**Clinical Audit Annual Report 2018-19**

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**2018-19 Clinical Audit Annual Report**

**Contents**

## Acknowledgements

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## For further Information

All documents referred to in this report are available on request from:
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## 1.0 Preface

This year marks the 30th anniversary of the formal introduction of medical audit into the National Health Service (NHS) (DH, 1989). It is therefore opportune to look back at the history of clinical audit and where we are today.

Shortly after the introduction of medical audit in 1989, it was recognised that this systematic review of care would be beneficial for all healthcare professionals and, as a result, clinical audit was established. The role of clinical audit in achieving a high-quality NHS was widely recognised (DH, 1997; DH, 1998) and, in 2000, clinical audit was made a requirement for all NHS Trusts (DH 2000). Today, clinical audit forms one of the key lines of enquiry used by the Care Quality Commission (CQC) to determine the effectiveness of an organisation (CQC, 2017).

Clinical audit is a crucial tool in enabling organisations to monitor and improve patient care. Equally important is how this information is shared both internally and externally to ensure that learning takes place and improvements are widely recognised by healthcare professionals, patients and the public. In 2018-19 the London Ambulance Service NHS Trust (LAS) Clinical Audit and Research Unit (CARU) continued to deliver a comprehensive clinical audit programme facilitating clinical improvement within the Service. Assurance was provided internally via our programme of Clinical Performance Indicators (CPIs) and clinical quality monitoring registries allowing us to nationally benchmark ourselves against other ambulances services in England.

This year our main focus has been on further developing the CPIs and expanding the continuous re-contact clinical audit. Despite the considerable development work, we also managed to continue to undertake specific clinical audit projects, involving the review of patient records, to allow for reassurance and the development of action plans to produce improvement, where required. This year's projects were prompted by potential risks that might have emerged through incidents, near misses or evidence of poor quality and covered a wide range of clinical areas from heart failure and end of life care to paediatric non-conveyance.

We ensure that learning is taken forward by sharing good practice externally and forming recommendations where improvement needs are identified and sharing our findings with staff through training, infographics and Clinical Update articles. Once recommendations have been implemented, clinical care is re-audited to determine whether patient care has improved.

Engagement with frontline clinicians continued to be a priority in 2018-19, with over 100 members of staff assisting with clinical audit throughout the year. Taking part in clinical audit is an invaluable mechanism for clinicians to learn about the clinical audit process and reflect on their clinical practice.

This report outlines all clinical audit activity undertaken by the LAS in 2018-19 and describes the direction for the next year.

## 2.0 Clinical Audit Projects

The LAS's clinical audit work programme is discussed and approved annually by the multidisciplinary Clinical Audit and Research Steering Group (CARSG). Topics selected for clinical audit are responsive to the objectives of the LAS, the wider NHS, and pre-hospital care in general and are prioritised using the LAS's Clinical Audit Selection and Prioritisation Tool. Findings and recommendations from our clinical audits are published widely to staff and key stakeholders, including other ambulance services. In 2018-19, CARU published five clinical audit reports. This section outlines the key findings and recommendations from clinical audit reports published in 2017-18.

## 2.1 CARU projects

The following clinical audit projects were completed in 2018-19.

### 2.1.1 Assessment and Management of Patients Presenting with Acute Heart Failure (July 2018)

In 2013, the clinical practice guidelines for acute heart failure (AHF) were updated, reflecting the changing consensus on treatment and management. There was anecdotal evidence that AHF was being misdiagnosed and that Glyceryl Trinitrate (GTN) was administered inappropriately to a small number of patients. This clinical audit aimed to investigate the assessment of patients presenting with AHF and examine the treatment and management of this patient group.

Our clinical audit found that the majority of patients had a full set of vital signs measured and most received a second set of observations after 20 minutes. Patients frequently had an electrocardiogram (ECG) performed and attached to their clinical record. However, jugular venous pressure (JVP) was assessed for very few patients.

These key findings have been shared with clinicians in the Trust-wide clinical newsletter (the Clinical Update), together with an infographic that was made available via the intranet, the closed staff Facebook group and displayed in all ambulance stations.

