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1 EXECUTIVE SUMMARY

1.1 Overview

This project focused on Ambulance-to-ED handover practice at the Emergency Departments of Royal Prince Alfred and John Hunter Hospitals.

Ambulance and ED staff were interviewed and focus-grouped to assess the scope and nature of the handover problem. 137 handovers were filmed and analysed. Video footage was edited into exemplars of practice and was shown back to staff in reflexive focus groups to elicit their thoughts on current practice, and their ideas for improvement.

Data analysis revealed the beginnings of a ‘tacit’ and tentative handover structure already being evident from our analysis of the video footage. Data analysis was complemented with reflexive feedback from ambulance and ED staff, and coupled with advice from the Clinical Handover Expert Reference Group (comprised of representatives from the participating hospitals and Ambulance NSW). This analysis-and-consensus process led to development of IMIST-AMBO as handover protocol for both trauma and general patients.

IMIST-AMBO stands for: Identification, Mechanism/Medical complaint, Injuries/Information about complaint, Signs, Treatment & Trends, Allergies, Medications, Background, Other issues. The handover protocol also minimises interruptions during handover thanks to a prescribed break (between IMIST and AMBO), prescribed eye contact during handover between the paramedic and the ED clinician, and improved identification of ED trauma team leaders.
1.2 Study achievements and findings

The main achievements of this study are as follows.

1. IMIST-AMBO was adopted as the new paramedic-ED clinician handover protocol at both sites
2. In total 373 staff (108 ED clinicians; 220 paramedics, 45 paramedic educators) were trained in using IMIST-AMBO between August and November 2010. Training at the participating sites included on-the-spot instruction in the protocol and on-site fast-feedback about its enactment
3. 73 handovers were filmed and analysed before the video-feedback intervention
4. A further 64 handovers were filmed and analysed post-intervention
5. The Ambulance Service of NSW have adopted IMIST-AMBO as their handover protocol.

The study findings are as follows:

1. Post-intervention handovers displayed a marked improvement on the following criteria:
   a. the structure of handover
   b. the amount of information handed over
   c. comprehension of ED staff
   d. eye contact
   e. handover duration
   f. duration variation.

2. Post-intervention perceptions on the part of ED clinicians pointed to:
   a. perceived improvement in handover duration
   b. perceived reduction in the variation of handover duration
   c. perceived improvement in handover structure
   d. perceived improvement in information content
   e. perceived improvement in the pre-triage process.
1.3 Study recommendations

IMIST-AMBO will require state and system wide consultation prior to formal system adoption by NSW Health and ASNSW. In the event of formal adoption, state-wide implementation should include:

1. Formal educational resources to ensure handover competence is studied and achieved across the NSW Health system.
2. Education of the IMIST-AMBO protocol that encompasses a range of strategies: inclusion of the handover protocol into the paramedic syllabus; education of all currently practicing paramedics across the state; adoption of a train-the-trainer approach; people highly skilled in the new handover protocol delivering education sessions around the state to paramedic educators and clinical training officers, and integration of IMIST-AMBO into the ‘Between the Flags’ observation sheets accompanied with relevant training.
3. Emergency Department induction programs that encompass IMIST-AMBO training and simulation.
4. Effective communication of patient-related information via all ambulance-ED handover channels in accordance to the IMIST [AMBO] protocol.
5. Hospital responses to trauma that are aligned to reduce practice variation.
6. An appreciation of staff roles; that is an equal understanding of the pressures and dynamics placed on paramedics and ED clinicians.
2 INTRODUCTION

This project is a fast feedback intervention project. This work involves frontline staff in observing and making sense of their own practices, critiquing their own practices and devising solutions for improvement, and then implementing these improvements. This section details the rationale behind this approach.

2.1 The ‘NSW Ambulance-to-ED Handover Project’: Design and rationale

The ‘NSW Ambulance-to-ED Handover Project’ was established to develop a handover protocol ensuring the smooth transfer of pre-hospital care into the acute setting. The project was structured as a before-and-after intervention. 73 handovers were filmed before the video-reflexive intervention, and 64 were filmed after the shared development of the new protocol, and on-the-spot training.

We know that clinicians want to understand the basis of the innovations that are introduced. They need to see a reason for introducing them, and they need to know there is shared agreement about and enthusiasm for putting them into practice. For this to happen, clinicians need to be involved in the design of local solutions and service delivery improvements. That is what this project set out to achieve. Throughout the project, staff from the Centre for Health Communication (CHC) worked closely with paramedics and other members of the Ambulance Service of NSW and with ED clinicians at both participating hospitals (John Hunter and Royal Prince Alfred Hospitals). This approach ensured a handover protocol was designed that was both ‘bottom-up’ and sensitive to frontline paramedics’ and clinicians’ needs and concerns.

Clinicians’ involvement was obtained by framing this project as a ