



Report on the New Year's Day 2017 Computer Aided Dispatch system outage

Embargoed until 11am on 27 June 2017

Executive summary

1. As the sole provider of emergency ambulance services for London, receiving 1.6 million calls each year, London Ambulance Service NHS Trust (LAS) has extensive contingency plans in place to deal with a variety of major incidents. These plans cover acts of terrorism, such as those seen recently in Westminster and London Bridge, large-scale events such as the Olympic and Paralympic Games, as well as IT and other system issues.
2. The plans are comprehensive and multi-layered, often involving the support of external partners and other ambulance services. A significant amount of work has gone into creating them and ensuring that they are up to date and tested frequently.
3. LAS, in common with ambulance services around the world, operates a Computer Aided Dispatch (CAD) system. This is a complex piece of computer software, designed to track the average 5,000 calls that come in via the 999 system each day. It supports the highly trained and experienced call handlers to ensure resources, such as ambulance crews, are allocated in the most effective way possible, being sent to the patients most in need first.
4. At 00.30 on New Year's Day 2017, LAS experienced a major failure of the CAD system, taking it offline. While onsite staff worked to fix the system, a major incident was declared and contingency plans were implemented, including call handlers reverting to a paper-based manual system for around six hours. Coming on the busiest night of the year for ambulance services across England, this failure contributed to delays in ambulances reaching some patients with non-life threatening conditions as well as severely stretching call-handling staff dealing with the high volume of calls.
5. Operational staff, both in the call centres and on the front line, deserve thanks and recognition for the skill and professionalism they showed, under exceptionally difficult conditions, during the incident. Their hard work ensured that thousands of people across London received the emergency care they needed, despite the failure of a key piece of infrastructure.
6. The cause of the incident has been identified as a historic upgrade that over time caused the CAD software to consume all available system resources, slowing it down to the extent it became unusable. The incident also exposed gaps in the expertise and capacity of the IT function at the Trust.
7. As a consequence of this system failure, and to ensure lessons were properly learned, an executive group was formed, involving LAS, commissioners, NHS England and NHS Improvement. It commissioned four pieces of work:

- Review 1: An examination of the impact of the CAD failure on patients and their care.
 - Review 2: An independent review of the IT system, carried out by PA Consulting, to look at why it failed, the steps that were taken to fix the problem and the IT systems, and what expertise and support LAS has available.
 - Review 3: An assessment of the business continuity and system resilience, led by the Emergency Preparedness, Resilience and Response Lead for NHS England (London).
 - Review 4: By nature of their complexity, the NHS has to plan for when CAD systems fail. A fourth review, looking at the response of the NHS more widely to CAD system outages, was undertaken by NHS England, to identify what additional learning could have taken place after previous outages.
8. This report, produced by LAS and assured by NHS England and NHS Improvement, includes the findings of those reviews, their recommendations and the action we have subsequently taken. In the interests of transparency, in line with our duty of candour, and to reassure Londoners we are doing all we can to ensure a high quality, safe ambulance service, we are making it public.
9. The reviews found that one patient who died on New Year's Day potentially had their treatment delayed as a result of the high volume of calls and the manual dispatch system that was in place during the CAD outage. However, it would be inappropriate to comment on the impact this delay had on their condition and treatment ahead of a pending inquest by the coroner. No other significant impact on patients has been identified.
10. Management and routine maintenance of the trust's IT systems were found to be insufficient, with a lack of oversight at board level. Since the incident, LAS has appointed a chief information officer and a non-executive director with extensive experience in IT has joined the board. A comprehensive plan is now in place that includes improvements to governance and performance management of IT.
11. Further simulation training and preparation for concurrent events were identified as being needed. This is particularly true when dealing with concurrent events during a period of very high call volumes.
12. LAS accepts the findings and recommendations of the reviews. The Trust has taken immediate action alongside NHS England and NHS Improvement to implement the most urgent of the recommendations with work in train to ensure all remaining actions are carried out as quickly as possible.

Background to the incident

13. Over a typical 24-hour working day, LAS would normally expect to handle around 5,000 calls, with around 7-800 in the midnight to 6am window. However, on New Year's Day, LAS regularly receives more than 2,500 calls in the midnight to 6am window alone.
14. Every year, LAS carries out extensive planning to ensure that sufficient staff and resources are available to meet this extra demand. The plans, which involve additional clinical and IT support staff onsite and reporting into a 'gold command', were subject to review by NHS England and NHS Improvement and found to be reasonable.
15. The majority of calls are triaged as relatively low risk, with large numbers of alcohol-related incidents. Across this period, while ambulance response times for low acuity patients are extended as resources are prioritised to high priority patients, some high priority patients inevitably experience delays while resources are directed first towards those most in need. However, to mitigate this, call handlers try to stay in contact with high risk patients until an ambulance arrives on scene. Additional clinical staff can also reduce the need for an ambulance by using a 'hear and treat' process for low risk patients.
16. Both the Waterloo and the Bow Emergency Operations Centres (EOC) were fully operational throughout the New Year period, with the trust medical director on site to support operational and clinical activities.

The incident and implementation of the contingency plan

17. A software upgrade, made 18 months previously, had prevented a database feature known as the 'Recycle Bin' from being emptied effectively. While the CAD system was being heavily used on New Year's Day, the process to manage the Recycle Bin was therefore using all the available system resource, slowing it down.
18. Shortly after midnight on New Year's Day, the CAD had slowed to the point where the call taking and ambulance dispatch process no longer worked effectively. LAS implemented its contingency plans, which involved switching to manual operations, using paper-based backup systems.
19. The paper-based backup system uses the same triage system as the CAD software, via a card index.
20. While EOC staff had received regular training on how to use this backup system, it is significantly slower. Given the particularly high volume of calls, focus was placed on identifying the sickest patients to ensure ambulances

were sent to those with the greatest clinical need. Some low risk patients were diverted to NHS 111.

21. The high volume of calls made it impossible for the paper system to keep up with the demand. By declaring a major incident, the trust, following established contingency plans, requested support from previously nominated neighbouring ambulance trusts.
22. However neighbouring trusts, who were dealing with their own high levels of calls, could only provide limited assistance. The trust therefore decided to implement the next stage of their contingency plans, which involved calls being automatically redirected to other emergency services. In total, 494 calls were answered and triaged by other agencies, with LAS dispatching an ambulance if necessary.
23. The CAD system was restarted and available within 90 minutes. The paper records then needed to be reconciled back onto the CAD system, which was hampered by the increased number of calls. Recovery to full normal operations took a further four hours.

Action following system recovery

24. The trust immediately established a review of the impact on patients. It apologised for the outage and worked proactively to identify and address the issues that caused the problem. Staff from across the organisation were encouraged to raise concerns, and the trust established a helpline for concerned members of the public to use if they felt they had been adversely affected, although the helpline received no calls.
25. Once the trust identified the cause of the incident, it then took immediate action to ensure no repeat of it was possible. This included testing the system and establishing that the 'Recycle Bin' facility wasn't needed. It was then emptied and disabled.
26. Further maintenance was needed on 26 April 2017 to implement outstanding system fixes. As this required the trust to move back to the paper-based system, it was carried out overnight when call volumes are low. Planned testing as part of the installation identified that the system updates had not been fully successful, so LAS rolled back to the previous stable version, and continued using paper operations until 13.30.
27. During this entire period, LAS was able to maintain effective clinical and operational standards with no measurable delays in answering calls or dispatching ambulances. No calls were diverted and no incidents were raised in relation to patient safety.

28. A comprehensive review of the failed upgrade was undertaken in conjunction with Northrop Grumman, the supplier of the software. This identified that adequate testing of the changes had not been completed, resulting in previously unidentified compatibility issues between the LAS version of the software and the upgrade.
29. This has been identified as a process failure, rather than a technical issue. Changes have been identified to the relevant processes and governance which will be implemented before any further upgrade to the system is authorised.

