London Ambulance Service
NHS Trust

Stroke Annual Report 2017/18

November 2018

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London Ambulance Service
NHS Trust

Stroke Overview | 2017-18

Patients

12,165

Total number of suspected stroke

47%
69 years

53%
72 years

Care Bundle

F A S t

98%

99%

99%

=

97%

Conveyance

99%

Appropriately triaged to a HASU

Timings

999 call to arrive scene

22 mins

Overall on-scene

34 mins

Journey to HASU

18 mins

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1 Introduction

From 1st April 2017 to 31st March 2018, the London Ambulance Service NHS Trust (LAS) attended 12,165 patients over the age of 16 who presented with symptoms of stroke as identified by our clinicians using the Face, Arm and Speech Test (FAST).

As part of the on-scene assessment, our clinicians complete the pre-hospital care bundle for suspected stroke patients: FAST, and measuring the blood pressure and blood glucose. In addition, staff will attempt to establish the time at which the patient's symptoms started as this will help determine the continuing care delivered at hospital.

Suspected stroke patients are conveyed to one of eight specialist hyper-acute stroke units (HASUs) in London for a Computerised Tomography (CT) scan and treatment as needed. Thrombolysis is one of the treatments available to patients where the stroke has been caused by a blood clot obstructing blood flow to the brain. Thrombolysis is most effective when administered early and the optimum timeframe is within 4.5 hours. As such, a pre-alert call is placed for patients who are conveyed within 4.5 hours of symptom onset to expedite their care by the specialist stroke team on arrival at the HASU. These patients are considered as potentially eligible for thrombolysis reperfusion treatment.

Data for this report was sourced from the LAS Suspected Stroke Registry, which holds clinical information collected from the LAS Patient Report Forms (PRFs), and operational details from the emergency call logs and vehicle Mobile Data Terminals (MDTs).

2 Findings

2.1 Patient demographics

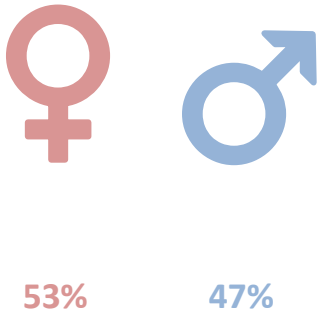

Figure 1: Gender

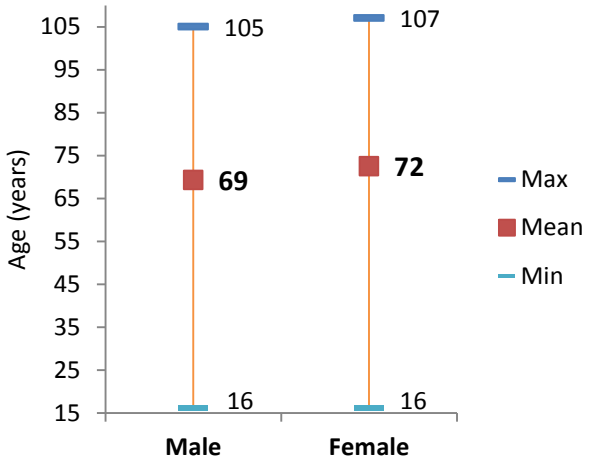

Figure 2: Age by gender

- Just over **half** (n=6,382, 53%) of patients were **female**.
- The mean age was **71 years**, with males being on average 3 years younger than females.

2.2 Call information

Emergency Medical Dispatchers (EMDs) will triage emergency calls based on the information provided by the caller. To help identify stroke patients as early as possible, EMDs will undertake a FAST assessment over the phone.

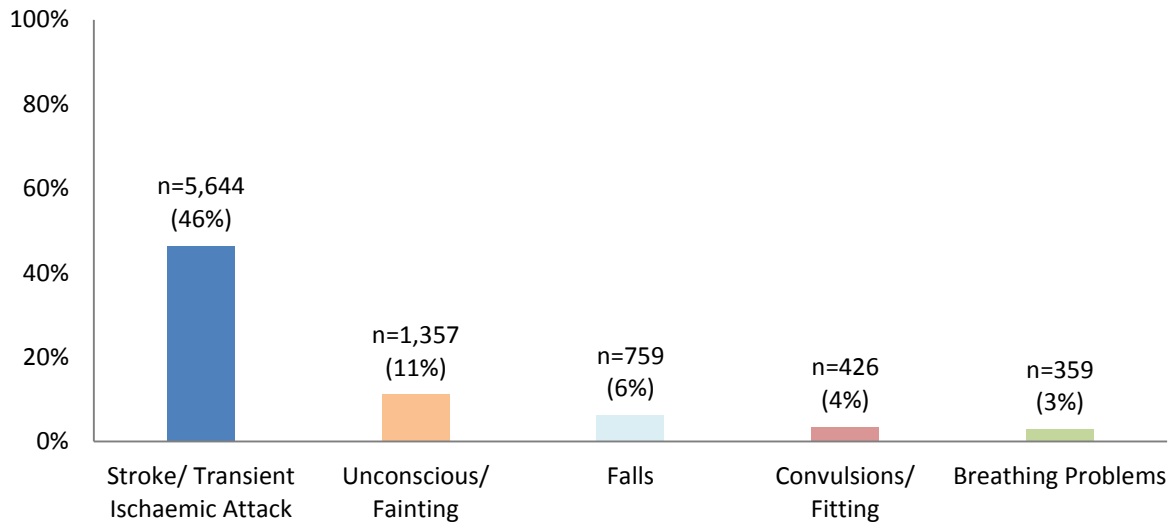

Figure 3: Top 5 chief complaints from emergency calls from members of the public

- **80%** (n=9,732) of calls were from members of the **public**. Just under **half** of patients (46%) were identified as suffering a **stroke** at the point of the 999 call.
- **Healthcare professional** admissions (n=1,121) and **111** transfers (n=1,312) accounted for **20%** (n=2,433) of calls.

2.3 Response information

On 1st November 2017 the LAS implemented the new national standard for call categorisation and associated response times as defined by NHS England's Ambulance Response Programme (ARP). As the new standards redefined response categories and the way response times are measured, this section is divided into two parts representing performance against the previous definitions (pre-ARP) and the new standards (post-ARP).

2.4.1. Pre-ARP (1st April 2017 – 31st October 2018)

During this period, calls were categorised as Red or Green calls. The highest priority (Red) response category was sub-divided into Red 1 and Red 2 (with Red 1 indicating those incidents which were immediately life-threatening). Red 1 responses were measured from the time the call was connected by the operator. The remaining categories allowed a period of time for information gathering by the EMD in order to assign the most appropriate response to each patient. For all categories, the clock stopped when the first resource arrived on scene. Red calls had a national target of 75% of patients receiving a response within 8 minutes.

Category ^	n (%)	Response time, minutes		
		Mean	Median	90th Centile
Red 1	81 (1%)	8	7	14
Red 2	4,855 (76%)	8	7	14
Green	1,427 (22%)	33	20	74
Overall◊	**6,363**	**14**	**8**	**26**

^ Healthcare Professional Admissions are excluded from response time figures.

◊ Total does not add up to 100% due to rounding.

Table 1: Category by response time (Pre-ARP)

2.4.2. Post-ARP (1st November 2018 – 31st March 2018)

From 1st November 2017, calls were categorised into four groups from Category 1 for 'life-threatening illnesses or injuries' such as cardiac arrest through to 'less urgent conditions' in Category 4. For each category, the response time is measured using a set of rules that define the point at which the clock starts and the type of resource that is required to arrive on scene for the clock to stop (see below).

Category	Response standard (mins)		Definitions
	Mean	90th centile	
Category 1 (Life threatening)	7	15	Clock start The earliest time that: • the call is assigned a chief complaint; or • the first resource is dispatched; or • 30 seconds from the call connecting. Clock stop The arrival of the first LAS resource (whether a solo responder or an ambulance).
Category 2 (Emergency)	18	40	Clock start The earliest time that: • the call is assigned a chief complaint; or • the first resource is dispatched; or • 240 seconds from call connect Clock stop The arrival of the first LAS vehicle able to transport the patient to hospital.
Category 3 (Urgent)	120 (maximum time)		
Category 4 (Less urgent)	180 (maximum time)		

Category ^	n (%)	Response time, minutes		
		Mean	Median	90th Centile
Category 1	244 (5%)	9	7	14
Category 2	3,739 (80%)	21	15	41
Category 3	563 (12%)	65	36	157
Category 4	134 (3%)	63	52	118
Overall #	**4,681**	**27**	**16**	**53**

^ Healthcare Professional Admissions are excluded from response time figures.

