



# **ST Elevation Myocardial Infarction Annual Report: 2008/09**

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## Introduction

The information in this report relates to 1788 patients who, between 1<sup>st</sup> April 2008 and 31<sup>st</sup> March 2009, were diagnosed by London Ambulance Service NHS Trust (LAS) staff as suffering with an ST-elevation myocardial infarction (STEMI). For each patient, information from the Patient Report Form (PRF), Mobile Data Terminal (MDT), 12-lead ECG rhythm strip and Emergency Operations Centre (EOC) record were collected and analysed by the Clinical Audit & Research Unit (CARU). Where possible, patient outcomes were collected from the Myocardial Infarction National Audit Project (MINAP) database.

This report presents figures for the LAS as a whole.

## Patient Information

The average age of STEMI patients was 64 years (ranging from 13-100 years). As per previous years, the majority of patients were male (75%). Male STEMI patients were on average 12 years younger than females (61 vs. 73 years respectively).

## Type of Infarct

The most common type of infarct was Anterior (50%), followed by Inferior (35%).

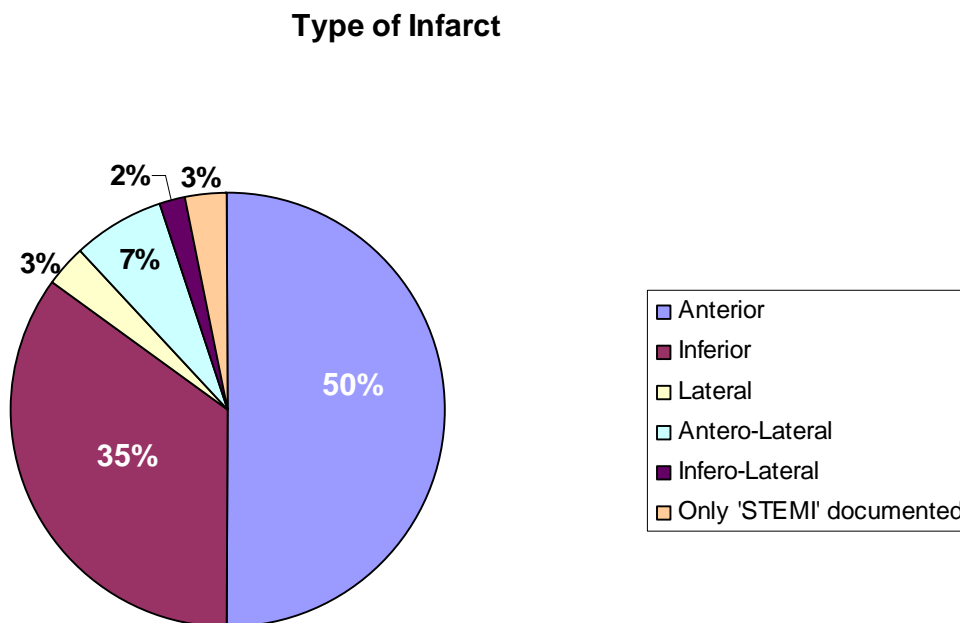


Figure 1. Type of Infarct

## Call for Emergency Help

Figure 2 below shows that the highest volume of 999 calls for help were received between the hours of 8am and 4pm (49%; n=869), with a peak between 10–11am. STEMI occurred most frequently on a Thursday (15.2%; n=271), closely followed by a Friday (15.0%; n=268).

