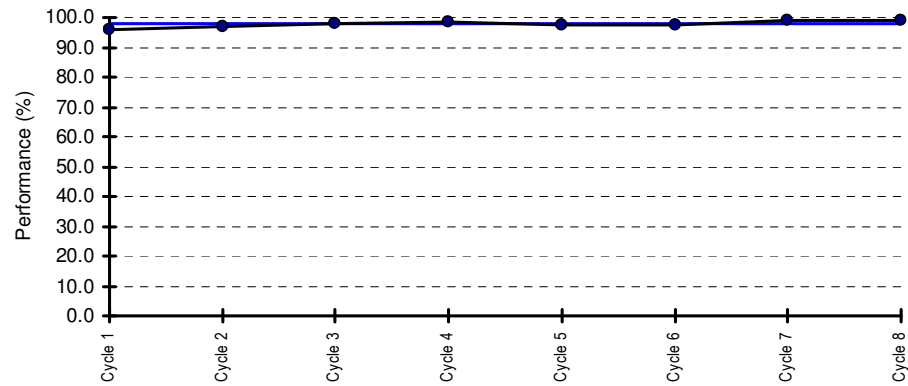
(M5 upward trend of 8 data points)

MC Care Bundle for STEMI (M1+M2+M3+M5)

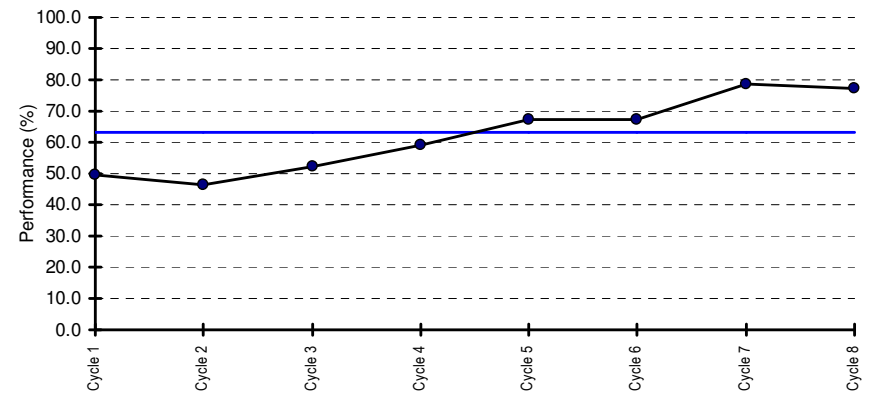


## Asthma

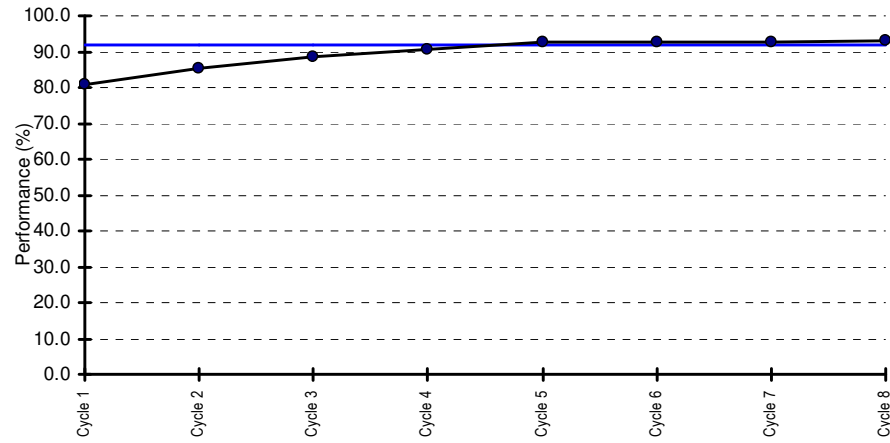
A1 Respiratory rate recorded



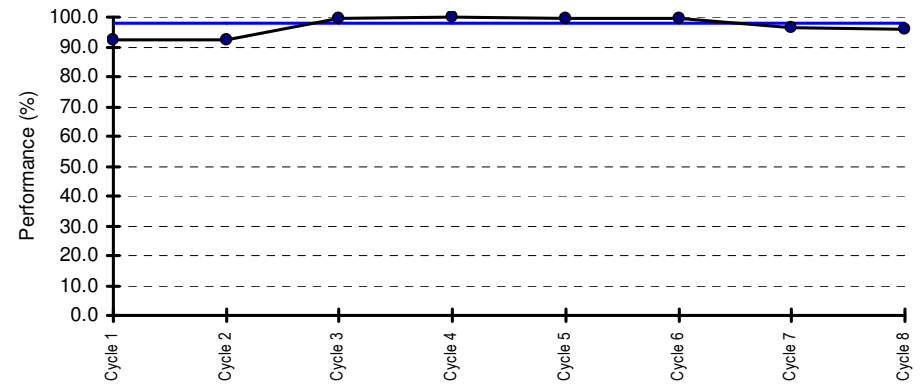
A2 PEFR recorded (before treatment)



