

**NHS****London Ambulance Service**
NHS Trust

ST Elevation Myocardial Infarction (STEMI) Annual Report

April 2022 – March 2023

November 2023

Produced by:

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Data within this report are correct as of the time of publication

STEMI Care Summary 2022-23



2,480
patients



73% Male
27% Female



44 mins
Response



42 mins
On scene



Aspirin
97.1%



GTN
97.3%



Pain
Assessed
96.7%



Analgesia
78.5%



73.7%
Full care bundle



105 mins
Call to Hospital



160 mins
Call to PPCI



95%
Discharged
Alive

1. Introduction

This report presents a summary of the care provided by the London Ambulance Service NHS Trust (LAS) to the **2,480** patients who presented with a suspected ST-Elevation Myocardial Infarction (STEMI) between April 2022 and March 2023.

The data were sourced from the LAS Acute Coronary Syndrome (ACS) registry, which contains information sourced from LAS operational and clinical records, together with data from the Myocardial Ischaemia National Audit Project (MINAP) database.

Patients who suffered a cardiac arrest prior to being handed over at hospital are excluded from this analysis; details on these patients can be found in the Cardiac Arrest Annual Report.

2. Findings

2.1 Patient profile

Gender, n (%)		Ethnicity, n (%) [†]	
Male	1,820 (73.4)	White	1,028 (41.5)
Female	660 (26.6)	Asian	318 (12.8)
		Black	222 (9.0)
		Other	82 (3.3)
		Mixed	24 (1.0)
		Unknown	806 (32.5)

Age in years, mean (median)	
Overall	63 (62)
Male	60 (60)
Female	71 (73)

[†] Percentages do not equal 100% due to rounding.

Chief complaints reported at the 999 call, n (%)			
Chest pain	1,082 (43.6)	Unconscious/fainting	159 (6.4)
NHS 111 transfer	442 (17.8)	HCP Admission	105 (4.2)
Breathing problems	251 (10.1)	All other complaints	441 (17.8)