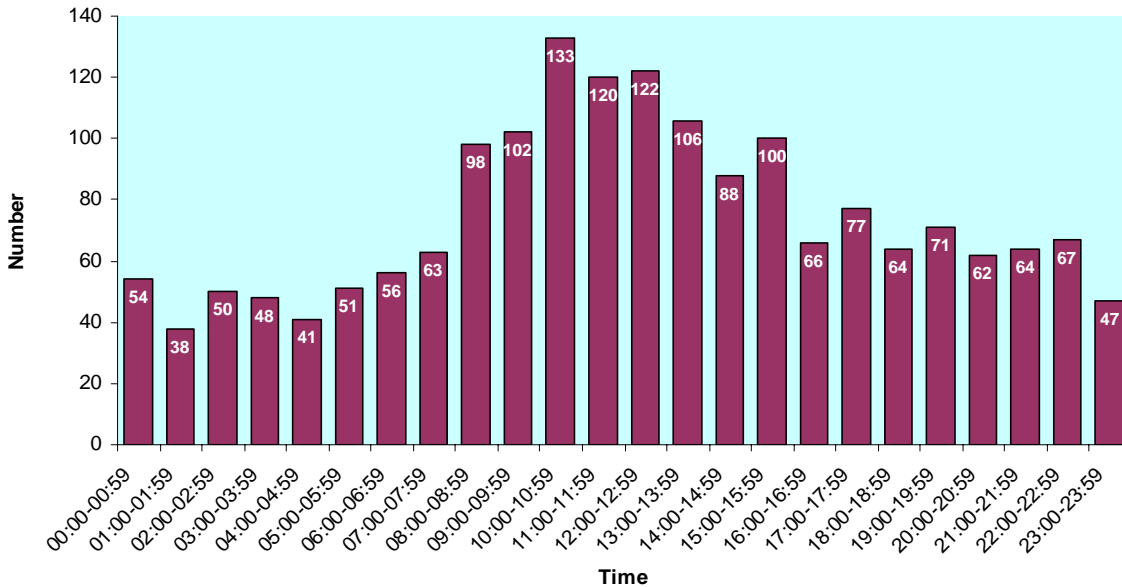


Figure 2. Time of 999 call requesting emergency help

## Response Times

From April 2008, all ambulance services in England adopted 'Call connect' as the 999 call start time; this is defined as the time the ambulance service receives the emergency call for help.

The National Service Framework for Coronary Heart Disease (NSF CHD)<sup>1</sup> states that people with a suspected myocardial infarction must be attended to within 8 minutes of the call for help by an individual who is equipped with, and trained in the use of, a defibrillator.

Table 1 shows the response times for crews attending STEMI patients in 2008/09.

73% (n=1298) of all STEMI patients were attended by LAS staff within the 8 minute target, which is a 5% improvement from 2007/08.

However, of the 1788 patients attended, only 1495 calls were identified as requiring a Category A response based on the information provided by the caller at the time of the 999 call. Of these patients, 77% (n=1150) were attended within the target time, with an average response time of 7 minutes.

<sup>1</sup> Department of Health National Service Framework for Coronary Heart Disease (2000), HMSO, London.

On scene, the average time spent with STEMI patients was 33 minutes. This reflects a gradual increase in time spent on scene year on year from 2004/05, and represents a 1 minute increase on the 2007/08 figure of 32 minutes.

Time Interval	Number of patients <sup>^</sup>	Average Time (minutes)	Range (minutes)
999 call* - arrival on scene	1788	8	1-106
999 call* - arrival on scene (category A calls only)	1495	7	1-41
Arrival on scene - arrive patient	1559	1	0-31
Arrival on scene - leave scene	1788	33	11-114

<sup>^</sup> Number of patients with both times available.

\* Time when the call was connected to the ambulance service (Call Connect time).

Table 1. Response Times and Time Spent with Patient On Scene

## Assessment and Management

### **Pain assessment**

As seen in Table 2, 96% (n=1707) of all PRFs had an initial (pre-treatment) pain assessment recorded. Of these, 79% (n=1342) contained a numerical pain score and 21% (n=365) reported a qualitative form of pain assessment. 2% (n=39) of all PRFs documented a valid exception as to why a pain assessment was not possible. This leaves a total of 42 patients (2%) who should have had their initial pain level assessed, but did not. The level of pre-treatment pain assessment has increased by 3% from that reported in 2007/08.

85% (n=1520) of patients had a final pain assessment recorded, which is consistent with last year's performance. 3% (n=56) of PRFs gave a valid exception for pain assessment. A final pain assessment was not reported for 12% (n=212) of patients.

In total, 84% (n=1494) of patients had both a pre- and post-treatment pain assessment undertaken, which is 2% higher than in 2007/08. For a further 3% (n=61) there was a valid reason reported for being unable to undertake at least one pain assessment. This means that 13% (n=233) of patients who should have received a pain assessment, did not.

Assessment			
	Pain assessment documented	Valid exception for assessment documented	Not assessed
Pain assessment (pre-treatment)	96%; n=1707	2%; n=39	2%; n=42
Pain assessment (post-treatment)	85%; n=1520	3%; n=56	12%; n=212

Table 2. Pain Assessment

### **Aspirin**

The JRCALC National Clinical Guidelines 2006 state that “aspirin should be administered to any patient with clinical or ECG evidence of a myocardial infarction” unless the drug is contraindicated.

86% (n=1539) of STEMI patients were given aspirin by LAS staff. A further 9% (n=164) of patients were not eligible to receive aspirin (3% had taken aspirin before the arrival of the crew, in 5% aspirin was contraindicated and 1% of patients refused). A total of 85 patients (5%) who should have received aspirin did not and there were no reasons for this reported on the PRFs.

