A clinical audit examining the response sent to patients with an intentional overdose by the LAS

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Background

Patients who contact the London Ambulance Service NHS Trust (LAS) are initially triaged according to the advanced Medical Priority Dispatch System (MPDS). MPDS allows call takers to determine the severity of a patient's condition based on the information provided, which, in turn, establishes the type and speed of response the patient requires. For example, if a patient has taken an overdose of a potentially harmful substance (the MPDS definition of an intentional overdose) and has immediately life threatening symptoms, the LAS will send a crew within eight minutes (known as a category Red 2 response). However, if the patient has taken an intentional overdose but has no life threatening symptoms, then they receive a category C response: either C2 (where the LAS aims to send a crew within 30 minutes) or C3 (where the LAS aims to have a telephone response within 20 minutes or a face-to-face assessment within 30 minutes), depending upon the substance taken and the patient's signs and symptoms.

The LAS received 17,149 calls in 2012/13 relating to intentional overdoses, representing about 2.4% of the LAS total call volume. Of these, 13,869 (81%) were conveyed to hospital, 780 (6%) of whom were conveyed with a pre alert call, indicating that the crew felt the patient had life threatening symptoms or signs. This shows that whilst intentional overdoses are a large group of patients for the Service, crews treat less than 5% of these patients as having life threatening symptoms.

Despite the small numbers of overdose patients initially presenting with serious conditions, this group has the potential to deteriorate very rapidly. In the first six months of 2013 there were four serious incidents relating to patients who had taken an intentional overdose and received a C2 or C3 category response. These four cases have raised concerns that patients who have taken an intentional overdose are waiting too long to be conveyed to hospital. This clinical audit directly assessed the LAS's response to, and conveyance of, this group of patients.

Once overdose patients arrive at hospital, they may be treated with activated charcoal, which is used to bind harmful substances, increasing the proportion of the drug that is excreted from the body without having a harmful effect. However, in order to gain the most benefit, it should be used within an hour of the ingestion of the harmful substance (NICE, 2004). Therefore this audit further sought to establish how often these patients arrive at hospital within the hour.

Methodology

Data from 999 calls triaged as Overdose in August 2013 was retrieved, and cases were manually sorted to exclude those where: the overdose was not intentional; the patient was not seen by the LAS or where the patient report form (PRF) was missing. The response received by the first 50 patients was reviewed against the following standards of care:

Aspect of Care	Target	Definitions and Instructions
Category Red 2 calls receive a face-to-face response within 8 minutes	75%	Department of Health Technical amendment to the category A8 ambulance response time standard, 2012
Category C2 calls receive a face-to-face response within 30 minutes	90%	LAS Control Services Bulletin 15 April 2011
Category C3 calls receive a telephone response within 20 minutes or a face to face response within 30 minutes	90%*	Interim Clinical Support & Clinical Telephone Advice Guidance – Version 1.0 December 2012

*Table 1: Clinical audit standards. *This is an aspirational target, in addition the LAS have agreed with our commissioners that 90% of Category C3 should receive a response within 60 minutes.*

Data analysis

Data was entered into SPSS and analysed using descriptive statistics. Averages are reported using medians.

Results

Demographics

The majority of the patients in the sample were female (n=34, 68%), and the average age of the patients was 31 years, ranging from 14 to 90 years.

Patient care

Of the 50 patients in the sample, four were not conveyed to hospital: two category C2 patients, one category Red 2 patient, and one category C3 patient. These four patients had their PRFs clinically reviewed, and the crew's actions were found to be appropriate as all four patients had capacity and refused conveyance. One of these patients, who had been advised to visit their GP, had ingested a toxic dose and therefore would have benefited from a direct referral to their GP instead.

Three of the four category Red 2 patients received a response within eight minutes, meeting the target. However, although the average response time for category C2 patients was 28 minutes (within the 30 minute target), 46% (n=16) of crews reached the patient outside of this target. See table two below for a breakdown of the patients' journey details by category.