Table 1: Demographic profile of suspected STEMI patients



Figure 1: Monthly breakdown of suspected STEMI patients attended

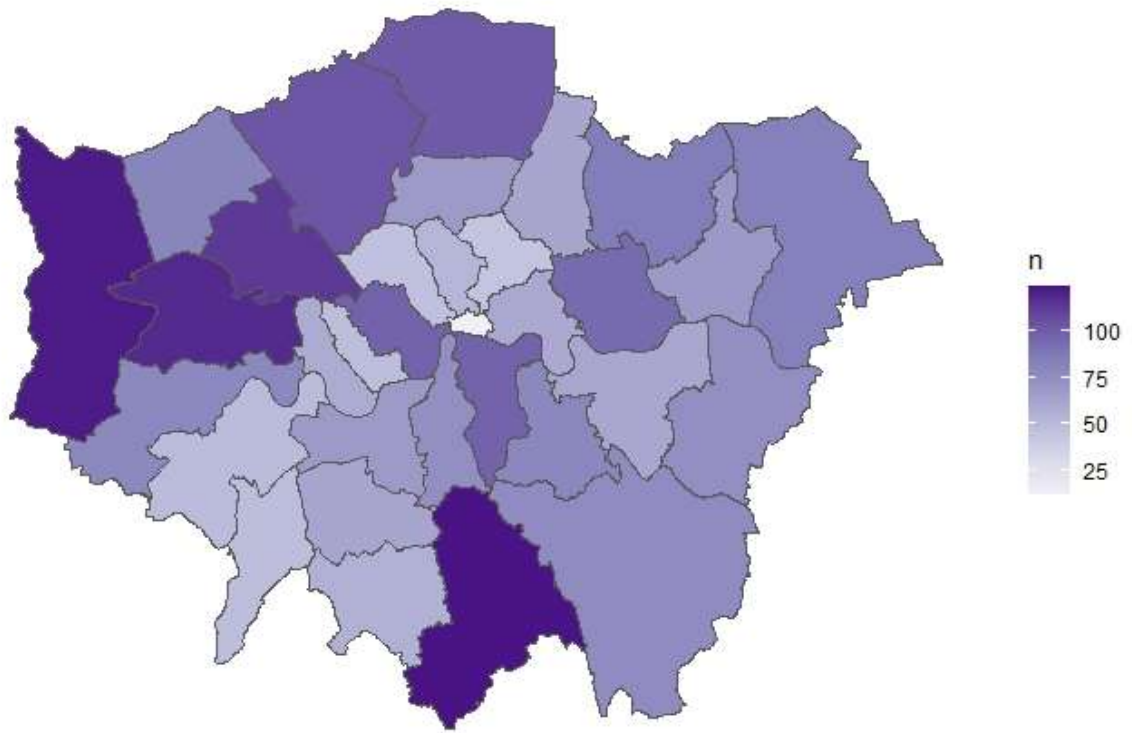


Figure 2: Count of suspected STEMI cases by Local Authority District

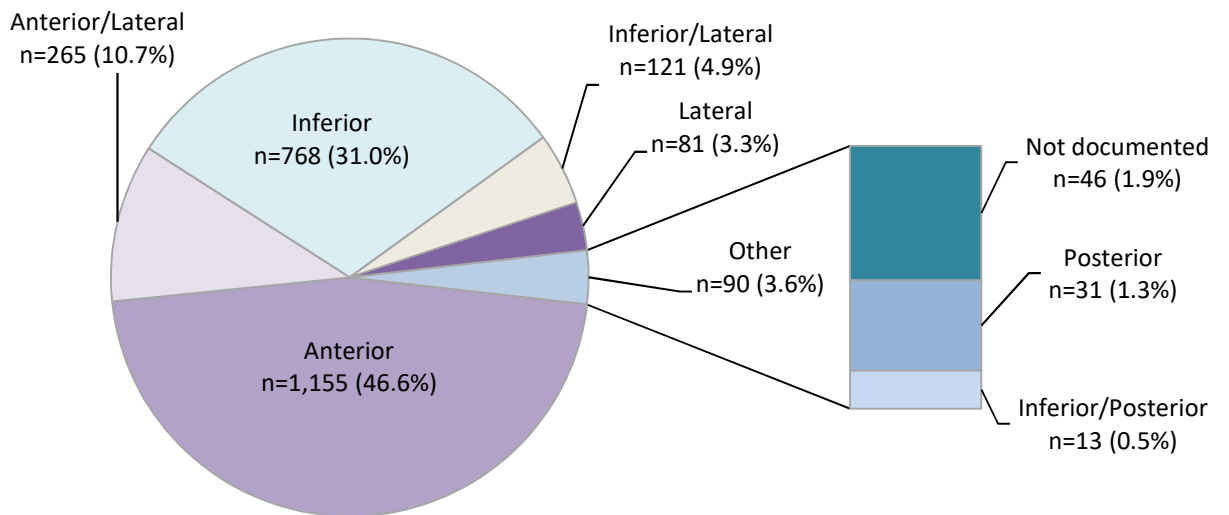


Figure 3: Region of infarct as documented by LAS clinicians

- The number of patients presenting to the LAS with suspected STEMI this year **fell by 12%** (2,480 vs 2,818 in 2021/22).
- This year, once again, there were **more males** than females (73.4% vs 26.6%).
- There was wide **variation** in the number of patients seen each month, with 265 patients seen in April 2022, and 144 seen in December 2022.
- The highest number of patients were seen in the **London Borough of Croydon** this year (n=124). The geographical variation observed is likely to be related to differences in population density and demographics across London.
- Compared to last year, similar proportions of patients presented with ECG findings suggestive of infarct located in different regions of the heart. The majority of patients had **anterior ST elevation** either in isolation (46.6%) or alongside lateral ST elevation (10.7%).