Patient safety during the New Year's Day incident

30. A systematic review was undertaken by LAS, with independent assurance from the medical director for NHS England's London region, using an externally validated methodology. A full list of the seven recommendations can be found in Appendix B. Six are now complete, with the remaining one being complete subject to testing.
31. There is good evidence that the extra clinical oversight provided by the additional clinicians brought in to both EOCs by LAS as part of the planning for New Year, assisted in correctly identifying and managing any deterioration in the clinical condition of patients waiting for an ambulance. Appropriate advice was provided and amendments were made to the assessment of call priority where clinically required.
32. The care provided to one patient during the period of the CAD outage has been subject to a specific investigation under the trust's Serious Incident Policy.
33. A 999 call was received for the patient at the height of demand in the early hours of New Year's Day. The initial call confirmed the patient was conscious and breathing, and was therefore triaged as a Red 2 priority level. This has a standard national response time of 8 minutes for 75% of calls. However, the volume of high priority calls on New Year's Day meant an ambulance could not be dispatched straight away to all Red 2 calls.
34. In line with usual practice in these situations the call handler remained on the line while waiting for an ambulance to attend. At the point the call handler was told the patient's condition had acutely deteriorated, the call was re-triaged to a Red 1 priority and an ambulance dispatched and arrived in 12 minutes. Sadly, however, the patient had died.

35. The family have been kept informed of the investigation and the Serious Incident report will be submitted to the coroner for a pending inquest.

36. No other feedback highlighting clinical concerns has been received from LAS frontline crews, hospitals or other partner providers (such as NHS 111) or control services staff at the feedback sessions.

Review of LAS IT and business continuity

37. An independent review by PA Consulting into LAS's IT and business continuity produced 12 recommendations, which are identified in Appendix C.

38. The trust has fewer outages than comparable organisations, but lacked key expertise and capacity in IT. Scheduled testing and maintenance of the CAD system and updates was not undertaken regularly. Responsibility was handled in silos across the organisation with insufficient visibility at executive and board levels.

39. The incident has identified significant gaps in IT provision, which affects the resilience of the system. Resilience is particularly affected by insufficient disaster recovery capability and testing, supplier management, leadership in IT, effective risk management and governance of the CAD system. Gaps in IT capability should be addressed before any further investment in new technology.

40. Additional investment and improved governance structures were recommended. Since the incident, LAS has appointed a chief information officer and a non-executive director with an extensive background in IT has joined the Board.

Review of business continuity and system resilience conducted by NHS England

41. The recommendations from this NHS England review are detailed in Appendix D. Good progress has been made to complete them, and short-term actions to improve immediate resilience have been completed.

42. The operational contingency plans were found not to be sufficiently robust to deal with the incident happening at the busiest time of the year. The review recommended that an urgent review of these plans takes place.

43. The review particularly identified that further clarity was needed in the command structure, to put management of concurrent events under a single

strategic command. Improved communications processes will enable better situational awareness across the system.

44. The importance of accurate log and record-keeping was emphasised and better training was called for.

Review of previous outages by NHS England

45. The recommendations are set out in Appendix E.

46. Between December 2013 and November 2016, a total of 10 unplanned CAD outages were identified for LAS. No impacts or significant concerns were reported or noted from eight of these. Where impacts were reported these were performance concerns, reporting calls queuing or resources not assigned to calls at the time. This also included ghost calls within the system. A number of the CAD outages were reported as serious incidents and notified to the lead clinical commissioning group.

47. In addition to the 10 identified outages, a further five planned outages for business continuity testing occurred: three in 2014 and two in 2015. None of the planned outages occurred immediately before or after an unplanned outage.

48. This review concluded that the reporting of these outages was appropriate and that decisions made at the time with the information available were proportionate.

Governance and progress on actions

49. The actions are being overseen by the Trust executive team and the trust board, which have been strengthened by the appointments outlined in paragraph 40.