Category	n (%)	Response time (minutes)		Response time target met n (%)	Time spent on scene (minutes)		Journey time (minutes)*		999 call to arrive hospital time (minutes)*		Patients with a 999 call to hospital time of more than an hour n (%)*
		Average	Range		Average	Range	Average	Range	Average	Range	
Red 2	4 (8%)	8	6-9	**3 (75%)**	38	32-44	9	8-18	55	48-70	1 (25%)
C2	35 (70%)	28	4-226	**19 (54%)**	26	3-81	15	4-31	71	35-307	19 (54%)
C3	11 (22%)	28	13-79	**6 (55%)**	24	14-90	12	3-17	60	35-118	5 (45%)
Overall		27	4-226		27	3-150	13	3-31	66	35-307	25 (50%)

*Table 2: Table showing the average and the range for different categories of overdose patients. Green response times indicate that the target has been met, whilst red response times indicate the target has not been met. *Note: the four patients not conveyed to hospital are excluded from these groups.*

Two of the eleven C3 patients did not receive a telephone assessment due to high demand upon the clinical telephone advice (CTA) department, meaning there were insufficient clinical advisors to handle these calls. The remaining patients were assessed and classed as not suitable for CTA assessment, so all 11 patients were sent a face-to-face response. Although the average response time was 28 minutes (within the 30 minute target), 45% (n=5) of patients did not receive a response within this time period.

Overall there were nine patients who waited longer than an hour for a response (C2 n=7, C3 n=2). Of these:

- four patients had responses dispatched and then cancelled for a higher priority,
- three patients received a general broadcast command from the Emergency Operations Centre (EOC) (indicating there were insufficient crews available in the patients' area, and the dispatcher was alerting on duty resources that calls are being held and crews should make themselves available), and two of these patients also had a response dispatched and then cancelled for a higher category patient, and
- the remaining two PRFs had no documented reason for the delay.

The overall average time spent on scene was 27 minutes. There were four patients where the crew were on scene for over an hour, and one patient where the crew was on scene for two and a half hours (as this non-conveyed patient required consultation with the clinical support desk (CSD), prior to a referral being made).

If the patients who were not conveyed are excluded, the average time spent on scene was 25 minutes (ranging from three minutes to one hour and four minutes), and almost all crews were on scene with the patient for less than an hour (96%, n=44).

Of the patients who were conveyed, the average time from 999 call to arrival at hospital was 66 minutes. Each category is broken down into response, on scene and journey times in figure one.

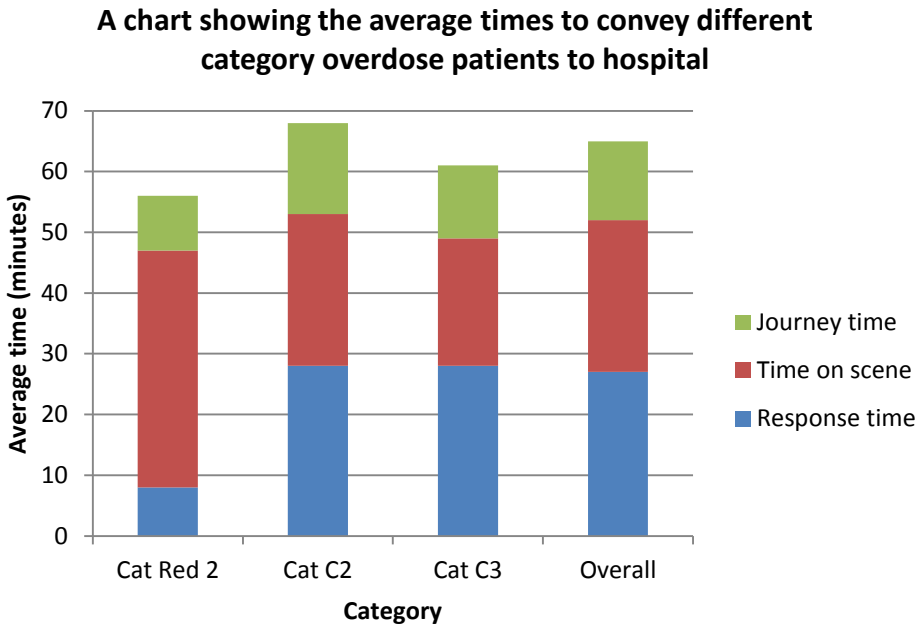

Figure 1: A graph showing the average times taken to convey different categories of patients to hospital. Note: Patients not conveyed are excluded from this graph.

Four patients received a pre alert call to hospital (response category C2 n=3, response category Red 2 n=1).

Twenty five patients (50%) had a 999 call to hospital time of more than an hour, and so were in the care of the LAS for this period. An additional eight patients (totalling 66%, n=33) were with the LAS for 55-60 minutes. Therefore, these patients would not have received the maximum benefit from ingesting activated charcoal once they arrived at hospital.

Discussion

These results show that the response times for patients with a category Red 2 response were good, with most patients receiving a response within the target time of eight minutes. However, despite an average time within the target, almost half of category C patients did not receive a response within the target. Our findings demonstrate that for patients who have taken an overdose, it can be hard to determine the level of severity of the patient through a telephone triage, as only one of the four category Red 2 patients was conveyed to hospital with a pre alert call, whilst three of the category C patients displayed life threatening symptoms and a pre alert call was placed. If these three category C patients had received a category Red 2 response, their 999 call to hospital times may have been reduced by an average of 20 minutes. A more in depth clinical audit should be conducted, to assess if intentional overdose patients are being appropriately triaged, and the effect this has on their outcome.

The on-scene times used in this clinical audit were calculated using the time of arrival at the patient and the time the crew left the scene. For patients who were not conveyed, a ‘left scene’ time was not recorded, so the ‘unit green’ time (the time

when the crew are ready to accept their next job) was used for these crews instead. This time may have included the crew completing paperwork, artificially inflating on scene times. When non-conveyed patients are excluded, most crews spent less than an hour on scene with the patient, and all spent less than 65 minutes on scene. Although the overall average on scene time was less than half an hour, category Red 2 patients' average on scene time (at 38 minutes) was over a third higher than the average. As part of the in-depth clinical audit, we recommend the reasons for longer than average on scene times should be explored, to see if there are areas which can be improved. However, it is recognised that these situations can be complex and this vulnerable group are often challenging and difficult to manage.

The LAS were responsible for the care of the patient for over an hour after their initial call to 999 in two thirds of the cases. This means that two thirds of patients would not receive activated charcoal within the optimal first hour by the time they arrived at hospital. Although activated charcoal can be considered as a treatment for overdose patients up to two hours after ingestion, evidence shows that it is more effective when given within the first hour post ingestion (Chyker *et al.* 2005). This clinical audit does not look at time of ingestion of the substance, so it cannot say that these patients would all be suitable for activated charcoal on arrival at hospital. However, it can say that these 33 patients would not have reached hospital in time to gain the most benefit from activated charcoal. Furthermore, in such cases, if activated charcoal were to be administered to have the most effect, it would ideally need to be given by the ambulance crew. These findings will be used to inform a feasibility research study looking into the use of activated charcoal within the LAS.

Due to the fact that some patients seen by the crews were not conveyed, it is important to ensure these patients are being safely assessed prior to being left. Patients who have taken an intentional overdose but not conveyed should have their care assessed as part of the proposed in-depth clinical audit.

Recommendations & Actions

	Recommendation	**Action**	**Responsible officer**	**Director**	**Deadline**
1	Ensure staff are aware that unnecessary delays on scene could impact further treatment for these patients	Summarise findings in the Clinical RIB	Head of Clinical Audit & Research	Medical Director	November 2013
		Produce an article for the Clinical Update			
2	At times of high demand, overdose patients receive an enhanced clinical assessment and where clinically indicated are pulled through the system to	Develop an implementation plan to ensure these patients are prioritised when required	Deputy Medical Director & Clinical Hub Governance Lead	Medical Director	January 2014

	ensure a timely response				
3	Assess if patients who have taken an intentional overdose are being triaged appropriately	A more in depth overdose clinical audit will be conducted.	Head of Clinical Audit & Research Unit	Medical Director	April 2015
4	Examine the reasons for longer than average on scene times				
5	Determine if patients who have taken an intentional overdose who are not conveyed are being appropriately assessed and referred				
6	Establish if the administration of pre-hospital activated charcoal is feasible within the LAS	Conduct a feasibility research study	Head of Clinical Audit & Research Unit	Medical Director	December 2014

Table 3: Recommendations and actions

References

Department of Health, Technical amendment to the category A8 ambulance response time standard, 16 May 2012. Available at: https://www.gov.uk/government/publications/technical-amendment-to-the-category-a8-ambulance-response-time-standard

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Chyker PA, Seger D, Krenzelok EP, Vale JA, American Academy of Clinical Toxicology and European Association of Poisons Centres and Clinical Toxicologist, Position Paper: Single Dose Activated Charcoal, *Clinical Toxicology,* 2005; 43:61-8.