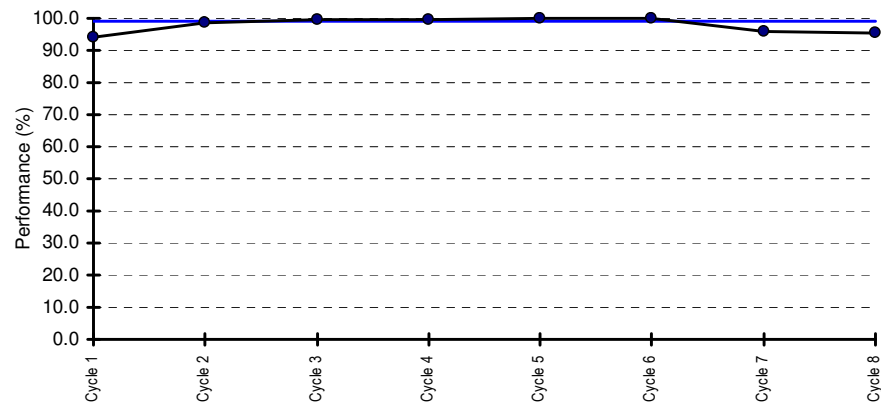
A3 SpO2 recorded (before treatment)



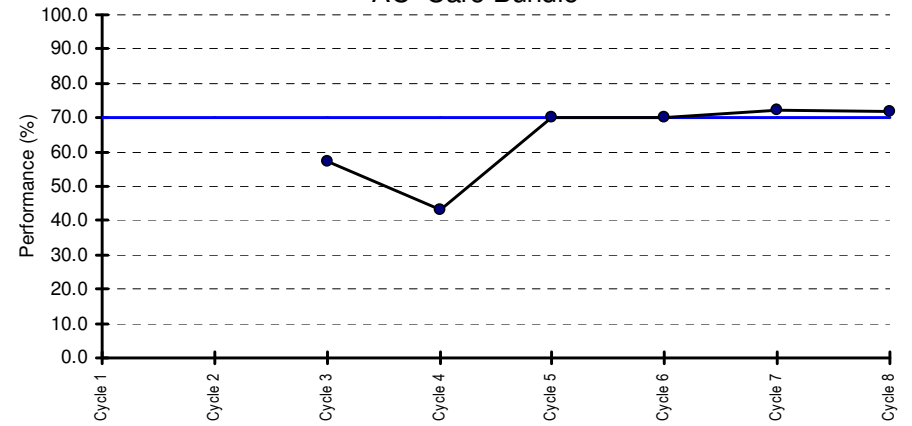
A4 Beta-2 agonist recorded



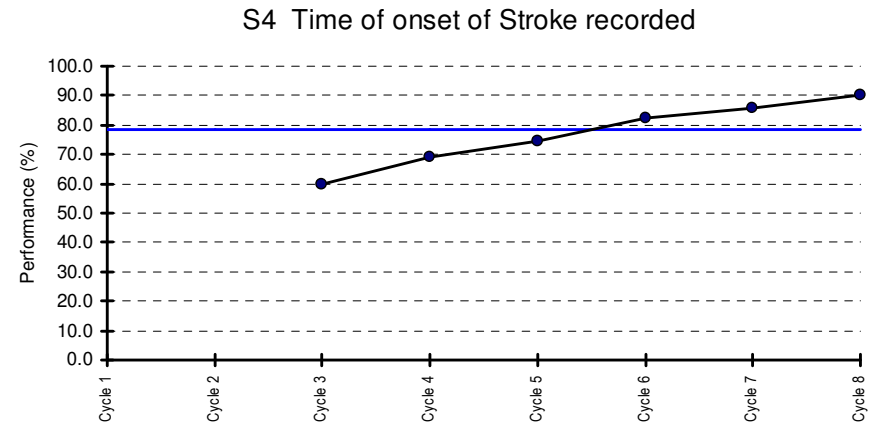
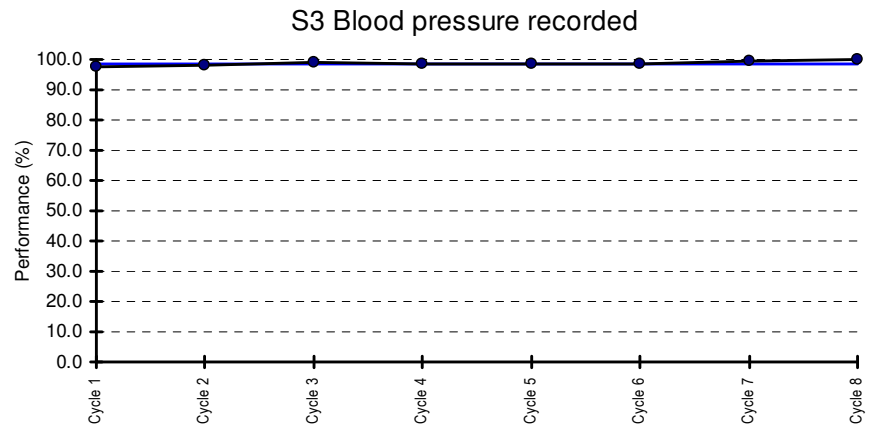
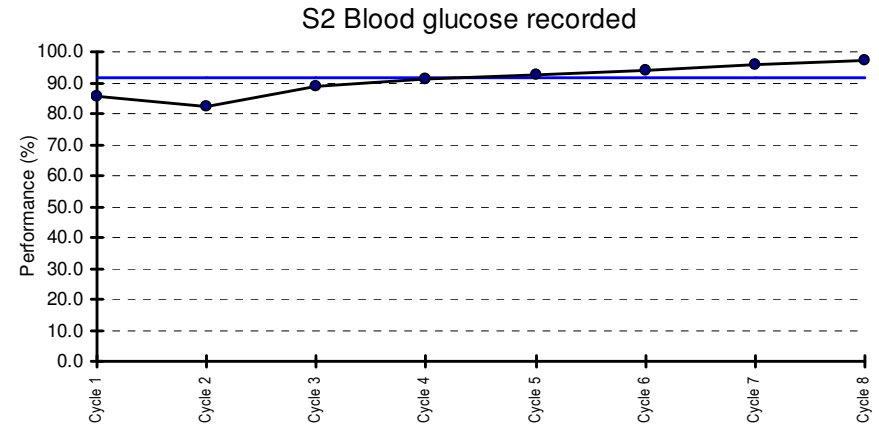
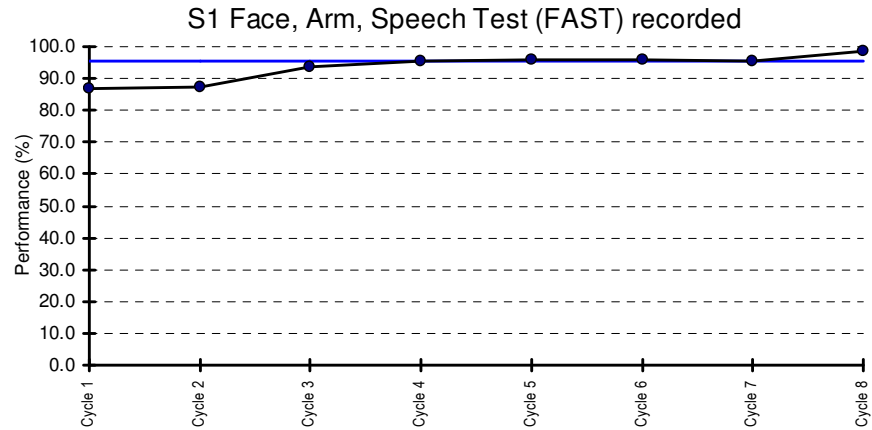
A5 Oxygen Administered



AC Care Bundle

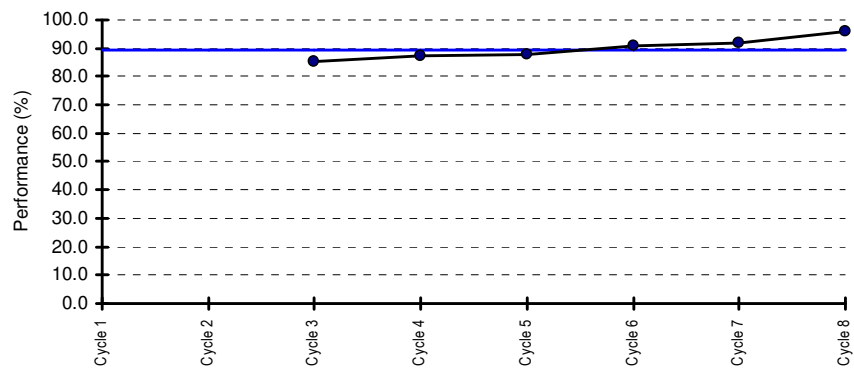


## Stroke



(S4 upward trend of 6 data points)