50. The LAS Chief Executive will oversee completion of actions in this report and report progress to the Board.

51. The table on the following page provides a summary status of the actions from the immediate technical root cause analysis and the four reviews. These are explained in more detail in the appendices.

Status	Technical root cause analysis	Review 1 Safety of care	Review 2 IT and business resilience	Review 3 Business continuity and system resilience	Review 4 System	Total
Completed	9	6	3	3	2	23
In progress	6	1	9	14	2	32
Not started	0	0	0	0	0	0
Total recommendations	15	7	12	17	4	55

Appendix A

CAD System outage root cause analysis actions

ID	Recommendation in report	Owner	Due date	Priority	Status	Progress against timeline
R8	LAS and Northrop Grumman must determine a detailed monitoring regime required to monitor all system resources. The overall systems management regime must be defined at lower level of detail than at present and the needs of LAS set out contractually.	Chief Information Officer	Feb 2017	High	Complete	
R9	System maintenance must be conducted regularly.	Chief Information Officer	Feb 2017	High	Complete	Replaced by Review 2 action IT1
R10	Whenever a system outage occurs there should be full checklist of data files, thresholds, and parameters etc. that are validated before a return to service. Whilst there is an existing process this should be reviewed, with NG, Oracle and other suppliers for completeness.	Chief Information Officer	March 2017	High	Complete	
R11	The relationship between LAS and Oracle through Northrop Grumman must be reviewed alongside the implementation of other recommendations.	Chief Information Officer	June 2017	High	Complete	
R12	The relationship between LAS IM&T ¹ and NG and LAS IM&T and other system suppliers must be reviewed and improved such that LAS has key information regarding the systems that deliver services to LAS.	Chief Information Officer	July 2017	High	In progress	On schedule to complete July 2017
R13	Empty the Recycle Bin	Chief Information	Feb 2017	High	Complete	

¹ IM&T: The LAS Information Management & Technology directorate

		Officer				
R14	Disable the Recycle Bin functionality	Chief Information Officer	Feb 2017	High	Complete	
R15	Perform an OP66 on 21st and 22nd February to allow the above.	Chief Information Officer	Feb 2017	High	Complete	
R16	Update the CAD system with recent patches.	Chief Information Officer	April 2017	High	Overdue	Following the failed upgrade in April 2017 a revised plan has been agreed for August.
R17	Review all system thresholds with Oracle and NG and amend those requiring it.	Chief Information Officer	March 2017	High	Complete	
R18	Plan regular maintenance slots, at least an average of 2.5 a year to cover all five operational shifts every two years (NB, current approach is to perform five per year which is generally unsustainable).	Chief Information Officer	Feb 2017	High	Complete	Planned schedule for system maintenance developed and agreed.
R19	Update the CAD servers to a modern, supported platform that replaces the existing Itanium servers	Chief Information Officer	Nov 2017	Medium	In progress	Superseded by Review 2 action IT10.
R20	Update the Oracle version to current (or one below as a default)	Chief Information Officer	Nov 2017	Medium	In progress	Following the failed upgrade in April 2017 a revised plan will be agreed in June 2017.
R21	Mid to long term, address gaps in problem management – RCA ² , capturing lessons learnt, updating procedures and maintaining known errors database.	Chief Information Officer	June 2017	High	In progress	Superseded by Review 2 action IT5.
R22	Review the concerns expressed in this report on shift change and roster deployment	Director of Operations and CIO	July 2017	High	In progress	On schedule to complete July 2017.