Every patient with oxygen saturation levels below 94% received supplemental oxygen and most patients received nebulized salbutamol and GTN when indicated. However, some patients were administered oxygen despite adequate oxygenation; salbutamol without a wheeze and GTN with no signs of congestion and who were inadequately perfused. Due to the concern regarding patients being administered medications when not indicated, we shared the findings with the national guidelines developers and as a direct result of our feedback they have amended the salbutamol wording in the management of heart failure national guidelines. In addition, these findings were also shared with clinicians in their mandatory core skills refresher training (in the medicines management session) and the Newly Qualified Paramedic training was updated accordingly.

### 2.1.2 Documentation of EZ-IO® Intra-osseous System use (May 2018)

When EZ-IO Intra-osseous Infusion was subject to clinical audit in 2014, we found that whilst compliance was generally high, recording of the site of insertion and needle size on the patient report form (PRF) was poor. As a result, the protocol for EZ-IO use was revised and reminders to encourage correct documentation on the PRF were included in the Routine Information Bulletin (RIB) and Clinical Update. This re-audit assessed whether there has been an improvement in the documentation of EZ-IO insertion site and needle size since the original 2014 audit.

We found that the majority of patients had a site of insertion documented, but it was not always one of the appropriate sites, or it was not clear which side of the patient's body the IO needle had been inserted. To improve documentation, we created an infographic which, along with highlighting the improvements made since the 2014 clinical audit, detailed the six appropriate sites for EZ-IO access that should be documented on the PRF. We also wrote an article for the Clinical Update highlighting key findings and reminding clinicians of the named sites that must be documented on the PRF.

The re-audit also saw an improvement in the proportion of patients for whom needle size was recorded. However, there remains confusion as to whether this should be the gauge size or length. Therefore, clarification will be provided in the LAS EZ-IO manual that when IO needles are used; the needle length should be documented in millimetres and not the gauge size (as the PRF template currently makes reference to). These clarifications will also be shared with the Clinical Education and Standards Department so that it can be included in future Paramedic training. We have also recommended the future electronic patient care record should specify that the intra-osseous (IO) needle lengths should be documented in millimetres.

### 2.1.3 Assessment and Advice given to Non-conveyed Paediatric Patients with Pyrexia (December 2018)

Identifying the cause of fever in young children can be difficult, therefore it is important that all children presenting to the LAS with pyrexia are thoroughly assessed by the attending ambulance crew and appropriate safety nets are put in place in the event that the child is not conveyed to hospital. A previous clinical audit, in 2012, demonstrated good practice by ambulance clinicians when initially assessing paediatric patients with pyrexia; however, some room for improvement was identified (recording a second set of observations, plus awareness of the observations and medical history which indicate conveyance and direct General Practitioner (GP) referrals). This re-audit evaluated compliance to clinical guidelines for the management of pyrexia in children following the communications made after the previous clinical audit.

Results showed that the assessment, advice and management of pyrexia in children have improved since the last clinical audit in 2012. However, there are still patients being left at home whose observations are not within normal parameters, and those for whom a GP or Walk in Centre referral has not been made. This at risk group accounted for a large proportion of the sample. Although it is reassuring that patient

care for paediatric pyrexia has improved, certain aspects of care still need to be addressed.  These positive messages were shared with the CARSG and summarised in the Trust-wide clinical newsletter.


## 2.1.4 Assessment and Management of Transient Loss of Consciousness (T-LoC) (December 2018)

The LAS audited the care provided to patients who had a T-LOC in 2013 and found that whilst some elements of history taking and assessment were completed well; some aspects more specific to T-LOC required improvement.  Clinicians were particularly poor at recording whether or not the patient had a family cardiac history and if they had bitten their tongue.  As result of the clinical audit, a voluntary study day was run for clinicians to highlight the importance of history taking. In addition, a prompt card was produced and issued on the LAS Digital Pocket Guide to assist clinicians with the management of T-LOC.  Despite the initiatives to improve care, in 2016 a CARU review of the National Institute for Health and Care Excellence (NICE) Quality Standard for T-LOC showed that whilst nearly all patients had a 12-lead ECG undertaken, no patients had details of the T-LOC event, clinical history and/or physical assessment recorded.  Furthermore, in 2016/17, two clinical incidents were reported related to patients with T-LOC: one where the patient had their continuing care delayed as a 12-lead ECG was not undertaken, and another had a delay of over two hours waiting for an ambulance to convey the patient.

This re-audit supports the findings from the NICE Quality Standards.  It demonstrates some areas of excellence for patients suffering a T-LOC such as: recording the circumstances of the event; standard observations; conveyance decisions for patients with red flag symptoms, and the consideration of capacity for patients not conveyed. There were also numerous other areas where the Service has demonstrated improvement since the 2013 clinical audit.

However, documentation of T-LOC care remained poor in a number of  areas including: during-event history (such as appearance and colour, movement or seizure activity and tongue biting); post-event history (specifically confusion and weakness during recovery); person history (including previous T-LOC and family cardiac history) and T-LOC specific assessment (such as auscultation for a heart murmur and standing blood pressure), as well as the need for a direct healthcare professional referral for patients discharged at scene.  The findings were shared with the LAS CARSG.

**2.2 Facilitated Clinical Audit Projects**

In addition to the above audits undertaken by CARU, we also supported other staff to design their own clinical audit project, we quality assured their data and helped them to report their findings.  One of these clinical audit projects, that was undertaken by paramedic Karina Orton and facilitated by CARU, was completed in 2018-19:

**2.2.1 Examining End of Life Care (November 2018)**

End of life care (EoLC) was originally audited in 2013 and demonstrated that improvements were needed.  Many changes have been made since, including the introduction of electronic Coordinate My Care (CMC) records and the updated Joint Royal Colleges Ambulance Liaison Committee guidelines. The LAS has also released four EoLC clinical circulars plus provided face-to-face training for all clinicians. Providing appropriate care to end of life patients is also part of the LAS's Clinical Strategy for 2016-2021.  This clinical audit aimed to assess: the frequency of CMC record access; whether clinicians were appropriately managing EoLC patients, and clinicians' documentation and decision-making.

There were several areas of good practice identified including: recording drug administration and contact with the relevant professionals prior to administering anticipatory medications.  Pain was also considered for the majority of patients.  However, an area of concern highlighted was the use of CMC.  Where the EOC call log confirmed a CMC record was available, this was not accessed for more than half of the patients in the sample.  Where CMC was accessed, this was documented on the PRF for less than a quarter of patients.

A limitation of the clinical audit was the inability for the auditor to gain access to the CMC system.  Patients that did not have an EOC alert stating a CMC record was present may have had a record, but this information could not be verified due to information governance issues.  LAS staff decision making once a CMC record was accessed could also not be evaluated due to lack of access.  These findings were reported to the LAS End of Life Care Working Group and Medical Directorate as well as End of Life Care Project Team to inform the pioneer service.  The key findings will also be highlighted to the CARSG who will consider whether a full clinical audit of End of Life Care should be included in the LAS clinical audit work plan in the future.

**3.0 Continuous Clinical Audit Activity**

**3.1 Clinical Performance Indicators**

The CPIs are a continuous method of clinical audit used to drive forward improvements in patient care throughout the Trust.  The proportion of CPI audits completed fluctuated throughout 2018-19.  In contrast to August 2017, which saw the highest level of completion at 94%, August 2018 saw the lowest level of completion for the year at 70%.  Conversely, the high of 95% in November 2018 exceeded all previous years' monthly completion rates.

At the end of 2018-19, only 37% of clinicians (n=1,413) had received two face-to-face CPI feedback sessions, a further 37% of staff (n=1,410) received face-to-face feedback once, meaning 25% of clinicians (n=968) did not have any face-to-face CPI feedback in 2018-19. This is an improvement of 2% compared to 2017-18, but still requires attention. Other mechanisms for staff feedback are described in Section 9.0.

Compliance to the majority of CPIs remained consistently high throughout 2018-19, with substantial improvements in the documentation of patient care seen in both the Elderly Falls and the Mental Health CPIs. The Elderly Falls CPI demonstrated an increase in the documentation of: recent history of falls; patients' social and environmental circumstances; the face arm speech test (FAST) and assessments for both head and c-spine injuries. The Mental Health CPI saw improved documentation of the patient's: appearance, behaviour, communication and expressed thoughts, as well as their current psychiatric care.

Figure 1 outlines yearly snapshots, each April, of the documentation of care provided for each patient group in April since 2006.
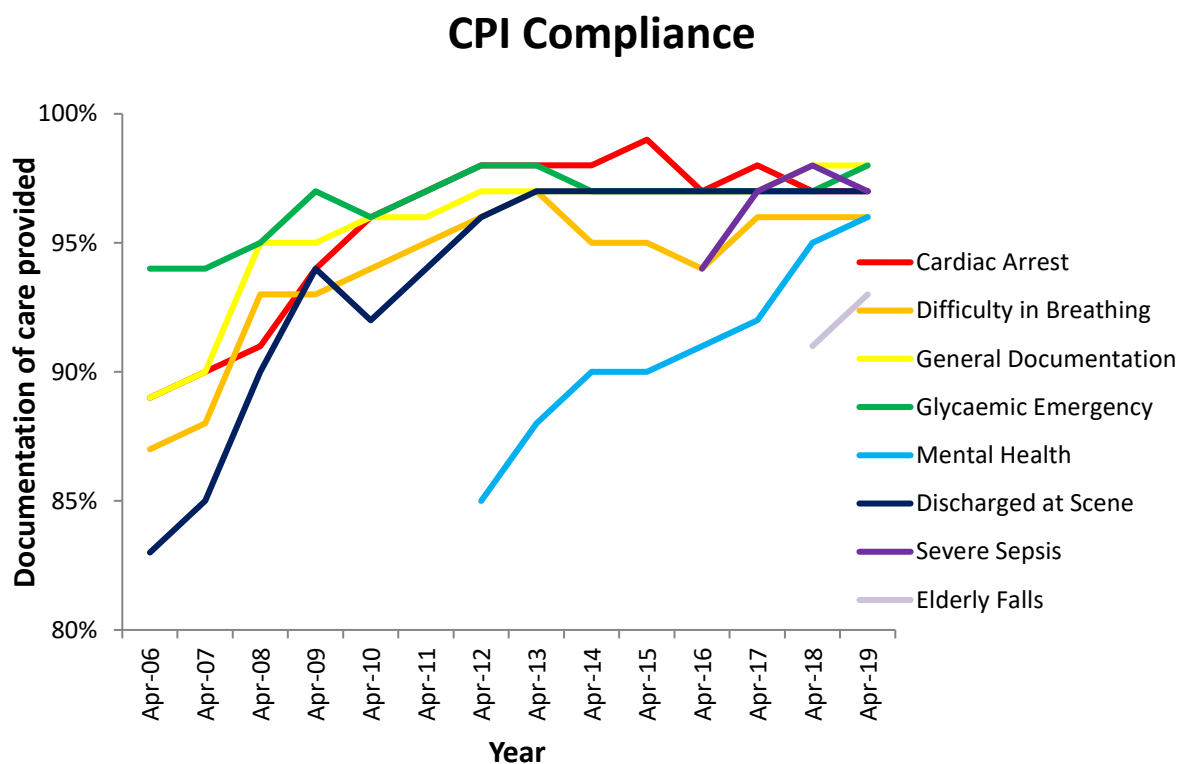


*Figure 1: CPI compliance rates from April 2008 to April 2019*

## 3.2 Clinical Quality Monitoring Registries

In 2018-19, through our clinical registries, we continued to monitor the care provided to:

- Cardiac arrest;
- Acute coronary syndromes (including ST elevation myocardial infarction, STEMI - a type of heart attack);
- Stroke, and
- Major trauma patients.

We also introduced a new sepsis registry to monitor the care for adult patients with severe sepsis (defined as patients with a National Early Warning score of 7 and above). The severe sepsis registry examines the response, assessment and treatment of patients.

Our monthly clinical care packs informed clinical staff and operational management teams of the care provided in each sector, which enabled them to assess and develop local improvement initiatives. Please see the cardiac arrest, STEMI and stroke annual reports for more detailed information.

## 3.3 Continuous Re-contact Clinical Audit

The Continuous Re-contact Clinical Audit (2017-18) aimed to provide assurance that patients discharged of LAS care were done so appropriately. We undertook a continuous clinical audit of all re-contacts that occurred within 24 hours of the original 999 call, where the patient had either severely deteriorated or died unexpectedly. We listened to 999 call and Clinical Hub tapes and also reviewed PRFs for 1,500 patients with assistance from paramedic reviewers, the Quality Assurance Unit and the Clinical Hub. Overall, 97% of the re-contact patients in our sample were pre-alerted to hospital, with 3% being found to have died unexpectedly upon re-contact.

Please see the continuous re-contact clinical audit annual report for more detailed information.

## 4.0 National Clinical Audit

In addition to the Ambulance Quality Indicators described below, in 2018-19, the LAS continued to supply data on request to hospitals for the Myocardial Ischaemia National Audit Project (MINAP). We also routinely supply data to the national Out-of-Hospital Cardiac Arrest Outcomes (OHCAO) registry for benchmarking and research.

**4.1 Ambulance Clinical Quality Indicators**

Throughout 2018-19, we continued to submit data to NHS England for the Ambulance Quality Indicator (AQI) clinical outcome measures for:

- Cardiac arrest;
- STEMI, and
- Stroke.

During the year, NHS England also introduced a new quarterly AQI that examines care for adult patients who have sepsis and a National Early Warning score of 7 and above.  The care bundle examines assessment, oxygen and fluid administration and hospital pre-alerts.

Two new measures were also introduced for the Cardiac Arrest AQI:

- total number of cardiac arrests (irrespective of resuscitation attempted), and
- a post-resuscitation care bundle for non-traumatic adult cardiac arrests.

The post-resuscitation care bundle examines ECG, blood glucose, blood pressure and end-tidal carbon dioxide assessments, and oxygen and fluid administration.

The time to arrival at hospital measure for the Stroke AQI was also broadened to include all suspected stroke patients and data was provided by the Sentinel Stroke National Audit Project (SSNAP) on time from arrival at hospital to CT scan and thrombolysis.

The 2018-19 data submissions were still underway at the time of publication, please refer to the clinical outcomes spreadsheets on the NHS England website for the most up to date submission (https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/ambulance-quality-indicators-data-2018-19/).


**5.0 Development work**

**5.1 CPI Developments**

We made a number of developments to the CPI process during the year:

- In April 2018, we expanded the Mental Health CPI to include auditing of the care given to patients with an undiagnosed psychiatric problem (rather than focusing solely on diagnosed problems).  In order to ensure the introduction of this CPI did not have a negative impact on workload for Team Leaders, the CPI audit for patients with an undiagnosed psychiatric problem alternates with that of patients with a diagnosed psychiatric problem on a monthly basis.

- The Elderly Falls CPI was also introduced in April 2018 as a result of the March 2015 audit 'A clinical audit evaluating the care provided by the London Ambulance Service to elderly patients who have suffered a ground level fall' (LAS, 2015) which found several areas of improvement were required for this

patient group.  This CPI assesses the treatment given to all patients over the age of 65 who have fallen.  The aspects of care this CPI assesses include whether: appropriate observations had been taken; existing anticoagulant and antiplatelet use was recorded; head injury was considered; C-spine injury was recorded; a 12-lead ECG was undertaken where clinically appropriate and whether patients had been referred to the appropriate care pathway.

- Furthermore, every PRF reviewed by a CPI auditor is also considered for any additional clinical concerns (beyond the scope of the CPI).  If any clinical concerns are identified, auditors are encouraged to record these as incidents using Datix (the LAS electronic incident reporting form).  In 2018-19, 126 incidents were logged on Datix as a direct result as being reviewed during CPI audit.

- Auditors were also encouraged to consider if any PRF highlighted a safeguarding concern for any patients.  Any concerns were then discussed with the Emergency Bed Service (EBS) with the view to making a retrospective safeguarding referral.  Seventy-five patients received a retrospective safeguarding referral as a direct result of CPI audit in 2018-19.

- In May 2018, we introduced two new clinical performance indicators for our Advanced Paramedic Practitioners (APPs) in Critical Care:

  - The Major Trauma CPI assesses the care provided by Critical Care APPs with a focus on tranexamic acid.
  - The Acute Behavioural Disturbance CPI allows for the audit of drugs such as midazolam and haloperidol.

## 5.2 Re-contact Developments

In 2018-19, the continuous re-contact clinical audit was expanded.  This programme now includes cases where the patient receives a call back from a Clinical Hub Paramedic (Hear & Treat) or where they are advised by the Emergency Medical Dispatcher (EMD) to call NHS 111 for a further assessment and re-contact the LAS within 24 hours because they have severely deteriorated or died unexpectedly.

## 6.0 Engaging Staff in Clinical Audit

Every PRF completed by an LAS clinician provides the opportunity for learning and improved patient care through clinical audit.  The Health and Care Professions Council's *Standards of Proficiency for Paramedics* (HCPC, 2014) clearly identifies clinical audit as a key obligation, specifying that registrants 'must be able to assure the quality of their practice… be able to engage in evidence-based practice, evaluate practice systematically and participate in audit procedures'.