2.2 Response times

We report the **clinical response interval** ('999 call' to 'arrival at scene'; Table 1). This is an international definition for reporting the response interval of clinical significance and starts at the time the 999 call is connected to the ambulance service, ending when the first vehicle's wheels stop turning upon arrival at scene (<https://www.ahajournals.org/doi/pdf/10.1161/01.CIR.84.2.960>). These times will be longer than times reported by the NHS England Ambulance Quality Indicators (AQIs) because they report on a different interval. ¹

n	Mean	Median
2,480	44:18	26:14

Table 2: '999 call to arrival at scene' clinical response interval (mm:ss)

¹ NHS England AQI response intervals are measured using Clock Start to Clock Stop as per the national AmbSYS specification, and can be found at: <https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/>

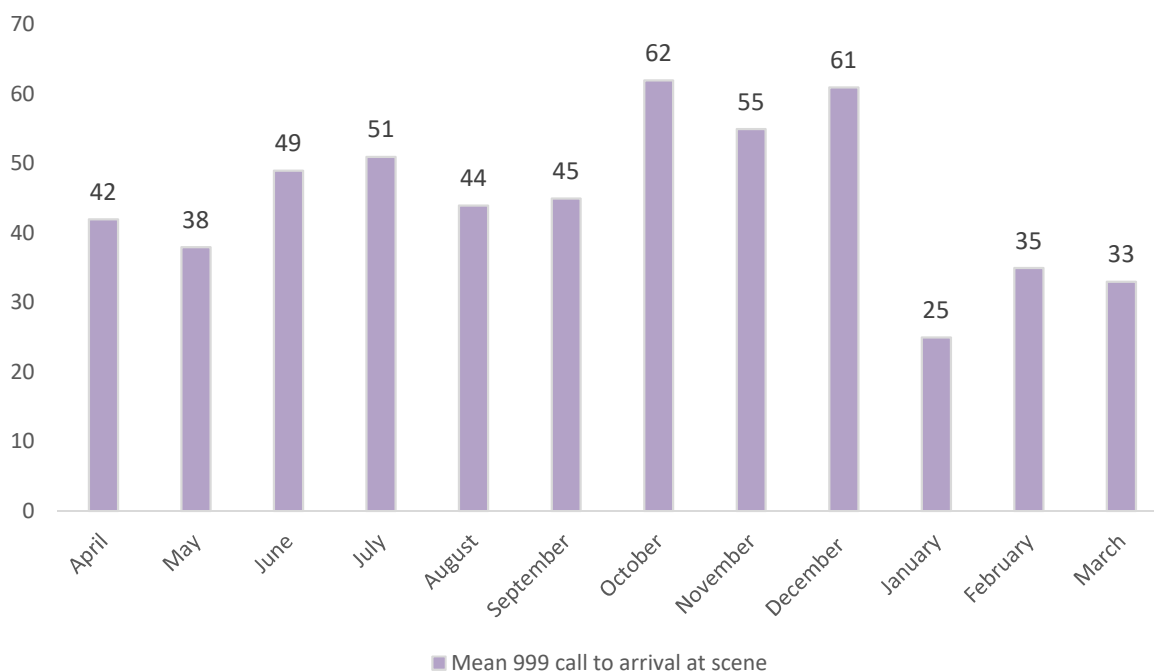


Figure 4: Monthly breakdown of mean response intervals (mins)

- The mean response time **increased** by almost **6 minutes** this year, up from 38:22 in 2021/22 to **44:18**.
- Response times varied significantly throughout the year. The longest average response time was seen in October (62 minutes) whilst the fastest time was seen in January (25 minutes).

2.3 On-scene times

Overall on-scene times are calculated from the first vehicle arriving on scene to the transporting vehicle leaving scene. For some incidents, a solo responder may be dispatched when an ambulance is not immediately available in order to provide initial patient assessment and care as rapidly as possible, particularly to those considered to be at highest risk. As solo response vehicles are unable to convey patients, on-scene times can be expected to be longer in these cases.

First vehicle on scene	n (%) [†]	Mean	Median
Solo responder	514 (20.8%)	48:37	44:40
Double-crewed ambulance	1,964 (79.2%)	40:20	37:30
Overall	2,478	42:03	38:56

Table 3: Time spent on scene by first arriving vehicle (mm:ss)

[†] Excludes cases with missing times (n=2).