² RCA: Root Cause Analysis

Appendix B

Review 1 Recommendation: Rapid Incident review – Safety of Care

ID	Recommendation in report	Owner	Due date	Priority	Status	Progress against timeline
R1	Regular refresher training must take place for EOC and operational crews (including NETS ³) to ensure they are familiar with the process when EOC is working on paper - EOC depend on information from crews.	Head of Control Services	May 2017	High	Complete	
R2	Laminated cards to be provided as an aide-memoire to EOC staff to ensure they are clear on the minimum fields that must be completed on the CRF ⁴ . This was a recommendation following a previous CAD outage and has been proved effective and should continue	Head of Control Services	May 2017	High	Complete	
R3	The watch management team on duty at the time of the fall-back should be responsible for auditing the quality of CRFs being completed to provide real-time feedback and therefore real time improvement. This process was instigated for the pre-planned CAD takedown on 21st February and evidence of CRF completion compliance was witnessed by the Medical Director	Head of Control Services	May 2017	High	Complete	
R4	The CRF unique identifier should be added to the call log instead of adding a CAD number after the event. This will prevent calls being tied up incorrectly and would reduce the amount of work/manual entering required following a fall-back test of system failure	Head of Control Services	June 2017	High	In progress	Solution developed and in testing.

³ NETS: Non-Emergency Transport Service

⁴ CRF: Call Receipt Form

R5	When operational resources are dispatched to a call, the unique identifier should also be included and used as their CAD number on the PRF. This will enable correlation of paperwork after the incident.	Head of Control Services	May 2017	High	Complete	
R6	Cancellation times should be recorded on CRFs so that delays can be correctly reviewed	Head of Control Services	May 2017	High	Complete	
R7	Planning for periods of unprecedented or sustained demand should include adequate clinical support and leadership	Head of Clinical Hub	May 2017	High	Complete	

Appendix C

Review 2 Recommendations: IT and Business Resilience Review

ID	Recommendation in report	Owner	Due date	Priority	Status	Progress against timeline
IT1	Schedule and perform regular maintenance and health checks across the entire CAD solution.	Chief Information Officer	June 2017	High	Complete	
IT2	Define, agree and publish EOC service resilience levels.	Head of Control Services and Chief Information Officer	July 2017	High	In progress	On schedule to complete July 2017
IT3	Strengthen resilience across practices throughout the Trust through a single accountable owner for IM&T on the Trust Board	LAS Chair	June 2017	High	Complete	Chief executive to lead IM&T at Trust Board, supported by Chief Information Officer (non-Board role).
IT4	Review the size of the CAD technical team to ensure that the right capacity and capability are in place to meet service levels.	Chief Information Officer	July 2017	High	In progress	Additional support in place; capacity will be reviewed once action IT2 is complete.
IT5	Review and improve the technical operating model to meet agreed service levels with a particular focus on service management, change management, release management, technical architecture and supplier management.	Chief Information Officer	September 2017	High	In progress	Additional support in place; plan in place on schedule to complete Sep 2017
IT6	Undertake non-pressurised simulations to ensure staff are familiar with critical incident management processes.	Head of Control Services and Chief Information Officer	August 2017	High	In progress	Simulations planned in July and August.
IT7	Explore what a fully managed CommandPoint system would entail, cost and whether that would meet defined service levels.	Chief Information Officer	August 2017	Low	In progress	Discussions underway with Northrop Grumman. Initial commercial proposal received.

IT8	Improve monitoring of the CAD landscape to improve communication between IM&T and EOC functions	Head of Control Services and Chief Information Officer	September 2017	Medium	In progress	Initial monitoring improvements in place with further enhancements to monitoring and communication planned to complete September 2017
IT9	Review and improve critical incident management process for the whole of the EOC service including all functions	Head of Control Services and EPRR ⁵	September 2017	High	In progress	On schedule to complete Sep 2017
IT 10	Increase resilience, capacity and redundancy of CAD system architecture	Chief Information Officer	May 2018	Low	In progress	Options appraisal in progress; due Aug 2017
IT 11	Annually review the current and future service requirements ensuring they are aligned to Trust and NHS strategic direction	Chief Information Officer	November 2017	Medium	Complete	Annual review scheduled
IT 12	Engage a full time CIO at industry standard remunerate rates	LAS Chief Executive	January 2018	High	Complete	