By actively participating in clinical audit, clinicians also obtain first-hand experience of using evidence for change, and demonstrate a commitment to professional development. Clinical audit can provide a different view of clinical practice, contributing to improved skills and confidence. In addition, the insight gained into how information from clinical records is used can enhance the clinicians' own documentation.

## 6.1 Volunteering

In 2018-19, 102 LAS clinicians and 3 external doctors worked with us, in their own time, on clinical audit projects.

- 91 assisted us with clinical audit by reviewing PRFs and collecting data (90 provided clinical reviews for the Continuous Re-contact clinical audit and one participated in other CARU led clinical audit projects)

- 11 members of front-line staff and three doctors undertook their own clinical audit projects with support and guidance from CARU.

We provide all clinicians who participate in clinical audit feedback on their auditing decisions, helping them with future audits and their clinical practice.

In addition, we have a Paramedic who works regularly with us in his own time as our Staff Engagement Facilitator helping us to communicate key messages across to staff through infographics, videos and discussion on LiA.

## 6.2 Training

As well as providing 1:1 training for individuals undertaking their own clinical audit projects, throughout 2018-19 we delivered a number of different training sessions to a wide variety of staff groups (as shown in Table 2). Each session was tailored to the specific staff group and the level of understanding of evidence based practice they required.

| Session | Audience | Participants 2018-19 |
|---|---|---|
| How to undertake CPI audit | Team Leaders, Mentors and other Paramedics | 114 |
| CARU and the CPIs | Student Paramedics in the LAS Academy | 51 |
| Evidence based practice and the CPIs | New Team Leaders | 13 |
| Emergency Operations Centre Induction: Clinical Audit & Research in the LAS | New Emergency Medical Dispatchers | 177 |
| Re-contact clinical audit | Paramedic volunteer reviewers | 31 |

*Table 2: CARU training delivered in 2018-19*

## 7.0 Patient and Public Involvement

Involving the public in clinical audit can enhance projects by providing a unique insight, offering a different perspective to staff. Patient and public involvement continues to play an important role in clinical audit in the LAS. Our patient representative member of the CARSG not only helped to set the clinical audit work plan, she also visits our department annually to independently review our clinical audit working practices and provide assurance that our clinical audit process is in line with best practice (described in section 7.0 below).

## 8.0 Clinical Audit Assurance

In 2018-19 CARU continued to evaluate whether completed clinical audit projects met their aims and objectives, and identified learning points for future projects (Walshe, 1993).

For the sixth consecutive year, a patient representative conducted a review of the Service's clinical audit working practices by to ensure compliance to our clinical audit strategy. The review found that clinical audits continued to be carried out in line with the strategy.

## 9.0 Sharing and Learning

## 9.1 LAS Internal Engagement

## 9.1.1 Infographics

CARU continued to promote clinical audit findings and key messages in 2018-19. Infographics outing key findings and improvement messages were sent to ambulance stations and were shared on the Service's closed Facebook Group for Staff (LiA), stimulating discussion amongst clinicians. The Quick Response (QR) codes on our posters (a 2D coded image that when read by a QR reader take the user to an online destination) continue to provide convenient access to the related LiA discussion. Messages from clinical audit projects are routinely communicated to staff via the Clinical Update, the RIB and in the LAS Insight magazine using interesting case studies identified via clinical audit.
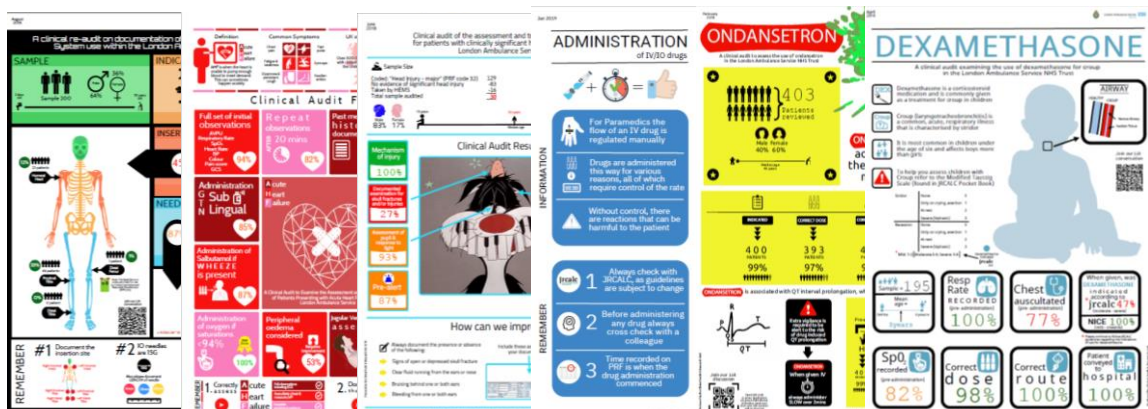
### 9.1.2 Feedback

CARU forwarded 204 PRFs to Quality Assurance and Governance Managers (QGAMs), or to specialty leads, for review where our clinical audit activity identified that clinicians may be able to improve their clinical practice. Where it was deemed necessary from review, feedback was delivered to clinician.

### 9.1.3 Safeguarding Concerns

CARU also raised 513 safeguarding concerns where patients' clinical records suggested they may be vulnerable and the attending clinician did not record that a referral had been made. The majority of referrals were for patients under 18 years involved in major trauma.

### 9.1.4 Survival Letters

CARU also continues to ensure that excellent clinical practice is recognised through positive feedback and cardiac survival letters:

- over 1,300 letters were sent to clinicians whose patient survived following a cardiac arrest, and

- more than 300 letters were sent to Emergency Medical Dispatchers to recognise their role in early recognition of cardiac arrest and initiation of dispatcher assisted bystander CPR.

### 9.2 Externally Spreading Best Practice

As well as communicating key clinical audit findings internally, CARU also externally promoted the LAS as an organisation that values and is active in clinical audit:

- In 2018-19, two LAS clinical audit abstracts were accepted at an international conference (as shown in appendix two).

- The third edition of Blaber's Foundations for Paramedic Practice: A theoretical perspective was published in 2018-19. This contains two chapters co-authored by members of CARU focussing on 'Research and evidence-based practice' and 'Using clinical audit to improve patient care' (Blaber, 2018).

- CARU also won the Clinical Audit Award 2018 from the Clinical Audit Support Centre for the Clinical Performance Indicators, highlighting how clinical audit can improve patient care and service delivery.

- In addition, the Clinical Audit Support Centre selected the LAS to showcase good clinical audit practice. This is the first time an ambulance service has been selected. The article was published on their website and tweeted as part of clinical audit awareness week.

## 10.0 Directions for 2019-20

The LAS's clinical audit programme for 2019-20 will look at a range of different areas allowing us to look more closely at areas of clinical care related to potential clinical quality issues. Clinical audit will focus on the LAS's strategic objectives: falls, mental health, maternity and urgent care, as well as medicines management. We will ensure that clinical audit focusses on areas that have not previously been audited as well as conducting re-audits. In addition, we will continue to participate in national clinical audit and promote LAS clinical audit through internal training and external publications. See appendix five for the complete work programme.

Additionally during 2019-20, the LAS will begin contributing pre-hospital data directly to MINAP and SSNAP as part of developments nationally. This will allow AQI metrics on timeliness to be reported on confirmed Myocardial Infarctions and stroke patients with more accurate source data from ambulance service records.

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**Appendix one: Glossary of abbreviations**

| | |
|---|---|
| AHF | Acute heart failure |
| APP | Advanced Paramedic Practitioner |
| AQI | Ambulance Quality Indicator |
| CARSG | Clinical Audit & Research Steering Group |
| CARU | Clinical Audit & Research Unit |
| CMC | Coordinate My Care |
| CPI | Clinical Performance Indicator |
| CPR | Cardiopulmonary resuscitation |
| CQC | Care Quality Commission |
| CSR | Core Skills Refresher |
| EBS | Emergency Bed Service |
| ECG | Electrocardiogram |
| EoLC | End of life care |
| EMD | Emergency Medical Dispatcher |
| GP | General Practitioner |
| GTN | Glyceryl Trinitrate |
| IO | Intra-osseous |
| JVP | Jugular venous pressure |
| LAS | London Ambulance Service NHS Trust |
| LiA | Listening in Action Facebook Page |
| MPDS | Medical Priority Dispatch System |
| MINAP | Myocardial Ischaemia National Audit Project |
| NHS | National Health Service |
| NICE | National Institute for Health and Care Excellence |
| OHCA | Out of Hospital Cardiac Arrest |
| PRF | Patient Report Form |
| QGAM | Quality Governance and Assurance Manager |
| QR | Quick Response code |
| RIB | Routine Information Bulletin |
| ROSC | Return of Spontaneous Circulation |
| STEMI | ST elevation myocardial infarction |
| T-LoC | Transient loss of consciousness |