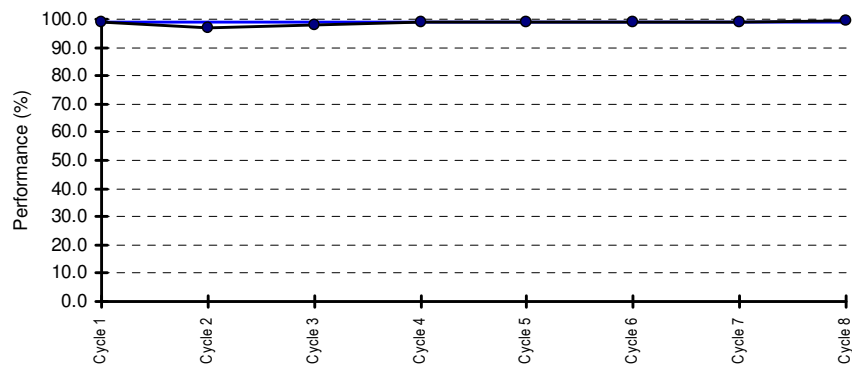
### SC Care bundle for stroke (S1+S2+S3)



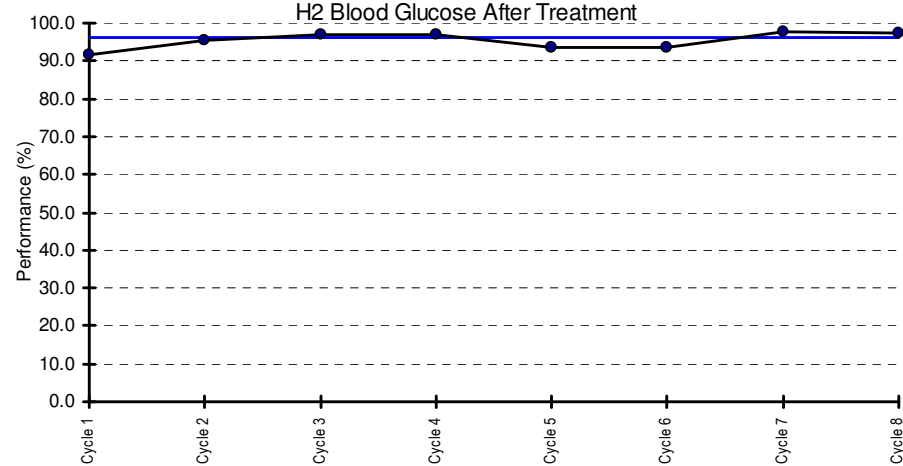
(SC upward trend of 6 data points)