- There was a **substantial increase** in the proportion of patients for whom a solo responder arrived on scene first this year (**20.8% vs 7.8%** in 2021/22).
- Average overall on scene times remained relatively stable, **increasing by just 21 seconds** this year (42:03 vs 41:42).

2.4 STEMI care bundle

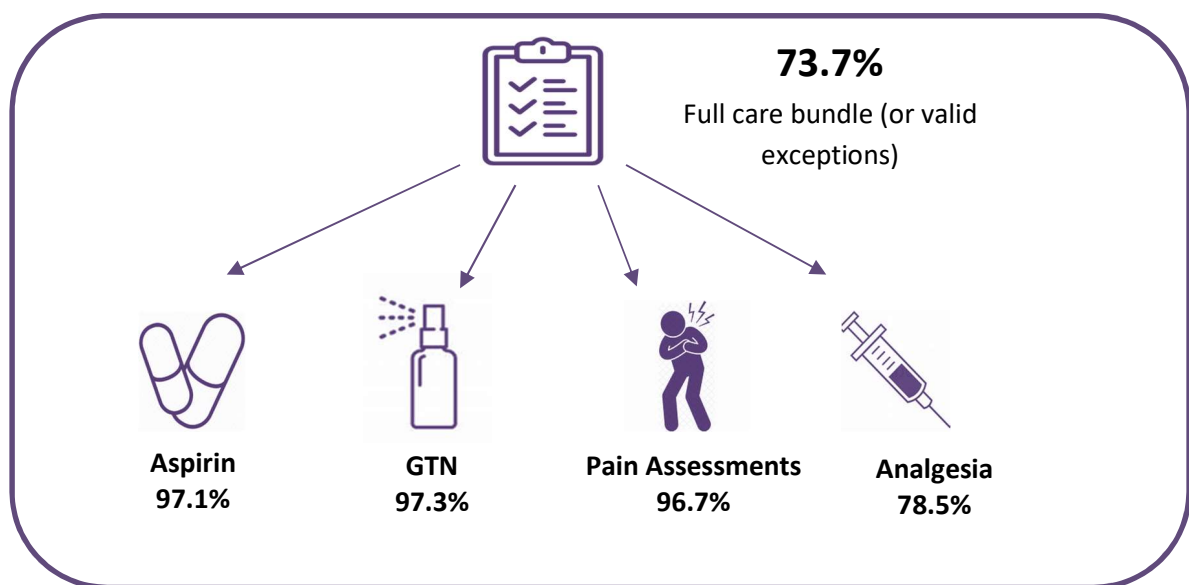


Figure 5: Compliance with the STEMI care bundle by individual component

- **73.7%** of patients received the complete STEMI care bundle, up from 70.8% in 2021/22.
- The provision of analgesia remains the element of the care bundle which is most often not delivered. This year 78.5% of patients received analgesia or had a valid exception, up from 77.6% last year.