 # Category was not available for one incident.

Table 2: Category by response time (Post-ARP)

- In the pre-ARP period, **three-quarters** of calls were categorised as requiring a **Red 2** response.
- Under the new ARP standards, the **majority** (80%) of calls were allocated a **Category 2** response.
- Stroke patients received a mean response of **14** minutes prior to ARP, with a median time of 8 minutes.
- The post-ARP mean response was **27** minutes from clock start to arrival of an appropriate response. The median time was 16 minutes.
- Comparing the time taken for a vehicle capable of transporting a patient to arrive on scene, the pre-ARP mean response was 23 minutes and the post-ARP mean response was 26 minutes.

2.4 On-scene times

The type of response dispatched to the scene by the LAS is based on the response category allocated. The highest priority patients will often receive a solo responder (i.e. a car, motorbike, cycles) to initially assess and treat the patient, followed by an ambulance that can convey the patient to hospital. Lower priority patients may still receive a solo responder but the aim is to dispatch an ambulance that can treat and convey the patient.

From the arrival of:	On-scene time, minutes ^		
	Mean	Median	90th Centile
First attending vehicle	34	30	52
First conveying ambulance	29	26	44

^ Non-conveyed patients (n=45) are excluded from on-scene time figures.

Table 3: On-scene times

- The overall mean **on-scene** time was **34 minutes** and the median time was 30 minutes, which is an improvement on last year by 2 minutes.
- When measured from arrival of the first ambulance vehicle, the mean on-scene time was 29 minutes. The median time was 26 minutes, which remains consistent with last year.

2.5 Patient assessment and care

2.5.1 Time of onset

Time of symptom onset	n (%)
Within 4.5 hours	7,584 (62.3%)
Over 4.5 hours	1,979 (16.3%)
Unknown	2,587 (21.3%)
Not documented	15 (0.1%)

Table 4: Onset of symptoms

- Documentation of the **symptom onset time is 99.9%**, an increase of 0.1% from 2016/17.
- Nearly **two-thirds** of patients had a **symptom** onset **within 4.5 hours** making them potentially eligible for thrombolysis.

2.5.2 Care bundle compliance

The care bundle includes the completion of all components of the Face, Arm and Speech Test, measurement of blood glucose and blood pressure.

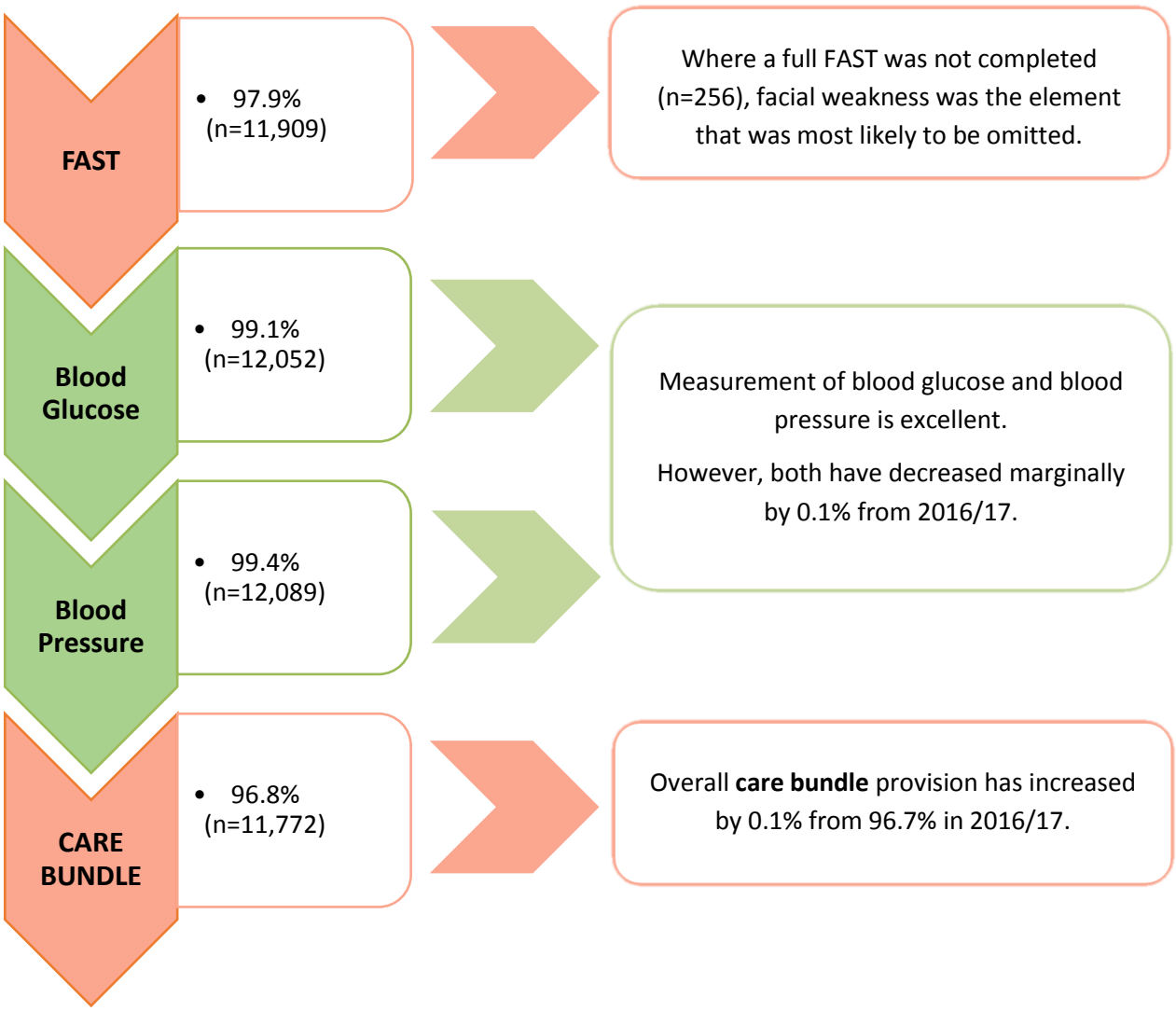

Figure 4: Care bundle administration

2.6 Conveyance

Stroke patients in London can be conveyed to a Hyper Acute Stroke Unit (HASU) for specialist care. In some instances the patient may be conveyed to an Emergency Department (ED) if the patient's condition is considered unstable by LAS clinicians or if a Health Care Professional has arranged admission at a hospital without HASU facilities.

2.6.1 Destination of patients

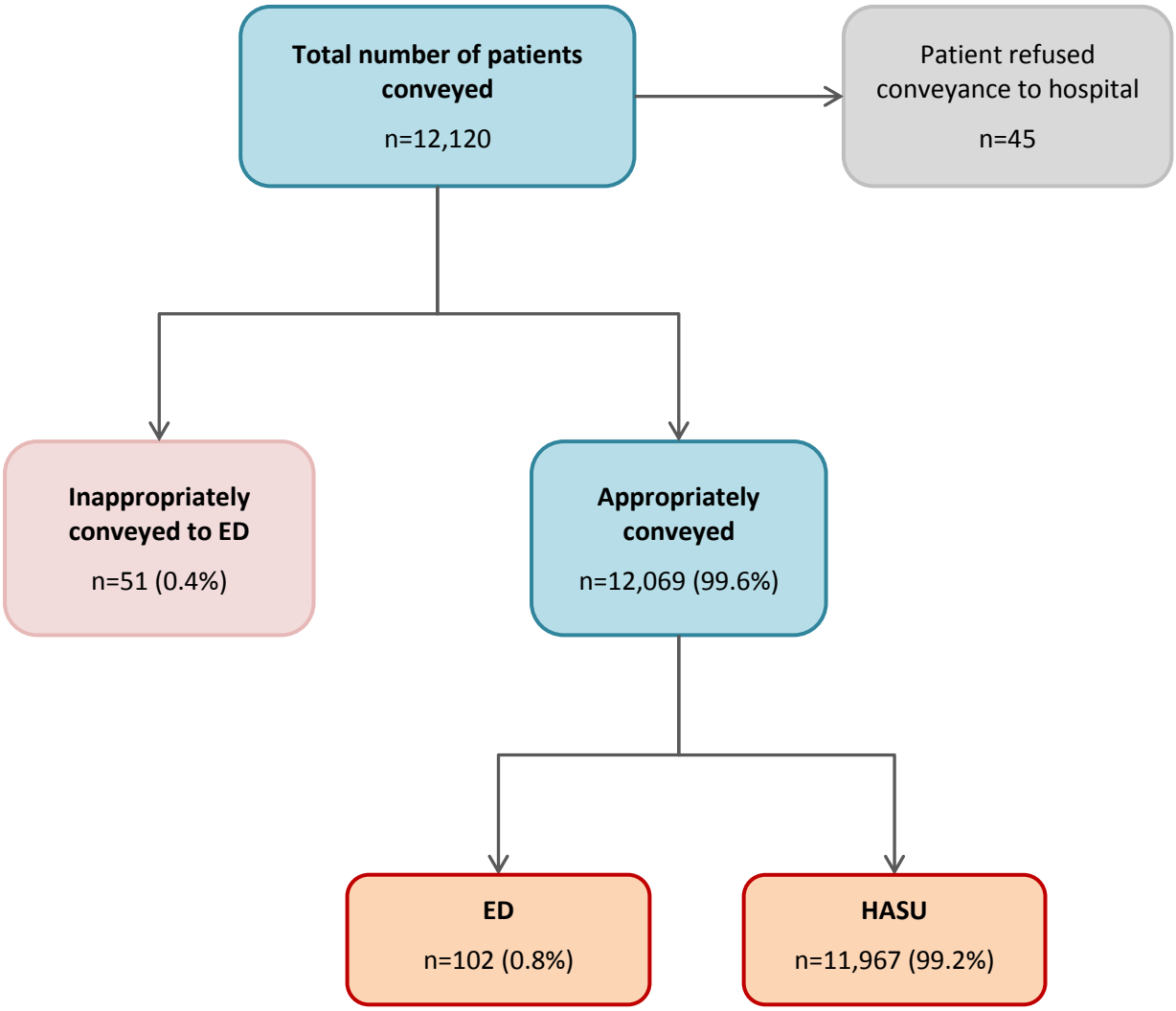

Figure 5: Patient destination

- The majority of stroke patients **(99.6%)** were conveyed to the most **appropriate destination** for their condition.
- **99.2%** of patients were conveyed to a **HASU**.

2.6.2 HASU utilisation

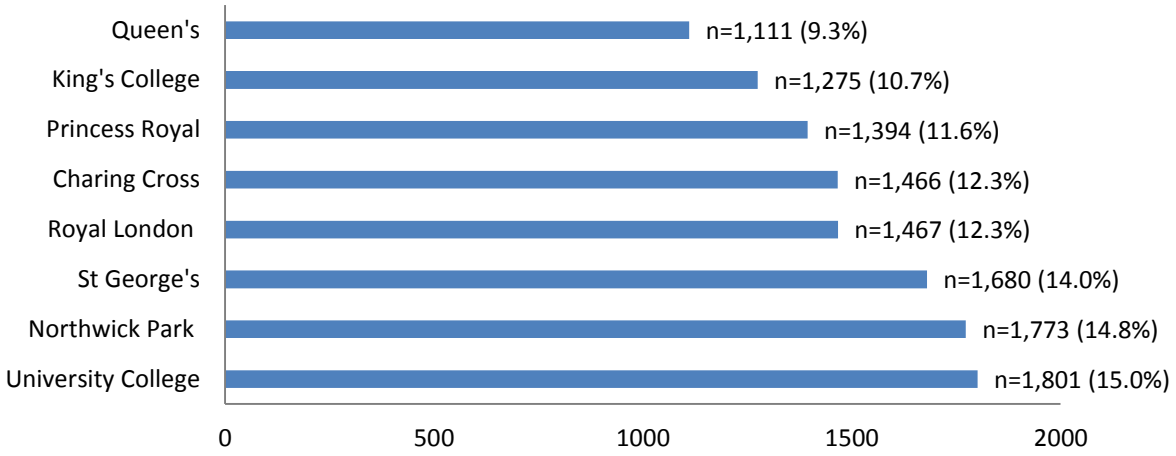

Figure 6: Number of patients conveyed to each HASU

- The majority of patients were conveyed to the HASU at University College Hospital (n=1801, 15%), closely followed by Northwick Park Hospital.

2.7 Journey and call to hospital times

Patients whose symptom onset falls within the thrombolysis treatment window of 4.5 hours are conveyed rapidly to a HASU following a pre-alert call to the stroke team. Patients whose symptoms are older than 4.5 hours are transported to a HASU under normal driving conditions.

Destination		Leave scene – arrive hospital, minutes ^			999 call – arrive hospital, minutes ^†		
		Mean	Median	90th centile	Mean	Median	90th centile
HASU	All HASU patients	18	15	31	72	63	109
	Patients with onset of symptoms ≤4.5 hours	15	14	25	62	58	91
Patients conveyed to an ED		17	15	30	93	76	193
Overall		18	15	31	72	63	110

^ Non-conveyed patients are excluded from the figures.

†999 Call to Hospital times have been calculated from the time the call was connected to the operator. Healthcare Professional Admissions are excluded from the figures.

Table 5: Journey and call to hospital times

- The mean **journey time** to hospital for patients was **18 minutes**.
- For those with a symptom onset **within 4.5 hours**, the mean journey time to a HASU was **quicker** by **3 minutes**. This was well within the 30 minutes target set by the London Stroke Network.
- The mean time from 999 **call to** arrival at a **HASU** was 72 minutes, which is 3 minutes later than the previous year. However, for patients with a symptom onset **within 4.5 hours**, the mean time from call to HASU arrival is **faster** by **10 minutes**, which is consistent with last year's findings.

3 Summary

The findings of this report show that the LAS has continued to provide excellent care to stroke patients in London. The LAS provided a comprehensive assessment as demonstrated by the excellent care bundle compliance, and ensured that nearly all patients were transported to an appropriate destination. Improvements still need to be made to reduce on-scene times and further increase the completeness of the FAST.

4 Looking forward

In the coming year, the LAS will focus on a number of initiatives to improve patient care:

- We will continue to highlight instances where the patient was not conveyed to an appropriate destination for investigation and feedback to staff.
- Details of all incidents where a full care bundle was not provided will be shared with local management teams for feedback and further learning.
- The LAS will continue to collaborate with NHS England in the ongoing development of Ambulance Quality Indicators for stroke patients to ensure that the metrics are appropriately defined.
- The LAS will work to source patient data from the Sentinel Stroke National Audit Project (SSNAP) to enable the reporting of outcomes and inform future initiatives to enhance stroke care by our staff.

Acknowledgements

CARU wishes to thank colleagues in the Medical Directorate for their ongoing support, particularly Neil Thomson.

Glossary of abbreviations and terms

Blood glucose (BM) – Blood glucose molarity is a measure of a patient's blood glucose level.

Blood pressure (BP) – Blood pressure is measured in systolic and diastolic units.

Care Bundle – The optimum combination of observations that ambulance crews should perform so that the patient receives the best possible care.

Category C – Calls which are not deemed immediately life-threatening (based on the information given by the caller regarding the patient's condition) are classed as Category C. Some patients subsequently diagnosed with a stroke receive this response, primarily where the patient has not reported any FAST symptoms or where other medical conditions were reported instead (e.g. collapse/ not alert).

Clinical Commissioning Group (CCG) – NHS organisations that govern the delivery of services within areas of England.

Computerised Tomography (CT) – A cross-sectional, three-dimensional view of internal organs made by combining multiple x-ray images. HASUs use a CT scan to identify where in the brain the suspected stroke is occurring, the type of stroke, how old it is, and how best it should be treated.

Face, Arm and Speech Test (FAST) – A diagnostic test developed in the UK in 1998 used by ambulance clinicians to help assess and detect the symptoms of a stroke. The FAST assesses for Facial drooping, Arm weakness and Speech difficulties as signs of a stroke. The 'T' can also refer to Time to emphasise the importance of rapid assessment and treatment. If a patient presents with one or more of these features they are known as FAST positive (in this report these patients are referred to as stroke patients).

First arriving vehicle – A resource dispatched to immediately life-threatening calls which can include a solo responder (such as a car, motorcycle, bicycle response) or an ambulance.

Hyper Acute Stroke Unit (HASU) – Specialist centres which patients suffering a stroke are taken directly to for rapid assessment and treatment.

Red category – Red calls (or category A) are those classed as immediately life-threatening, and should receive a response within 8 minutes of the initial 999 emergency call. The vast majority of patients diagnosed with a stroke receive a Red response.

Time of Onset – The potential time that the stroke occurred based on information available from patients and others. Where a time cannot be established the last time the patient was seen well is used as an alternative to help assist ambulance staff with decisions regarding rapid conveyance to HASU.

Thrombolysis – A form of treatment in which a drug that breaks down blood clots is used in an attempt to unblock the artery leading to the area of brain affected by the stroke.