**Appendix two: Papers accepted for journal publication**

| | |
|---|---|
| **Title:** | Repeated adrenaline doses and survival from an out-of-hospital cardiac arrest |
| **Authors:** | **Fothergill, R.T**; **Emmerson, A.C**.; **Iyer, R.**; **Lazarus, J.**; **Whitbread, M.**; Nolan, J.P.; Deakin, C. D.; Perkins, G. D. |
| **Publication:** | Resuscitation. 2019 May; 138: 316 – 321 |
| **Title:** | Temporal and geographic patterns of stab injuries in young people: a retrospective cohort study from a UK major trauma centre. |
| **Authors:** | Vulliamy, P.; **Faulkner, M.**; Kirkwood, G.; West, A.; O'Neill, B.; Moore, F.; Brohi, K. |
| **Publication:** | BMJ Open. 2018 Nov; 8(10) |

**Appendix three: Abstract accepted for conference presentation**

| | |
|---|---|
| **Title:** | Pre-hospital paediatric pain management in the London Ambulance Service |
| **Authors:** | J Shaw, B Murphy-Jones, R Fothergill |
| **Conference:** | EMS 2018, Copenhagen, April 2018 |
| **Published:** | BMJ Open, 2018 Apr;8(1) |
| **Title:** | The Pre-Hospital Management of Acute Heart Failure: A Clinical Audit of Current Practice |
| **Authors:** | J Price, B Murphy-Jones, T Edwards |
| **Conference:** | EMS 2018, Copenhagen, April 2018 |
| **Published:** | BMJ Open, 2018 Apr;8(1) |

**Appendix four: Other publications**

| | |
|---|---|
| **Book chapter:** | Research and evidence-based practice |
| **Publication:** | Blaber's Foundations for Paramedic Practice: A theoretical perspective, Third Edition |
| **Authors:** | J Williams, R Fothergill and J Shaw |
| **Book chapter:** | Using clinical audit to improve patient care |
| **Publication:** | Blaber's Foundations for Paramedic Practice: A theoretical perspective, Third Edition |
| **Authors:** | R Fothergill and J Shaw |

**Appendix five: Clinical Audit Work Programme 2019 - 2020**

In order to be responsive to the needs of the Service, projects may change if the need arises.

**CARU Clinical Audit Projects**
- Continuous Re-contact
- Maternity Emergencies Re-audit
- Non-registrant Non-conveyed
- Sepsis Re-audit (including diarrhoea and vomiting)
- Clinical Care Provided by the Mental Health Car
- Bariatric Care
- Paediatric Pain Management Re-audit
- Advanced Airway Management
- Notting Hill Carnival

**Clinical Performance Indicator Audits**
- Cardiac Arrest (all PRFs)
- Difficulty in Breathing: 50% sample overall (derived by looking at all PRFs every other month)
- Glycaemic Emergencies: 50% sample overall (derived by looking at all PRFs every other month)
- Diagnosed Mental Health: 50% sample overall (derived by looking at all PRFs every other month)
- Undiagnosed Mental Health: 50% sample overall (derived by looking at all PRFs every other month)
- Severe Sepsis (all PRFs)
- Elderly Falls (all PRFs)
- Discharge at Scene (50% of all PRFs and 100% of police arranging removal)
- General Documentation (1/40: 2.5% of all PRFs)

**Clinical Performance Indicator Audits (APPs)**
- Critical Care APP Adult Non-Traumatic Cardiac Arrest (all PRFs)
- Critical Care APP Major Trauma (all PRFs)
- Critical Care APP Acute Behavioural Disturbance (all PRFs)

**Clinical Quality Monitoring**
- Cardiac Arrest
- Major Trauma
- Acute Coronary Syndromes
- Stroke
- Sepsis

**National Ambulance Clinical Quality Indicators**
- Cardiac Arrest
- Stroke
- ST-elevation myocardial infarction (STEMI)
- Sepsis