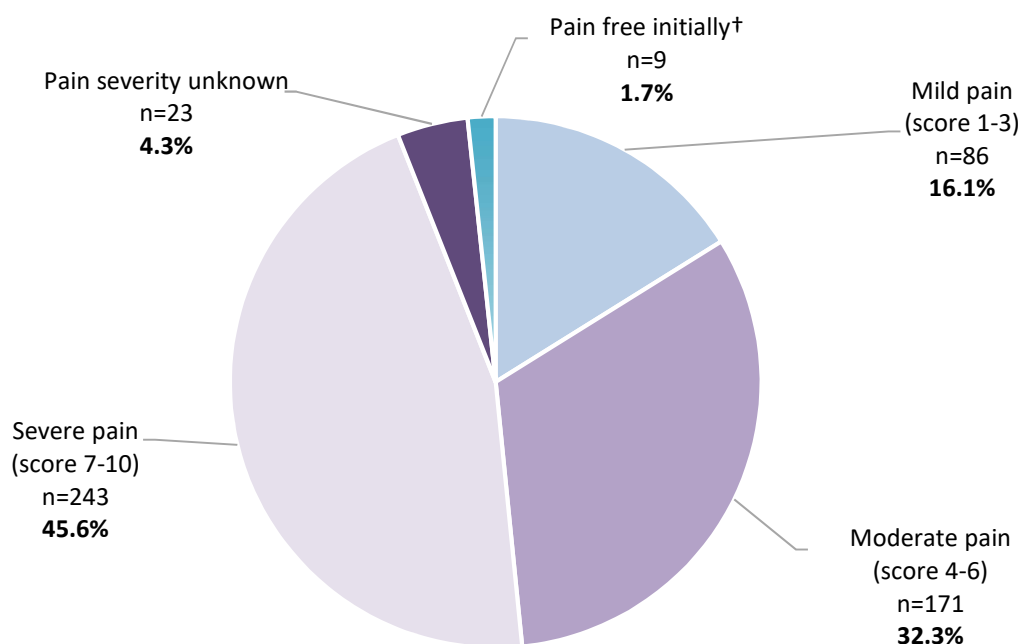


Figure 6: Initial pain level of patients not receiving LAS analgesia

† patients who were initially pain free and later developed pain but did not receive analgesia

- **533 patients did not receive analgesia** as part of the STEMI care bundle and did not have a valid exception documented.
- Consistent with findings in previous years, a large proportion of these patients reported either **severe** (45.6%) or **moderate** pain (32.3%).

2.5 Conveyance

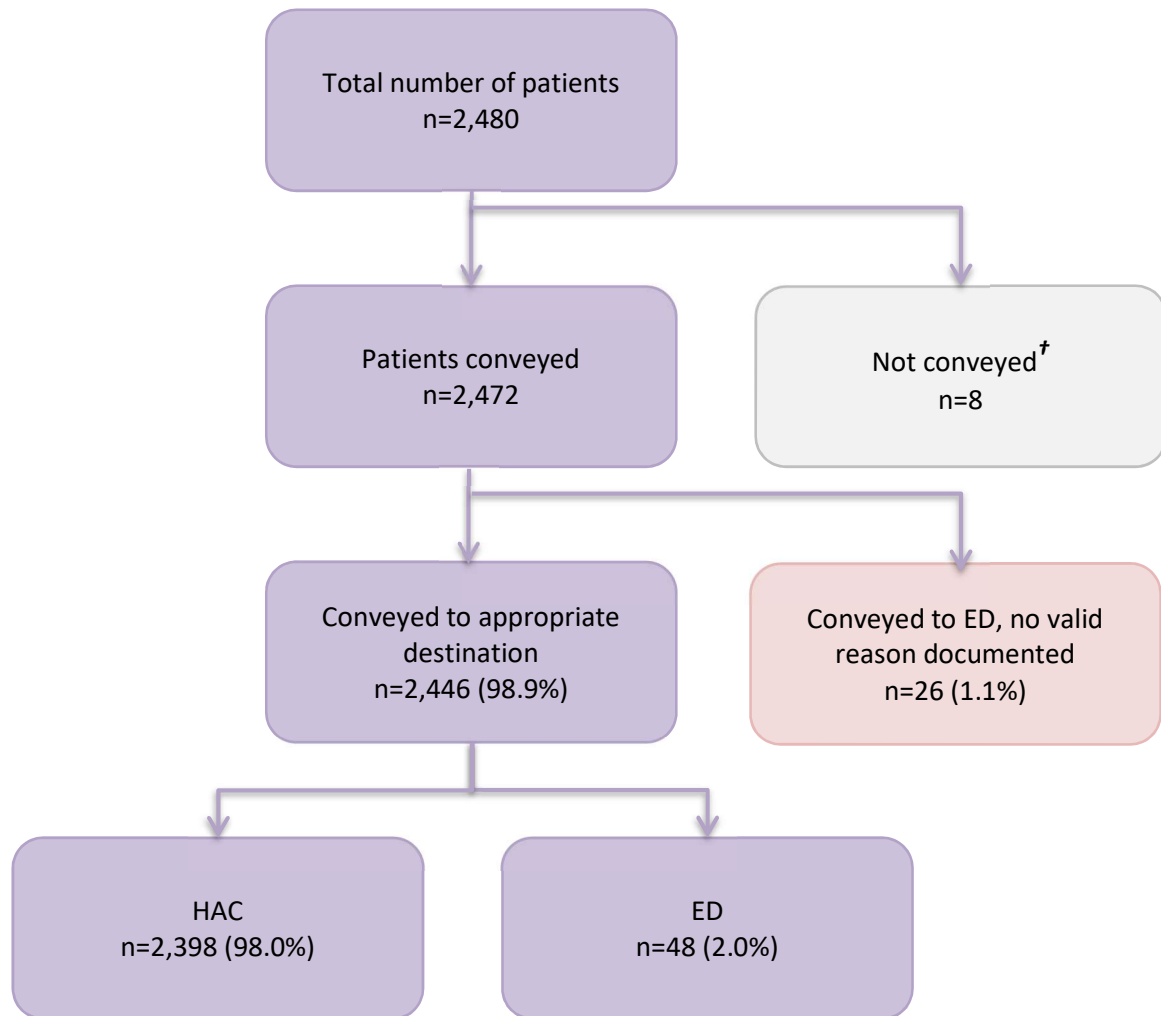


Figure 7: Patient destination

†Five patients refused conveyance against LAS advice, with a further three not conveyed due to pre-existing end of life care arrangements.

- **98.9%** (n=2,446) of patients were conveyed to an **appropriate** destination this year, with 98.0% (n=2,398) of these transported directly to a Heart Attack Centre (HAC) for specialist treatment.
- 26 patients (1.1%) were conveyed to an Emergency Department and did not have a valid reason documented. This is a similar proportion to in 2021/22.

2.6 Journey and Call to HAC times



Figure 8: Mean journey and call to hospital times for patients conveyed to a HAC

* calculated from the time that the 999 call was connected to the ambulance service.

† Excluding cases with missing times (n=2).

- The mean journey time for patients transported directly to a HAC has **remained at 19 minutes** this year.
- However, the mean average time from the 999 call to arrival at a HAC has **increased by 6 minutes** to 105 minutes (up from 99 minutes in 2021/22).

2.7 Patient outcomes

Patient outcomes data for those with a STEMI confirmed at hospital are sourced from the Myocardial Ischaemia National Audit Project (MINAP) database. Data are entered into MINAP by hospital teams and we match them to the cases held within our registry. This year, only a small proportion of records were available for matching due to data quality issues within MINAP and due to significant variation in the contribution of data by hospitals.