### **GTN**

The JRCALC National Clinical Guidelines 2006 state that “GTN should be administered to patients with cardiac chest pain due to myocardial infarction” unless the drug is contraindicated.

GTN was administered to 74% of STEMI patients (n=1329). A further 23% (n=410) of patients were not eligible to receive GTN (17% had contraindications, 4% had received GTN before the arrival of the LAS, 1% of patients did not provide consent and 1% had a reduced level of consciousness and could not be given the drug). Therefore, a total of 49 patients (3%) should have received GTN, but did not, with no reasons for non-administration documented on the PRF.

### **Analgesia**

The JRCALC National Clinical Guidelines 2006 on Morphine Sulphate states that it is indicated for “pain associated with suspected myocardial infarction (analgesic of first choice).” In conjunction with this, the guideline for Entonox indicates that it “can be administered whilst establishing intravenous access to deliver morphine.”

In 2008/09, 34% (n=598) of patients either received Entonox or had a valid reason documented as to why this was not appropriate. Morphine was administered (or a valid exception documented) in 77% (n=1375) of cases.

3% (n=56) of all patients were recorded as being treated with both Entonox and morphine. In total 20% of patients (n=355) received neither form of analgesia (and did not have a valid exception recorded for this).

<b>Analgesia</b>	<b>Administered</b>	<b>Valid exception</b>	<b>Not administered</b>
Entonox	11%; n=190	23%; n=408	66%; n=1190
Morphine	32%; n=577	45%; n=798	23%; n=413

Table 2a. Analgesia Administration

## Conveyance Location

It is LAS policy that all STEMI patients are taken directly to a Cardiac Catheter Laboratory (Cath Lab) for primary angioplasty (PTCA) or have a clearly documented reason why this care pathway is not appropriate.

Of the 1788 STEMI patients included in this report, 89% (n=1604) were taken directly to a Cath Lab. A further 8% were appropriately transported directly to A&E. However, 6 patients (1%) were taken to A&E when, according to PRF documentation, they should have been transported directly to a Cath Lab. In addition, it was not possible to identify from the PRF whether a further 2% of patients were taken to a Cath Lab or A&E. One patient was not transported to hospital because they refused to travel.

Direct to Cath Lab	Direct to A&E		Unsure if taken to Cath Lab or A&E
	With valid reason	Without valid reason	
89% (n=1604)	8% (n=143)	1% (n=6)	2% (n=34)

*\*Excludes 1 patient who refused to be conveyed to hospital by the attending crew.*

Table 3. Patient Destination

## Conveyance Response Times

Table 4 shows that the average overall call to door times (i.e. time from connection of the 999 call to arrival of the ambulance at the door of the hospital) were the same irrespective of whether patients were conveyed to a Cath Lab or to A&E.

However, the journey times from leaving the scene to arriving at hospital for patients taken directly to a Cath Lab were, on average, 4 minutes longer than the journey times for those taken to A&E.

	Number of patients <sup>^</sup>	Average Time (minutes)	Range (minutes)
999 call* - arrival at Cardiac Cath Lab	1604	57	24-159
Leaving scene - arrival at Cardiac Cath Lab	1604	16	1-70
999 call* - arrival at A&E (call to door)	149	57	26-146
Leaving scene - arrival at A&E	149	12	3-64

<sup>^</sup> Number of patients with both times available.

\* Time when the call was connected to the ambulance service (Call Connect time).

Table 4. Response Times by Patient Destination

## Reperfusion Times - Primary Angioplasty

Of 731 patients confirmed as receiving reperfusion treatment, 666 patients (91%) were confirmed as receiving primary angioplasty treatment (PTCA) at hospital.

Of these, 644 (97%) were admitted directly to a Cath Lab and 11 (1%) were initially transported to A&E (with a valid reason) by LAS staff. In addition, there were 10 cases (1%) where it was unclear from PRF documentation as to whether the patient was transported to a Cath Lab or A&E, and 1 case (1%) where the crew took the patient to A&E without a valid reason.

The average time from 999 call to receiving angioplasty was 119 minutes; 54 minutes of which were accounted for by the hospital.

Four door to balloon times were over 3 hours; reasons provided by the hospitals for these were clinical concerns over one patient, one patient going into cardiac arrest, access to the Cath Lab being delayed for one patient plus one incident where no reason for the delay was reported.

