



## Cardiac Arrest Annual Report: 2005/06

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### Introduction

During the period 1<sup>st</sup> April 2005 to 31<sup>st</sup> March 2006, the London Ambulance Service NHS Trust (LAS) attempted to resuscitate 3022 patients following an out-of-hospital cardiac arrest of presumed cardiac aetiology. The information presented in this report was collated from LAS Patient Report Forms (PRFs), Mobile Data Terminals (MDTs), FR2 defibrillator downloads and corresponding Emergency Operations Centre (EOC) records. Patient hospital outcome data were collected from receiving A&E hospital records and from two national databases: the Myocardial Infarction National Audit Project (MINAP) and the National Strategic Tracing Service Database (NSTS). This report presents figures for the whole LAS. More detailed Complex level information can be found in the Cardiac Arrest Complex Reports that are disseminated quarterly via the LAS Clinical Education and Patient Care Update.

### Patient Profile

The average age of the cardiac arrest patient was 68 years (ranging from 0 to 109 years). The majority of patients were male 66% (n=2003). Female patients were, on average, 8 years older than males (73 years vs. 65 years).

### Time of Arrest

Emergency calls requesting help for a cardiac arrest were highest between the hours of 8am and 12 noon (24%; n=713). Cardiac arrests occurred most frequently on a Friday (15%; n=461). 10% (n=299) of all arrests occurred during the month of November.

### Location of Arrest

Most cardiac arrests (72%; n=2164) occurred in a private, residential location. Of those that occurred in public (n=858), over a third took place in the street (35%; n=299).

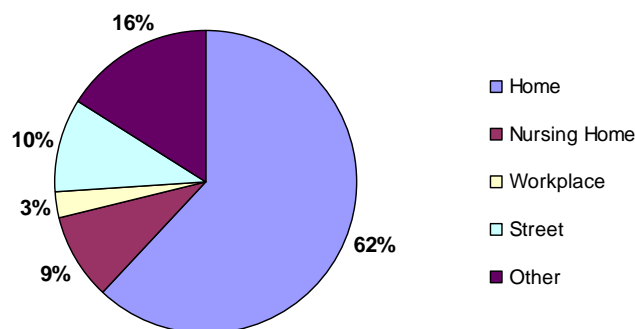


Figure 1. Location of cardiac arrest

### Witnessed Arrest

Nearly half (46%; n=1383) of all cardiac arrests were witnessed (seen or heard) by a bystander. A further 12% (n=363) were witnessed by LAS crews. Cardiac arrests were most frequently witnessed when the patient collapsed in public rather than in a private location (71% vs. 53%).

### Bystander CPR

Bystander CPR was initiated in over a third (39%) of cases. Bystander CPR was undertaken most often when the arrest was bystander witnessed rather than unwitnessed (44% vs. 32%) and when the patient collapsed in public rather than in private (55% vs. 32%).

### Community Defibrillation

Twenty-four patients were defibrillated prior to the arrival of the LAS by someone trained as part of the LAS's Community Defibrillation Programme. Details of these 24 cases are reported below:

Patient Profile	
Average age	63 (43-85) years
Gender	Male (87%); Female (13%)
Event Information	
Incident location	London Heathrow Airport (58%; n=14) Underground/mainline train station (42%; n=10)
Bystander witnessed	92% (n=22)
Bystander CPR	100% (n=24)
Average number of shocks	2 (1-7) shocks
Return of Spontaneous Circulation (ROSC)*	67% (n=14)
Survival Status	
Patient outcome	Survived to hospital discharge (38%; n=9) Died in hospital (62%; n=15)

\*ROSC status was not available for 3 patients.

### Response Times

The following response intervals relate to the period prior to LAS-wide training in the latest Resuscitation Guidelines, which recommend providing 2 minutes of good quality CPR prior to defibrillation in unwitnessed cardiac arrests. The average response times for this reporting period are unchanged from 2004/05.

Time Interval	Average Time (minutes)	Range (minutes)
999 call* – arrival on scene	7	0 – 133
999 call* – 1 <sup>st</sup> LAS Defibrillation**	9	1 – 51
Arrival at scene – 1 <sup>st</sup> LAS Defibrillation**	3	0 – 31
999 call* – arrival at hospital	39	0 – 153

\*Time when the incident location and the patient's chief complaint were obtained (ORCON time).

\*\*Includes only those patients with a non-crew witnessed arrest and an initial arrest rhythm of VF/VT.

## Initial Presenting Rhythm

Almost half of all patients (43%; n=1297) were found to be in Asystole on arrival of the ambulance crew. Just over a quarter (27%; n=812) had an initial presenting rhythm of Ventricular Fibrillation (VF) or Ventricular Tachycardia (VT).

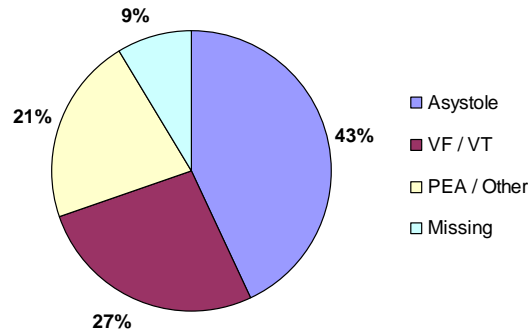


Figure 2. Initial presenting rhythm

## Return of Spontaneous Circulation

Just under one fifth (19%; n=563) of patients had a return of spontaneous circulation (ROSC) at some point during their treatment by the LAS. Patients who collapsed in public rather than in private, and who had a witnessed rather than unwitnessed arrest, were more likely to experience ROSC (25% vs. 16% and 22% vs. 14% respectively).

## Destination Hospital

Cardiac arrest patients were conveyed to 35 hospitals. Mayday, Northwick Park, Whipps Cross and Lewisham hospitals received the highest proportion of patients during this period.

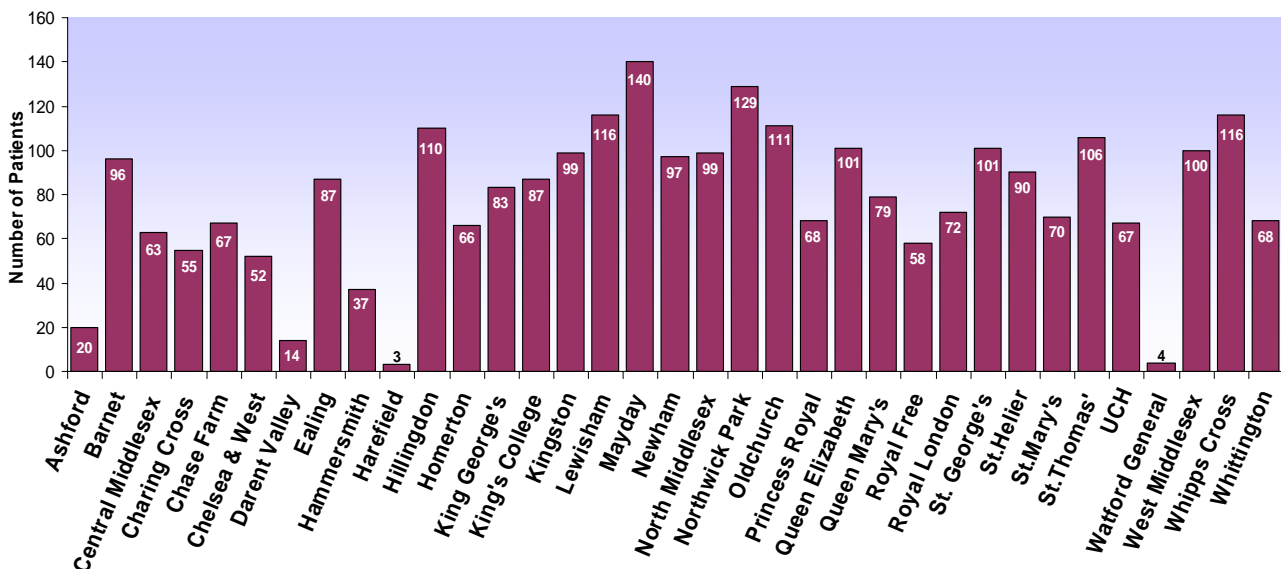


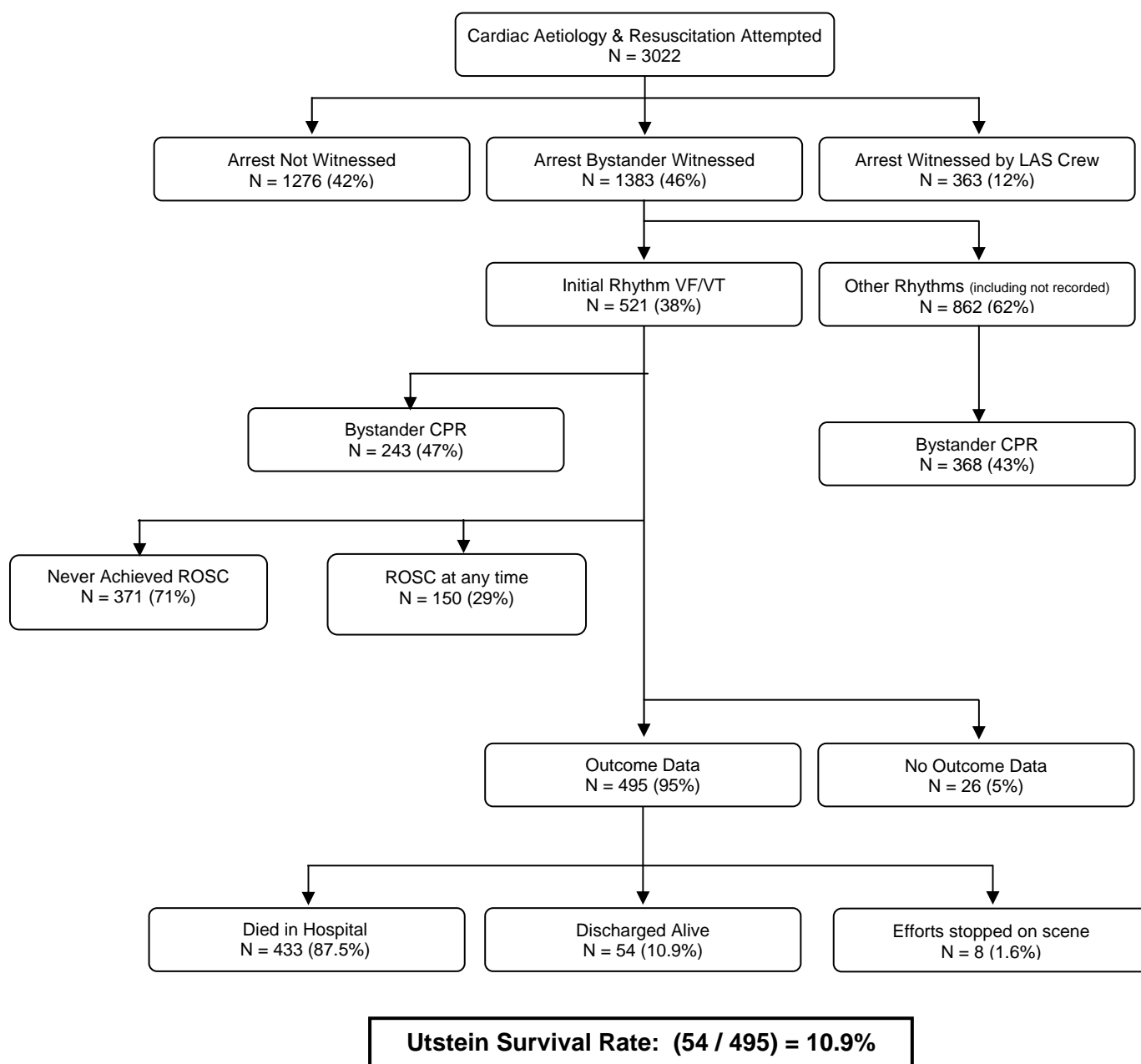
Figure 3. Destination hospital

## Survival Calculations

The LAS calculates two survival figures: an Utstein survival rate and an overall survival rate.

### Utstein Survival Rate

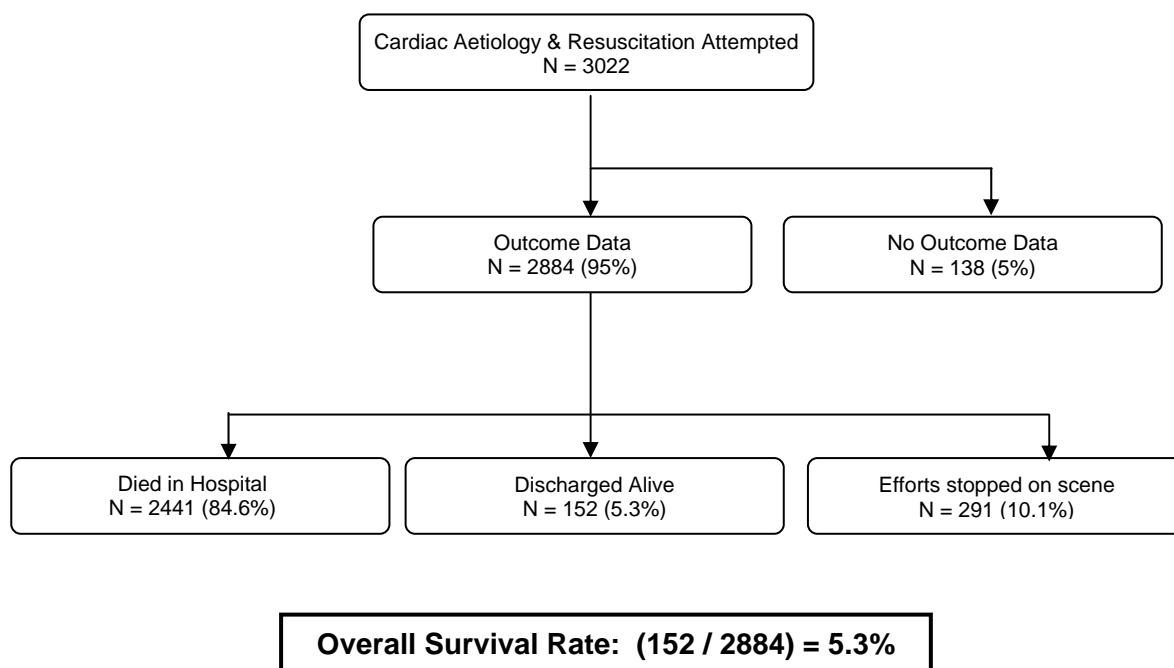
The Utstein survival calculation<sup>1</sup> is an internationally validated method for calculating out-of-hospital cardiac arrest survival rates that enables comparisons between services. The Utstein calculation is the number of patients discharged alive divided by the number of persons who had resuscitation attempted following a cardiac arrest of a presumed cardiac aetiology, where the arrest was bystander witnessed and the initial rhythm was VF or VT. Patients for whom outcome records could not be traced (n=26) were excluded from the survival analysis. Therefore, the valid denominator for the 2005/06 Utstein survival calculation was 495. The Utstein survival rate for 2005/06 was 10.9%.



<sup>1</sup> Cummins RO, Chamberlain DA, Abramson NS et al. Recommended Guidelines for Uniform Reporting of Data from Out-Of-Hospital Cardiac Arrest: The Utstein Style. *Annals of Emergency Medicine*, 1991; 20: 861-873.