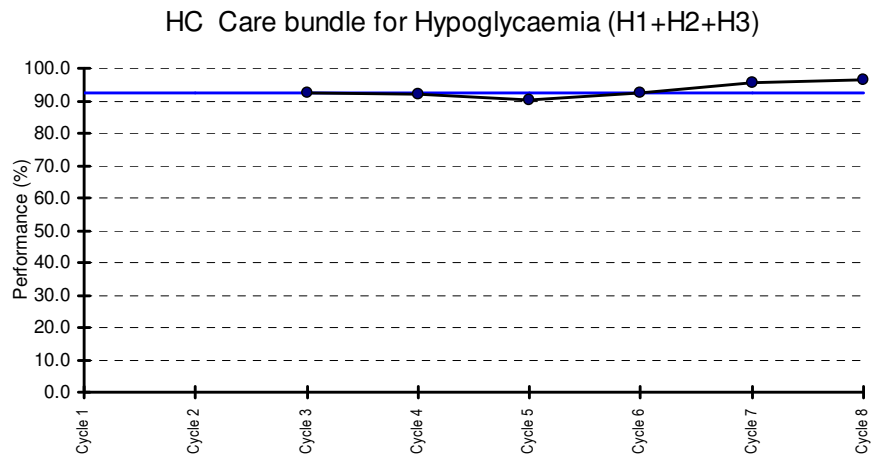
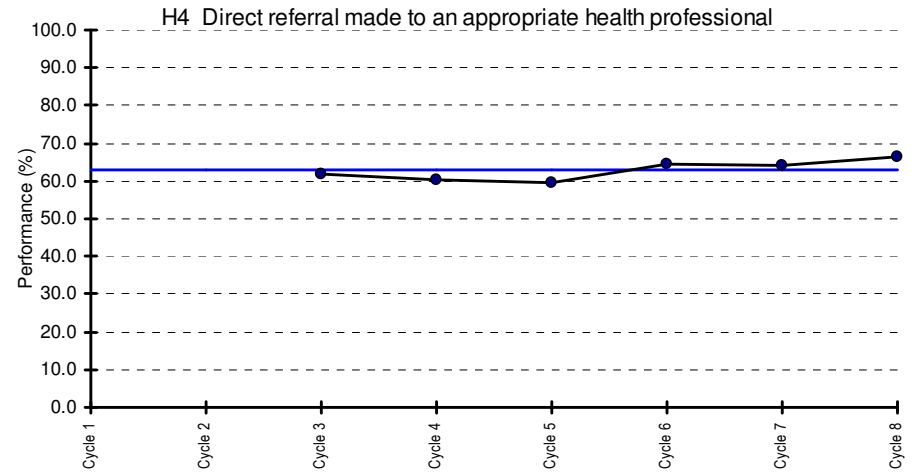
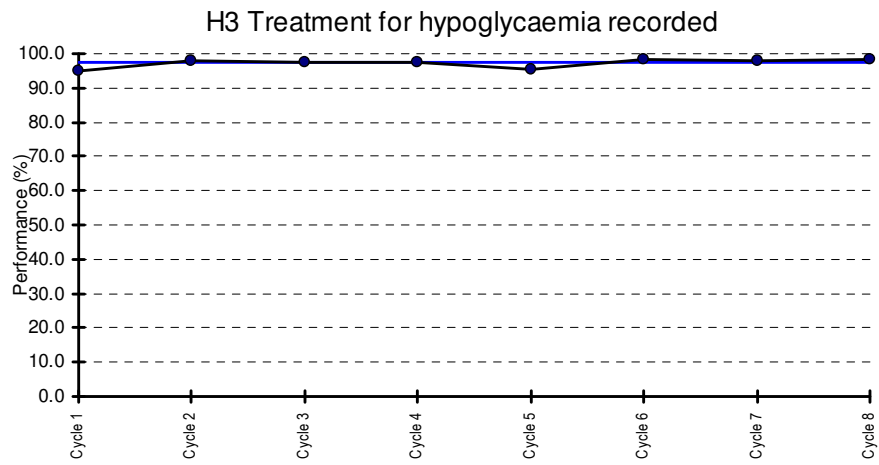
### Hypoglycaemia

#### H1 Blood Glucose before Treatment Recorded



#### H2 Blood Glucose After Treatment





## Quality improvement (QI) activity

- 2.16 This section reports on QI activity carried out since the previous cycle report to the end of the cycle 8 reporting period.
- 2.17 Five Trusts provided feedback on the QI activities and initiatives they had undertaken.

## Generic quality improvement activity

### 2.17.1 Trust 1

No quality improvement information supplied.

### Trust 2

The Trust continues to focus on improving patient care through the Clinical Performance Indicators. The Trust monitors the performance against the CPIs on a monthly basis, through this process all cases are clinically validated by the Head of Cardiac and Stroke Management. The results are published on the Trusts intranet site and are specifically sent to the Clinical Practice and Governance Managers (CPGMs) or each of the five operational areas. The CPGMs of the Trust then review their areas performance and develop local action plans. The Trust operates a clinical supervision programme which includes a section on the CPIs, this includes discussion and awareness raising of the CPIs and the rationale around each topic. There have also been posters developed which specifically raise awareness of CPIs for display on stations. Articles have been developed which have been published in the Trust's Weekly Briefing and Quarterly Clinical Times which are internal workforce communication documents.

### Trust 3

No quality improvement information supplied.

### Trust 4

No generic quality improvement information supplied.

### Trust 5

A series of activities are being carried out in order to raise awareness of the importance and detail around CPIs and to improve documentation of care given. These include the development of a CPD event programme, regular CPI updates, letters to staff highlighting the importance of CPI/PRF documentation and shortfalls in care bundles, Posters on all stations giving guidance on PRF completion CPI awareness/promotion posters on all stations, training departments and standby points. A web package relating to the CPIs which provides links to e-learning, research and case studies has been developed and work is being carried out with a clinical pathways advisor to ensure pathways linked with CPIs are available on the website. Random audits of PRFs are also carried out on stations.

### Trust 6

No quality improvement information supplied.