⁵ EPRR: NHS Emergency Preparedness, Resilience and Response

Appendix D

Review 3 Recommendations: Business Continuity and System Resilience

ID	Recommendation in report	Owner	Due date	Priority	Status	Progress against timeline
E1	A complete revision to be undertaken of all contingency arrangements related to CAD outages and revise contingency policy OP66 and OP68.	LAS Business Continuity Lead	March 2018	High	In progress	An earlier deliverable of 30/9/2017 has been set. The lessons learnt and actions have been consolidated into a single work plan. 41% of these actions or recommendations have been completed.
E2	Articulate clearly within OP066, OP068 the command and control structure	LAS Business Continuity Lead and Head of Control Services	March 2018	High	In progress	The use of Silver and functional bronzes now forms part of the plan, and was used for the 21st Feb 2017 OP66 and was used again during the planned outage 26/27 April. Will be written into the new version of OP66 or its replacement.
E3	Investigate options for other technical solutions to be activated when main CAD goes down 1) Locally within LAS Systems 2) More widely across other ambulance trusts	Chief Information Officer	November 2017	High	In progress	LAS and Northrup Grumman developing options to scope and review. Investigations with other trusts in planning.
E4	Investigate options for staff to multi-skill and assess the benefit of that multi skilling to provide wider support to EOC	Head of Control Services	July 2017	Medium	In progress	Needs further work due to requirements to be certified as an EMD ⁶ by the licensing organisation for the triage system.
E5	Reiterate and ensure clarity of understanding of the role of runners at both sites	Head of Control Services	July 2017	High	Complete	Roles clarified and communicated. To be included in re-write of OP66

⁶ EMD: Emergency Medical Dispatcher

E6	Roles for non-EOC trained personnel should be clearly defined within the contingency arrangements	Head of Control Services	July 2017	Low	Complete	Work completed and will be incorporated into rewrite of OP66.
E7	All revised contingency plans are subjected to a rigorous testing and exercise programme supported by structured training for all levels of staff including Golds.	EPRR/Head of Business Continuity	September 2017	High	In progress	Training and exercise plan being reviewed to address all recommendations.
E8	Preparation and planning for high impact events such as New Year Eve and Notting Hill Carnival should, where possible, include planned takedowns of CAD as part of the risk management process.	EPRR/Head of Control services	September 2017	High	In progress	The planned schedule for OP66 exercising includes key dates. All watches will have been through an OP66 exercise this calendar year.
E9	Escalation processes for alerting partners and commissioners about CAD and other LAS system outages should be reviewed.	Head of Control services	September 2017	Medium	Complete	The escalation process for alerting partners was revised and used successfully for the 26/27 April. It will be written into the revised OP66 procedure.
E10	Business continuity and resilience is a trust-wide holistic activity and should be re-aligned as part of wider corporate governance processes.	Head of Business Continuity	July 2017	Medium	In progress	Business Continuity (BC) lead engaged to address. A full review of BC arrangements currently underway as identified during annual EPRR assurance process. This action will be included in the trust-wide business continuity plan that will be presented to the trust board.
E11	OP066/068 training lesson plans and learner outcomes need to be updated to accurately reflect changes in operational procedures.	Head of Control Services	March 2018	Medium	In progress	Work has been done by the training team to ensure that the lesson plans and learner outcomes align with the current version of OP66 / 68 in use.
E12	The training regime for all staff groups including competency training as part of the promotion process should be revised to better equip staff to deal with CAD outages.	Head of Control Services	November 2017	Low	In progress	The programme has been reviewed and is now included in this year's CSR (3) delivery, and will be included in assessment centres for promotion.