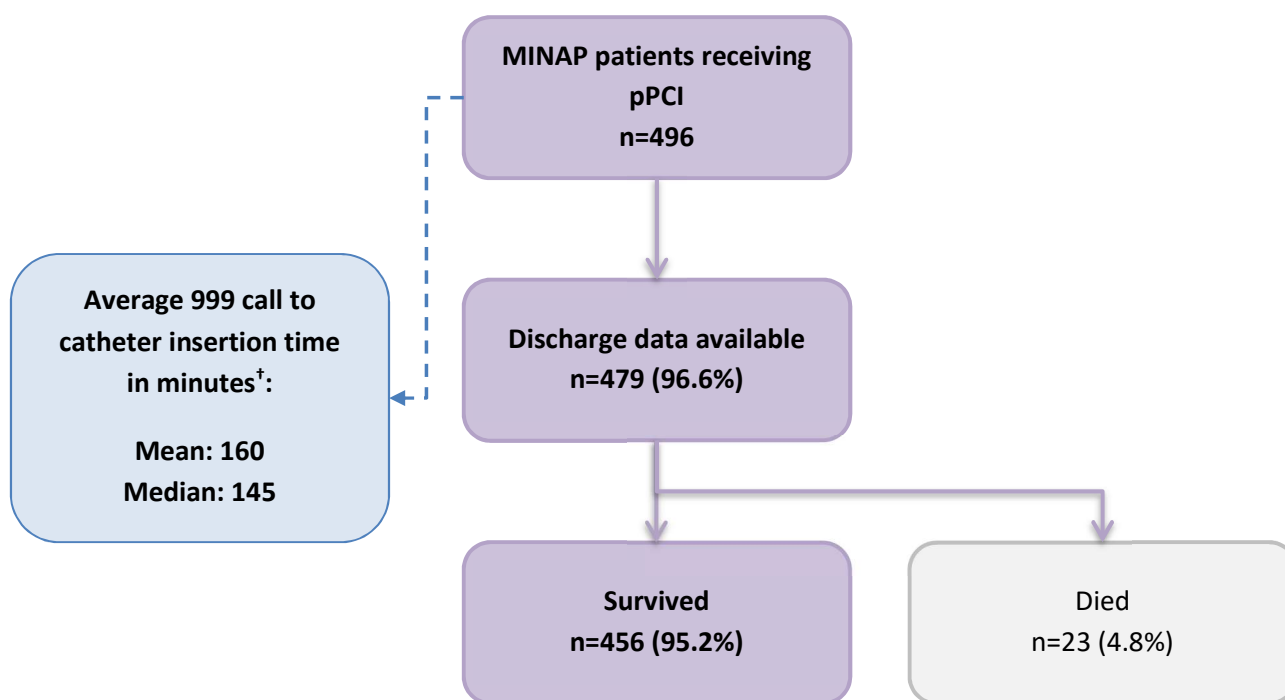


Figure 9: Outcomes for suspected STEMI patients

† calculated from the time the 999 call was connected to the ambulance service.

- Using data from MINAP, we were able to identify that **496 patients** we conveyed to hospital with a suspected STEMI, had their STEMI confirmed at hospital and went on to receive pPCI. It is important to note that it is extremely likely that significantly more patients received pPCI but were not captured within the incomplete the MINAP dataset.
- For these patients, the average time from the 999 call to insertion of the catheter in the catheter laboratory was **160 minutes**. This is **10 minutes longer** than the national target of 150 minutes.
- **95.2%** of patients who received pPCI and for whom outcome data were available **survived to leave hospital**. This is similar to the figure in 2021/22 (95.3%).

3. Conclusions

The LAS has continued to experience significant operational pressures this year which has resulted in increased response times for our patients. Response times were particularly prolonged during winter; in October and December the average response times exceeded 60 minutes. This was due to extremely high demand on our service, and unprecedented hospital handover delays which significantly impacted our ability to respond to patients.

Despite this, the care provided by our clinicians to patients with suspected STEMI continued to be of a very high standard. We saw an increase in the proportion of patients who received the full STEMI care bundle, with high levels of compliance in three of the four elements (provision of aspirin, GTN and documenting of pain assessments). The proportion of patients receiving analgesia as part of the care bundle increased slightly this year, but at 78.5% still requires improvement. Consistent with previous years, most of the patients who did not receive analgesia reported moderate or severe pain and would have benefited from this intervention.

Almost all patients were conveyed to an appropriate destination, usually one of the specialist Heart Attack Centres in London, but the average time from 999 call to hospital arrival increased for these patients, mostly due to extended ambulance response times. Where data was available, we saw that pPCI was delivered quickly, on average 160 minutes after the initial 999 call was made, and a high proportion of these patients survived to leave hospital.

Throughout this year, we have continued to provide feedback to Senior Sector Clinical Leads on cases where the full STEMI care bundle was not provided. This has allowed Clinical Team Managers and Team Managers to provide feedback to clinicians, facilitating continued learning and improvement. The importance of the STEMI care bundle has been emphasised at a number of education sessions including the Clinical Team Managers' Clinical Leadership and Resuscitation Programme and new starter courses for both Clinical Team Managers and Clinical Team Navigators. Additionally, we have commenced a project to upgrade our STEMI registry, which will complete next year, to provide improved efficiency and access to data, and should lead to further improvements in patient care.

Appendix 1 – Hospital Handover Delays

Our ability to respond to patients in a timely manner this year was impacted by unprecedented hospital handover delays. Data relating to these delays are provided, for context, below.

Month	Ambulance hours lost
April	11,265
May	10,167
June	10,947
July	13,386
August	11,214
September	10,965
October	14,578
November	13,673
December	17,941
January	12,326
February	11,902
March	12,814

Ambulance hours lost due to hospital handover delays of >15 minutes in 2021-2022