### Trust 7

In June 2011 a Quality Improvement Officer (QIO) was appointed to give feedback to staff who were non-compliant in delivery of care. The process for feedback of CPI results to operational management was refined to create greater collaboration between the Clinical and Operational directorates.

### Trust 8

No quality improvement information supplied.

### Trust 9

A poster setting out the care bundles for all CPI conditions was produced and put in every operational vehicle. From September 2011 the Research and Audit Manager attends Clinical Service Operational meetings to further publicise the individual CPIs.

### Trust 10

From November 2011, team leaders were tasked with challenging staff when patient report forms (PRFs) were not fully completed or demonstrated a lack of accuracy with no justification. At the same time senior paramedics were given the task of checking the compliance against aspects of care at individual stations. Spot check audits were carried out on the quality of PRF completion and feedback given to individual crews. In December a poster presentation was distributed aimed at encouraging 'good in-putting' of audit data and appropriate claims for exceptions.

### Trust 11

A lot of work has been carried out around raising awareness of best practice. In October 2011 all staff in one division were issued with pocket sized CPI prompt cards whilst staff in a second division received an 'Understanding CPIs' leaflet by email. A local audit of patient records identified recording of pain scores to be an area which needed attention. Staff were provided with a report on the findings of the audit which were linked to information on good practice and the CPIs. Laminated signs setting out CPIs were also strategically put up on lavatory doors on stations within the division and make ready crews put CPI stickers in the rear of every vehicle. CPIs are emphasised to line managers on a regular basis to ensure that they are discussed during clinical supervision.

A check of pulse oximeters was carried out across the Trust. This led to a new system of storage of spare parts, ie ensuring they are easily accessible to crews when needed, and introduction of clear local process following failure of a pulse oximeter

### Trust 12

No quality improvement information supplied.

## **STEMI specific quality improvement activity**

### 2.17.2 Trust 1

No quality improvement information supplied.

## Trust 2

The Assessment and Management of STEMI continues to remain a high level of focus within the Trust. The Trust has continued to promote the work following on from the ASCQI project and has held events on the Management of STEMI and ECG Seminars.

Articles have been developed which have been published in the Trust's Weekly Briefing and Quarterly Clinical Times which are internal workforce communication documents

## Trust 3

No quality improvement information supplied.

## Trust 4

On 23 September 2011 an Ambulance Service Cardiovascular Quality Initiative (ASCQI) launch day was held at the host Complex which was used to highlight care bundles and appropriate documentation of exceptions. The event was also used as an opportunity to deliver an ECG training session. The project was also detailed in the September edition of the Trust's clinical newsletter to raise awareness of the project and its aim to improve care to STEMI patients. On 24 October ASCQI pages on the Trust intranet went 'live'. These pages include information about the project aims, targets and future plans.

## Trust 5

Quality initiatives around the management of STEMI patients have continued and individual clinician participation in quality improvement has also been encouraged. CPD events around ECG training, awareness and education have also been promoted

## Trust 6

No quality improvement information supplied.

## Trust 7

From June 2011, care bundles for STEMI were promoted through posters on stations and A5 inserts for personal issue JRCALC protocol books were forwarded to all operational staff as an aide memoire. These inserts also focussed on pain scores.

In July 2011 The Quality Improvement Officer met with Team Leaders in one area to discuss clinical audit and quality improvement activity, and to reiterate the care bundle elements and the updates to clinical guidelines for STEMI.

The CPI sample of PRFs from January was further reviewed to confirm whether poor documentation was more prevalent in the paper PRFs or the e-PRFs; the ePRF demonstrated an improvement in documentation over paper PRFs.

The Clinical Audit Manager now highlights non-compliant PRFs to the Quality Improvement Officer (QIO) who manages a 'Feedback Log' which is distributed to all Operational Managers. Individuals receive one to one feedback from their team leader who then returns a feedback form to the QIO to confirm reflection has taken place.

## Trust 8

No quality improvement information supplied.

### Trust 9

Information regarding STEMI care bundle delivery was sent out to staff by the ASCQI Quality Improvement Fellow and a STEMI workshop was held during August 2011 with a second arranged for January 2012. An article about ASCQI which highlighted the STEMI care bundle was included in the weekly Chief Executive's bulletin.

### Trust 10

During May to October 2011 awareness/educational material was placed on station CPI notice boards to introduce the changes to the cardiac chest pain matrix. PPCI awareness sessions were delivered by a Cardiac Nurse Specialist as part of a CPD event on 31st May and further drop-in sessions were held in October. The Advanced Paramedic team in one area circulated local PPCI pathways to crews working cross-border. Education sessions regarding early use of pain relief (Entonox if EMT crew & Entonox & Morphine for Paramedics) were carried out.