E13	EOC staff training records need to be reviewed and consolidated in one place prior to being integrated into service wide processes.	Head of Control services	November 2017	High	In progress	CS Practice Learning Manager in progress of confirming format of data and how this can be linked to the OLM system in ESR and be flagged as a competency in GRS.
E14	An action plan needs to be developed to address the log keeping issues highlighted as part of this report	EPRR	November 2017	High	In progress	NHS E currently reviewing LAS logs to provide best practice guidance. Loggist course being run by NHSE in June to increase capacity.
E15	Escalation procedures for call management by other agencies including NHS trusts need to be reviewed and protocols agree to ensure calls can be sent back to the affected trust in a timely and appropriate manner.	NARU ⁷	November 2017	Medium	In progress	A national review is in progress to go to the 10 ambulance Trusts, through the National Director of Operations Group (NDOG). This is due to conclude in November 2017.
E16	Escalation, notification and management processes within and beyond NHS England (London) need to be improved.	EPRR	November 2017	High	In progress	An algorithm/flowchart has been developed for NHS01s to use which outlines what actions need to be taken following notification from LAS of a IT/CAD issue. It outlines who needs to be contacted internally and externally and what actions are expected at each stage of an outage, eg when a teleconference should be held with partners and who should be involved (NHS Improvement, national EPRR team). The flowchart is undergoing consultation with the NHS01s group before it is formally signed off.
E17	There should be a national resilience exercise to test mutual aid arrangements which should include BT	NARU/EPRR	November 2017	Medium	In progress	By July 2017 the business as usual process for testing mutual aid agreements will be agreed.

⁷ NARU: National Ambulance Resilience Unit

Appendix E

Review 4 recommendations: Lessons Learned review of system response to historical CAD outages.

ID	Recommendation in report	Owner	Due date	Priority	Status	Progress against timeline
H1	All logs and records are completed using best practice for incident logging, including writing out in full, on first use, before the use of acronyms and initials to ensure clarity and that language is clear and local jargon and non-standard terms are avoided.	NHS England	July 2017	Medium	Completed – this will be monitored through future NHS01 meetings	NHS01 group to agree a common process for logging on call issues. NHS01 group to agree common terminology for on call logs. Initial NHS01 meeting held on 5 April and it was agreed that acronyms would not be used in call logs unless explained first. List of agreed acronyms has been added to the on call log template to ensure consistency. Ongoing NHS01 meetings will ensure that there is continued consistency around logging and terminology.
H2	To ensure that there is a clear process for the management of reported CAD outages for first on call including when to escalate, who to escalate to, other parties to inform and expected actions. This involves commissioner oversight of Serious Incidents (SIs) generated as a result of CAD outages.	NHS England	July 2017	Medium	Completed – awaiting sign off	NHS01 group to develop an algorithm /flowchart for the management of reported CAD outages. Draft algorithm /flowchart has been developed which outlines who needs to be contacted and what actions are expected at each stage of the outage, eg when a teleconference should be held with partners.
H3	To determine timescales and/or triggers for outages when further reporting and possible further investigation/root cause analysis is undertaken and identification of any impacts. Trend analysis of CAD outages to be undertaken.	NHS England	November 2017	Medium	In progress	Across the country the national EPRR team are assessing all CAD systems for ambulance trusts to determine triggers for outages and any possible root causes. This will complete in November 2017

H4	As part of the regional assurance done by organisations which have an oversight and assurance role of London's Ambulance Service, monitoring of the risks associated with CAD outages should be strengthened for winter periods where peak demand is expected.	NHS England	November 2017	High	Completed	The winter assurance process led by NHS England has been updated to ensure that risks associated with the CAD system at LAS are incorporated.
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Appendix F

Record of LAS CAD unplanned outages since 2013-2016

Date	Time NHS01 notified of outage	Time NHS01 notified of resolution	Duration of outage
25 December 2013	16:50	00:35	6:45
22 July 2014	08:15	12:56	4:31
22 July 2014	17:57	18:55	0:58
17 September 2014	17:34	18:02	0:28
20 September 2014	03:34	03:55	0:31
10 November 2014	16:57	19:20	2:23
22 March 2015	23:09	01:17	2:08
28 May 2015	11:53	17:15	5:23
27 June 2016	04:08	09:41	5:33
22 November 2016	12:47	17:28	4:19