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Project title: Improving the quality of ambulance crew hand-overs: a qualitative study of knowledge transfer in emergency care teams

Authors: Professor Robert Crouch - University Hospital Southampton NHS Foundation Trust
Mr Mark Ainsworth-Smith - South Central Ambulance Service NHS Foundation Trust
Professor Charles Deakin - South Central Ambulance Service NHS Foundation Trust
Professor Valerie Lattimer - University of East Anglia
Mr Stephen Murray - Health Education South West
Professor Catherine Pope - University of Oxford
Mrs Fizz Thompson - South Central Ambulance Service NHS Foundation Trust

Plain language summary

Nationally, ambulance crews make over 3 million patient journeys a year. These journeys involve the 'handover' of information between patients, crews and hospital staff. Our research looks in detail at these journeys and handover communication. We observed ambulance journeys and transfers to hospital, interviewed staff and patients, and examined patient records. We studied verbal, written and non-verbal communication across the patient journey to describe handover, and how it is affected by patients, staff and technologies. We explored how information, experience and knowledge is combined to create an understanding of the patient, and identified some of the problems (i.e. information decay, communication failures) which may lead to handover breakdown. We hope that these findings will inform practice and training for handover and contribute to improving communication and patient safety.

Handover transfers information and responsibility. It occurs when the ambulance is assigned, at scene, on the ambulance and at hospital. Verbal transfer of information occurs between patients/public/carers, health and other professionals (e.g. police, crew, nurses). Written information can be paper or digital. Non-verbal communication includes gestures and facial cues. Multiple transfers of information/responsibility occur in a single journey, at different times and places. Communication can be affected by behaviour (e.g. it is difficult obtaining information from people under the influence of alcohol) relationships (e.g. between different professions or teams) and technologies (e.g. telemetry – equipment that transfers information remotely).

Handover in the pre-hospital setting is more frequent and complex than usually acknowledged. Staff combine different sources of information with experiential and clinical knowledge to build up an understanding of the patient. Huge amounts of information are collected in a short time, and there are a number of potentially critical points and reasons why communication can breakdown (e.g. information decay/loss, poor communication, distractions/interruptions, lack of trust, technology failure). This study provides the first detailed examination of handover. Training for pre-hospital care should consider the complexity of handovers and address potential risks.

Keywords

Handover; communication; pre-hospital setting; ambulance; emergency care; patient journey; information transfer; qualitative research.

Summary of research findings

BACKGROUND: Handover is a vital but poorly described part of pre-hospital care. Effective handover enables continuity of care, patient safety, faster decision-making and better record keeping (1-6) . Previous research has focussed on hospitals and/or nurses, and on views and experiences (largely from staff perspectives, not patients), or used observation, including quasi-experimental studies with simulated patients testing new training or standardised procedures. Ambulance crews have been shown to provide accurate handovers (6,7) but other research highlights poor communication (8). Written communication is believed to reduce information loss but structured procedures can reduce accuracy and retention (6,9-14). Numerical values are more likely to be forgotten than descriptions and information provided at the beginning of the handover is more likely to be recalled (15,16) . Information passed via a third person is often distorted or lost (2,7,8,10-12). There is more information decay in resuscitation rooms than wards (5 12). Ambulance crews report difficulties in delivering handovers (6,8,16-19) and studies have shown that time pressures and distractions prevent good handovers (1,3,5,7,8,13,15,18).

AIM: The aim of this study was to describe and understand the process of handover and show how this impacts on patient care.

OBJECTIVES: The study employed an ethnographic case study design, using real time observation and video, interviews and documentary analysis to:

- Provide a unique and detailed description of handover processes
- Compare the content and use of different types of information (e.g. written and verbal)
- Critically examine handover and consider its impact on patient care.

METHODS: We observed 223 ambulance journeys on 56 shifts at different times/days over 18 months from 2009-11. 109 patients consented to the inclusion of their data in the study. We estimated needing 120 patients but 'data saturation' (no more emerging themes) occurred earlier than this. Contemporaneous notes were taken to describe verbal, written and non-verbal communication and the technologies used in handover: notes were anonymised and transcribed. Video recordings and photographs were taken to supplement the notes.

19 semi-structured interviews were conducted with crew, staff and patients to understand handover practice. These were audio-recorded, anonymised and transcribed. Anonymised copies of patients' records were made for consented patients. Data were read independently, discussed collectively and coded, to develop themes and analytical categories. The analysis was inductive (from data) and deductive (guided by the proposal) and the findings below are structured around two overarching themes in line with the project objectives.

KEY FINDINGS: Pre-hospital handovers are far more frequent and complex than usually acknowledged. 652 hours of observation covered 851 handovers during 109 (consented) patient journeys – approx 9 per patient, sometimes as many as 18. Handovers are verbal, non-verbal and written and occur in different environments, often where communication is difficult. Given this frequency and complexity, the risk of error is significant and should not be underestimated.

i) Handover complexity

The first handover of information occurs with the 999 call. Information is taken by a call handler and transferred digitally via a Mobile Data Terminal (MDT), or (less frequently) by radio or mobile phone. This information includes patient details, address and incident description. Receipt of this information may allow the crew to prepare and plan for the incident and gather appropriate equipment. At the scene (or patient's home) carers, relatives and the patient provide verbal handover. Sometimes a first responder is at scene to provide a verbal handover that may include clinical observations and details of any treatment provided. Documents such as record forms, GP or hospital discharge letters and carer's notes also provide information. Other objects – notably collections of prescribed medicines may be used to help the attending crew to understand the patient. Further information may be sought by contacting the Clinical Support Desk (CSD) or other health professionals by telephone.