## Overall Survival Rate

The overall survival rate is based on all patients who had resuscitation commenced by the LAS following an out-of-hospital cardiac arrest of a presumed cardiac cause. The overall survival rate for 2005/06 was 5.3%.



## Conclusions

The LAS's Utstein out-of-hospital cardiac arrest survival rate has more than doubled in the last six years, increasing from 4.2% in 1998/99 to 10.9% in 2005/06. This means that over one in ten people who suffer an out-of-hospital cardiac arrest in London are likely to survive if they have a bystander witnessed cardiac arrest and an initial arrest rhythm of VF/VT. There has also been a positive increase in the overall rate of cardiac arrest survival, from 3.2% in 2003/04 to 5.3% in 2005/06. Overall, patients now have a one in twenty chance of surviving an out-of-hospital cardiac arrest of presumed cardiac aetiology. A number of factors will have contributed to the improved survival rate, some of these are discussed below.

Effective bystander CPR is known to be associated with a better chance of survival. Bystander CPR rates increased by 5%, from 34% in 2004/05 to 39% in 2005/06. During 2005/06 the LAS Community Resuscitation Training team taught 8,500 people the life-saving technique of CPR. Such training has helped to improve the public's knowledge of the importance of intervening in a cardiac emergency, and may have contributed to the increased rates of bystander CPR.

In April 2005, the Advanced Medical Priority Dispatch System (AMPDS) software was upgraded to version 11.2. This upgrade involved a change in the dispatcher-assisted telephone CPR protocol, so that callers reporting a cardiac arrest were instructed by Emergency Medical Dispatchers to provide an initial set of 400 chest-compressions, without any interruption for ventilations, followed by a series of 2

ventilations and 100 compressions. Prior to this upgrade, callers were instructed to provide chest compressions and ventilations at a ratio of 15:2. There is an increasing evidence base that uninterrupted chest compressions are associated with a greater survival benefit. It is possible that the introduction of this 'compression first' protocol may have contributed to the increase in survival that was evidenced in the year since its implementation.

Other important cardiac work has been undertaken by the LAS's Community Defibrillation Officer who has trained 2,500 people in the use of Public Access Defibrillators situated across the Capital. In 2005/06, 24 patients were defibrillated by somebody trained as part of the LAS's Community Defibrillation Programme, and over a third were discharged alive from hospital. Of the 152 survivors in this report, 9 were defibrillated as part of the Community Defibrillation Programme.

In addition to the positive impact of bystander intervention, an increased rate of ROSC was reported during 2005/06 compared to previous years. ROSC was achieved in one fifth of patients, which represents a 2% increase from 2004/05.

This year has seen yet another reduction in the number of missing outcomes for patients conveyed to hospital. Only 5% of patient outcomes were untraceable during this period, compared to 10% in 2004/05 and 43% in 2002/03. This improvement is largely due to the support and cooperation we have received from our NHS colleagues at the hospital trusts to which patients are conveyed, and the access we have gained to two national databases.

### **Points for Action**

- Efforts must continue to promote and ensure complete, accurate and legible PRF documentation through the Team Leader Clinical Performance Indicator (CPI) and feedback process. This is essential for ensuring that the cardiac arrest data set represents a true reflection of each case and for maximising the number of patients included in the survival calculations.
- The FR2 data card downloads form an essential part of the cardiac arrest patient record. They can be used to confirm a patient's initial arrest rhythm and help inform future treatment decisions. It is therefore essential that Team Leaders encourage crews to hand in FR2 data cards and download them on a regular basis.
- Bystander intervention clearly has an important role to play in patient survival following out-of-hospital cardiac arrest. The LAS should continue to support the valuable work of the Community Defibrillation Officer and the Community Resuscitation Training team.
- The LAS must continue to support its programme of cardiac research and audit to enable further developments and improvements to be made to cardiac care in the coming year.