Appendix 1: Incident information by area (as determined by the CCG of the incident)

CCG^	**Number of stroke patients**	**Journey times to a HASU** Mean (median), minutes	**Call to arrival at HASU~** Mean (median), minutes	**Call to arrival at HASU for patients who were potentially eligible for thrombolysis* ~** Mean (median), minutes
Barking and Dagenham	287	12 (11)	64 (56)	56 (54)
Barnet	559	24 (22)	80 (73)	71 (67)
Bexley	426	27 (25)	83 (74)	73 (65)
Brent	497	16 (14)	69 (60)	60 (56)
Bromley	571	13 (12)	65 (59)	59 (55)
Camden	304	12 (10)	65 (59)	58 (53)
Central London	325	13 (11)	63 (56)	58 (53)
City and Hackney	323	14 (12)	69 (62)	62 (58)
Croydon	627	21 (18)	77 (69)	68 (62)
Ealing	552	19 (16)	74 (65)	64 (58)
Enfield	433	36 (31)	99 (84)	82 (75)
Greenwich	329	26 (23)	77 (72)	69 (67)
Hammersmith and Fulham	255	9 (8)	63 (50)	53 (48)
Haringey	278	24 (22)	85 (74)	71 (65)
Harrow	362	11 (10)	62 (53)	57 (51)
Havering	459	10 (10)	63 (54)	56 (52)
Hillingdon	543	23 (20)	79 (69)	69 (64)
Hounslow	399	21 (19)	77 (66)	65 (60)
Islington	258	15 (13)	68 (58)	60 (55)
Kingston	529	11 (19)	71 (62)	62 (55)
Lambeth	374	11 (10)	63 (55)	53 (49)
Lewisham	406	17 (16)	69 (64)	63 (57)
Merton	283	12 (11)	57 (51)	50 (46)
Newham	347	18 (15)	74 (68)	66 (63)
Redbridge	412	18 (16)	75 (64)	64 (59)
Richmond	264	23 (21)	76 (69)	68 (63)
Southwark	398	11 (10)	63 (56)	56 (53)
Sutton	329	19 (16)	68 (62)	61 (55)
Tower Hamlets	277	9 (8)	64 (58)	56 (53)
Waltham Forest	365	26 (24)	88 (76)	75 (68)
Wandsworth	352	13 (11)	58 (52)	53 (48)
West London	306	13 (11)	62 (58)	56 (54)

^ For 6 cases the CCG was unknown.

~ Health Care Professional admissions are not included.

** Patients whose symptoms were less than four and a half hours old when leaving the scene of the incident, or where the time of onset of symptoms was not documented by the crew.*

Appendix 2: Care of patients by Group Station

Station Groups	**n**	**On-scene times (from first attending resource)** Mean (median), minutes	**Care bundle**	**Journey time to a HASU** Mean (median), minutes
Homerton	581	35 (32)	97%	13 (11)
Newham	818	34 (31)	98%	20 (17)
Romford	877	33 (29)	97%	13 (11)
North East	2,276	34 (31)	97%	15 (13)
Camden	519	35 (31)	98%	14 (13)
Edmonton	601	36 (32)	96%	30 (27)
Friern Barnet	473	35 (33)	96%	27 (24)
North Central	1,593	35 (32)	97%	24 (22)
Brent	981	31 (28)	98%	15 (13)
Fulham	592	32 (28)	97%	13 (11)
Hanwell	775	33 (30)	98%	21 (18)
Hillingdon	377	33 (29)	98%	23 (21)
Westminster	245	34 (30)	98%	14 (13)
North West	2,970	32 (29)	98%	17 (15)
Bromley	825	34 (30)	97%	16 (14)
Deptford	1072	34 (31)	97%	12 (11)
Greenwich	697	34 (31)	98%	26 (24)
South East	2,594	34 (31)	97%	17 (15)
Croydon	500	33 (29)	97%	20 (17)
New Malden	401	33 (31)	96%	21 (19)
St Helier	417	33 (29)	99%	17 (15)
Wimbledon	604	29 (26)	95%	15 (12)
South West	1,922	32 (29)	97%	18 (16)
PAS & VAS	345	43 (37)	98%	18 (15)
Other LAS[†]	465	33 (29)	86%	19 (16)
LAS-Wide	**12,165**	**34 (30)**	**97%**	**18 (15)**

[†] *Includes Hazardous Area Response, Special Events, Tactical Response Units and Training.*