	Number of patients <sup>^</sup>	Average Time (minutes)	Range (minutes)
999 call* - primary PTCA ( <i>call to balloon</i> )	653	119	45-331
Arrival at hospital - primary PTCA ( <i>door to balloon</i> )	653	54	7-262

<sup>^</sup> Number of patients with both times available.

\* Time when the call was connected to the ambulance service (*Call Connect time*).

Table 5. Time to reperfusion for patients receiving primary angioplasty

## Reperfusion Times - Thrombolysis

One STEMI patient was confirmed as receiving thrombolytic treatment; this patient was taken directly to a Cath Lab.

The NSF CHD states that thrombolysis should be given within 60 minutes of calling for professional help. In the case reported, the time from Call Connect to treatment was 99 minutes. The PRF documents that there were delays on scene due to the patient not speaking English and being in an unstable condition, and then going into cardiac arrest on arrival at the Cath Lab. The arrival at hospital to treatment (door to needle) time was 34 minutes.

## Patient Outcome

Patient outcome data was available for 959 patients. 96% (n=922) were discharged alive. The average length of stay in hospital for patients who survived to hospital discharge was 5 days, which remains the same as last year.

## Conclusions

In comparison to last year, the number of STEMI patients reported as being treated this year has increased by 19% (from 1497 in 2007/08 to 1788 patients this year). Reasons for this increase include improvements in processes for accessing the data (i.e. 12-lead ECG strips and PRFs are now kept and scanned as a complete record). Together with further improvements in data systems, this has meant that CARU are able to capture data on STEMI patients more accurately. In addition, during 2008/09, feedback continued to be provided to staff by Team Leaders via the LAS Clinical Performance Indicator (CPI) process on the importance of accurate PRF documentation, such as using the correct illness codes (which enable us to identify a STEMI patient). National CPI reporting for STEMI was also introduced during the past year.

The findings of this report continue to demonstrate a generally good level of compliance with clinical guidelines for the treatment of STEMI patients with aspirin and GTN, with administration levels increasing for aspirin and remaining constant for GTN.

Although the level of pre- and post-treatment pain assessment has increased by 2% from last year, 13% of patients still do not receive both assessments (or have valid exceptions documented as to why it was not possible).

Furthermore, while the majority of patients are either receiving analgesia where required or have a valid exception to its administration, 20% of patients are still not receiving either Entonox or morphine. The control and relief of pain is not only of comfort to the patient, but may also aid their condition or at the very least help prevent further deterioration. Therefore it is essential that all eligible patients receive adequate pain relief.

The number of STEMI patients transported directly to a Cath Lab has continued to increase from 86% (n=1280) in 2007/08 to 89% (n=1604). Significantly, there has also been a drop of 8% in patients whose destination is either unclear or who were taken to A&E without a valid reason. The average time from the 999 call for help to arrival at the Cath Lab has remained constant at 57 minutes, although for patients transported to A&E, it has increased by 2 minutes to 57 minutes.

The number of patients for whom hospital outcome information was available this year was over double the amount from the previous year. This is an important improvement as it allows us to monitor the impact of LAS care pathways on patients. Hospital treatment information was available for 731 patients; from these, primary angioplasty treatment was confirmed as being delivered to 666 patients. On average, this was given 1 hour and 59 minutes after receipt of the 999 call by the LAS. Only 1 patient was confirmed to have received thrombolytic treatment this year, with their overall call to needle time decreasing by 3 minutes from last year's average.

The increase in hospital outcome information available this year can be attributed to the introduction of a dedicated member of CARU liaising with hospitals regarding MINAP data, enabling the hospitals to enter more accurate data onto the database, and in turn providing us with the means to report more reliable outcome data for patients. Measures such as this are beneficial in enabling us to obtain and report a better view of patient care as a whole.



## Points for Action

Staff should be encouraged to facilitate data collection and the reporting of clinical care by:

- Recording both pre- and post-treatment pain assessments in all patients who do not present with a valid exception.
- Recording all interventions taken by the crew, especially in the administration of analgesia.
- Ensuring that all eligible patients are taken directly to a Cath Lab or that a valid reason for conveyance to A&E is clearly documented on the PRF.
- Correctly documenting the destination hospital name, code and ward to allow accurate identification of patients directly transported to cardiac Cath Labs.
- Using illness code 87 for all patients with a confirmed MI by 12-lead ECG.
- Submitting a copy of all 12-lead ECGs to Management Information in addition to the PRF (with requests for clinical feedback, clearly marked on the front of the ECG strip, if desired).