In August 2011 posters and emails were sent to Senior Paramedics and Assistant Operational Managers to encourage them to monitor PRFs and challenge individual staff and taking the opportunity to explain exceptions which could be documented. If no reason for non-compliance was found then any educational needs were to be addressed and future practices monitored. Where there was evidence of patient refusal, advice was to be given to empower staff in explaining the benefits of treatment to patients and to encourage full documentation on PRF to that effect. A mail shot was sent out regarding oxygen guidelines and promoting PRF completion when pain was relieved following the administration of Nitrates & oxygen. Reminders were also sent to staff that where oxygen saturation levels were between 94-98% then oxygen was not indicated and should be recorded as an exception. Staff were also reminded of the importance of recording pre and post analgesia pain scores regardless of journey time. Staff were directed to a pain management handbook to assist with accurate pain scoring. An awareness session on CPI recording using Siren ECS was to be arranged.

In October the drop in performance for the care bundle was noted to have coincided with the metric change from Stemi to cardiac chest pain. This was discussed and raised at the Advanced Paramedic meeting to incorporate the changes into quality improvement efforts. Staff were reminded via email of the treatment acronym MONA - Morphine, Oxygen, Nitrates, Aspirin, in addition to the hospital pre alert for a complete care bundle. A monthly CPI splash, incorporating good practice and sharing with staff across the Trust, was developed and is now incorporated Trust wide. Newly appointed Senior Paramedics were tasked with ensuring that staff comply with CPIs in an effort to improve individual station performances. Posters were created to remind staff to document analgesia, pain scores and pre-alert and efforts were made to ensure staff were fully competent at managing cardiac related chest pain, including 12 lead ECG recognition and pain management therapy. This work is ongoing.

### Trust 11

In November one hospital was asked to prompt crews to document pain scores before handover if a second pain score had not been recorded.

### Trust 12

No quality improvement information supplied.

## Stroke specific quality improvement activity

### 2.17.3 Trust 1

No quality improvement information supplied.

### Trust 2

The Trust has focused its efforts on improving the documentation of onset of symptom times where known. The Trust has published a number of articles within its internal communication documents in regards to this and has seen performance remain consistent throughout the year.

### Trust 3

No quality improvement information supplied.

### Trust 4

An ASCQI launch day held on 23 September 2011 included a presentation from a team from the local Hyper Acute Stroke Unit (HASU).

### Trust 5

CPD events for staff have been offered, promoting education and awareness. Care bundle exceptions have also been highlighted and communicated to the clinical management structure. These have been followed through and discussed further with staff.

### Trust 6

No quality improvement information supplied.

### Trust 7

In January 2012, the proportion of paper and e-PRFs where BM was not documented was checked to see whether the rate was higher in e-PRF documents. It was confirmed that performance was the same for both styles of PRF.

### Trust 8

No quality improvement information supplied.

### Trust 9

No specific information for this indicator provided.

### Trust 10

During September 2011, to ensure smooth cross-border working, Advanced Paramedics (APs) working on the Trust border liaised with APs in the neighbouring Trust to circulate local stroke pathways and local knowledge of Stroke centres. In November, Advanced Paramedics were tasked with ensuring that crews were passing pre alerts to hospital and documenting this. Senior paramedics were asked to reiterate the documentation of time of onset where this was witnessed or document 'unknown' where the onset was not witnessed and the patient unable to indicate the time. A communications programme to raise staff awareness of care bundles for stroke was implemented in January 2012 and an internet link to 'CPD Stroke Competencies' is being developed for the Trust Learning Zone.

### Trust 11

A stroke seminar lead by a local stroke physician was held in one division to raise awareness of the importance of the stroke care bundle. Links were strengthened with the stroke teams at the local stroke unit with an ambulance representative attending weekly meetings to assist in monitoring crew compliance with the care bundle and pathways.

### Trust 12

No quality improvement information supplied.

## **Hypoglycaemia specific quality improvement activity**

### 2.17.4 Trust 1

No quality improvement information supplied.

### Trust 2

The Trust has included the importance of the referral of patients to their primary care provider following a hypoglycaemic episode within the clinical supervision programme and has also developed posters to reinforce this message.

### Trust 3

No quality improvement information supplied.

### Trust 4

In December 2011, vehicle packs containing a BM kit were distributed to all A&E vehicles.

### Trust 5

Work on hypoglycaemia referral pathways has continued and staff have been involved in there development and implementation

### Trust 6

No quality improvement information supplied.