Various technologies are used at scene and on the ambulance to send information/data. Telemetry transfers written messages, clinical observations (e.g. ECG) to the Emergency Department and can allow two way communication between crew and hospital. Occasionally telephone or radio is used to convey this information, notably when technologies fail.

The crew take details from the patient or carers and write this on the patient record form. They also commonly make notes on gloves. The collecting of information may be structured around the forms used, or less commonly, according to a memorised rubric or standardised template.

At hospital crews transfer patients to triage, minors, majors or resuscitation bays/areas. Communication en route with hospital staff, and experience, tacit and formal and clinical knowledge informs decisions about handover processes. Crews may provide several handovers or partial information transfers to different hospital staff they encounter. In the majors and minors areas handover is given to the Rapid Assessment and Treatment (RAT) nurse. They often tailor what they say to different health professionals. While there is an expectation that handover will be listened to, this is not always met, and distractions and interruptions to verbal handovers are common. At the end of handover the formal transfer of responsibility is marked by the crew requesting a signature from the receiving nurse/doctor and the transfer of a copy of the signed paper Patient Report Form (PRF) to the hospital notes. Information may also be transferred to digital records, and crew may do this verbally, often dictating information to a nurse or administrator/clerical worker.

ii) Challenges to handover

The sheer frequency, the multiple locations, and numbers of people involved in handover make it extremely complex and challenging. While we were not in a position to clinically assess handover communication we witnessed many examples of good practice (for example assessing pain by asking the patient for a subjective score, providing medication for pain relief and re-checking the pain score). Crews, hospital staff (and indeed patients) manage the difficult tasks required for communication, often in difficult circumstances/settings and in a relatively short time frame. There are multiple transfers of information and responsibility throughout the patient journey. Handover information is used to inform decisions about diagnosis, treatment and management at the scene, on the journey and at transfer to hospital. The different environments and the people involved may

make collecting and giving information difficult. Poor verbal communication skills, misunderstandings and inaccurate or illegible written or digital information can compromise handover and communication. Some decisions may be based on misinformation, or on value judgements, stereotypes and these may not enable best patient care.

We note the following challenges or potential problem areas for ambulance handovers:

- information decay: as information passes between multiple people it is more likely to get lost or changed. Lack of understanding or failure to see the relevance of information, withholding or forgetting will result in incomplete handover;
- partial information: if inaccurate or limited information is communicated this makes it harder for the receiving professional to plan and manage care effectively;
- lack of trust: if people providing information are regarded as competent, truthful and reliable, information is more likely to be used and/or retained. Patients who appear to be under the influence of alcohol or drugs, less experienced staff or different professional groups may not be trusted and this can compromise handover;
- technology failures: equipment breakdown (notably telemetry) reduces the amount of information available and hinders transfer of information, repeated equipment failure produces scepticism and lack of trust;
- tacit knowledge and preconceptions: mobile data terminal messages may cause crew to construct preconceived ideas about the incident or the patient, for example based on location or prior knowledge and this may not always be helpful;
- difficult environments: crews often found that handovers were not listened to due to the noise levels, competing tasks, frequent interruptions and distractions.

CHANGES AND IMPACT ON THE FIELD

SCAS and SUHT have collaborated on improvements to practice which have impacted handover. New technologies with better performance or enhanced functionality (e.g. mobile data transfer, satellite navigation) have addressed some of the challenges surrounding technologies. Training and continuing professional development has been used to improve the use of technologies (e.g. telemetry) and new operational directives have been emailed to staff to improve practice. Dr Crouch and Ms Thompson led the introduction of new standard operating procedures to clarify handover processes and responsibility, and a RAT nurse takes the initial handover information from crews.

The research team has fed back to the advisory team and patient representative. This has informed some of the improvements noted above. We are engaged in further discussions about presenting findings to staff in both Trusts, and at local leadership training.

CONCLUSIONS: Ambulance handover is complex and challenging. The number of different handovers (averaging 9 per journey), different people involved, types of information, the nature of the environments and tasks presents a range of potential risks. Our findings should be used and widely disseminated to inform training and practice.

Patient and public involvement

It was not easy to identify relevant patient and public involvement due to the general (wide range of conditions) and emergency nature of the care studied. Unlike projects focussed on a single disease there is no single support group or network whom we could approach.

Changes to the way PPI is organised also made identifying potential advisors difficult. We are grateful to our PPI contributor (Vice Chair Oxford and Bucks division of SCAS PPI Forum) for input to the research design, ethics application and early part of the project. In the analysis and closing phase of the project, the PPI advisor to SCAS kindly agreed to join the advisory group and has provided very helpful feedback about the report and our dissemination plans. We hope that we will be able to maintain this link with him as outputs are produced from the project.

Data sharing statement

See link

[\[https://www.nihr.ac.uk/documents/nihr-position-on-the-sharing-of-research-data/12253\]](https://www.nihr.ac.uk/documents/nihr-position-on-the-sharing-of-research-data/12253) for the NIHR position of the sharing of research data. The NIHR strongly supports the sharing of data in the most appropriate way, to help deliver research that maximises benefits to patients and the wider public, the health and care system and which contributes to economic growth in the UK. All requests for data should be directed to the award holder and managed by the award holder.

Disclaimer

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This project was carried out between April 2009 and March 2011. This final report has not been peer-reviewed. The report was examined by the Programme Director at the time of submission to assess completeness against the stated aims.