### Trust 7

No specific information for this indicator provided

### Trust 8

No quality improvement information supplied.

### Trust 9

No specific information for this indicator provided.

### Trust 10

In December an awareness raising exercise around exceptions in the hypoglycaemia CPI audit was carried out to ensure appropriate exceptions, such as "Patient transported to hospital" were counted. In January 2012, Advanced Paramedics documented an action to ensure all crews had access to, and were aware of, alternative pathways for diabetic referral and, in areas where no referral pathway was available, to encourage staff to refer to a GP or Out of Hours service and document that referral. Senior Paramedics completed, and placed on station notice boards, an example hypoglycaemic PRF demonstrating excellent defensive clinical documentation along with supporting literature regarding the importance of referring this vulnerable patient group to appropriate health care professionals where they were not transported to hospital. Staff were encouraged to document reasons for not administering oxygen when saturation was less than 94% and data in-putters reminded to claim an exception for non-oxygen administration where saturation was above 94%. Awareness sessions on CPI recording using Siren ECS were to be arranged. Station debates on the subject of hypoglycaemia have been initiated by Advanced Paramedics to determine why care bundles were not being achieved. Education sessions have been offered to staff on referral patterns and processes. Senior paramedics and Area Operational Managers have been asked to randomly audit PRFs and provide one to one timely feedback. Senior paramedics now discuss non-compliant PRFs with clinicians and address root causes.

### Trust 11

Work is continuing across the Trust to establish pathways in all health communities.

### Trust 12

No quality improvement information supplied..

## **Asthma specific quality improvement activity**

### 2.17.5 Trust 1

No quality improvement information supplied.

### Trust 2

The Trust has included the assessment and management of Asthma within the mandatory training for 2011/12; this has mainly focused on the assessment of Peak Flow.

### Trust 3

No quality improvement information supplied.

### Trust 4

No quality improvement information supplied.

### Trust 5

Posters giving information on the importance of peak flow prior to treatment in cases of asthma have been put up on all stations and the monthly CPI results are posted on station with feedback comments.

### Trust 6

No quality improvement information supplied.

### Trust 7

The QIO informed Operational Management in November 2011 that some staff were still not documenting a PEFR (or exception) on the patient report form. In February 2012 the Clinical department identified that the 'unable' field on the e-PRF was inactive. This was to be activated in the next e-PRF upgrade in the summer of 2012.

### Trust 8

No quality improvement information supplied.

### Trust 9

No specific information for this indicator provided.

### Trust 10

Examples of 'good' asthma PRFs were created and displayed on notice boards to encourage improvement in documentation and care bundle compliance and to encourage clinicians to document reasons for not administering oxygen. This was backed up by an article in the Trust magazine on the importance of performing and recording pre and post treatment peak flows. Emphasis was placed on staff ensuring that peak flow meters, sats probes and oxygen were present and in working condition when carrying out daily equipment checks and on taking responsibility for reporting faults or missing equipment and making arrangements for the restocking of mouth pieces. Staff in one area were planning to invite a respiratory expert to speak at a conference they were arranging to get the message across to staff about the importance of peak flows. Staff in another area of the Trust were arranging awareness sessions on the CPI reporting system using the ePRF to ensure that care provided to asthmatic patients is captured.

### Trust 11

The cycle 7 asthma report was circulated to all divisions together with a memo from the team of Clinical Quality Managers. This congratulates clinicians on the steady improvement in the recording of peak flows but also highlighted a drop in compliance of SpO2 recording. Advice was given around recording reasons for being unable to carry out an SpO2 and the process to follow where equipment failed.

As 'SpO2 recorded' was only counted if the timings clearly indicated that it had been recorded before treatment, staff were reminded of the importance of accurately recording the time it was taken and ensuring that the ePRF automatic timing was overridden with the correct time if the reading was not entered straight away.

### Trust 12

No quality improvement information supplied.

## Future developments

- 2.18 The National Ambulance Services Clinical Quality Group continues to refine and develop the CPIs. Other topic areas are being explored with a view to launching new CPIs.

## List of participating trusts

East Midlands Ambulance Service  
East of England Ambulance Service  
Great Western Ambulance Service  
Isle of Wight Ambulance Service  
London Ambulance Service  
North East Ambulance Service  
North West Ambulance Service  
South Central Ambulance Service  
South East Coast Ambulance Service  
South Western Ambulance Service  
West Midlands Ambulance Service  
Yorkshire Ambulance Service

(Note: order of list does not reflect the order of anonymised chart identifiers)

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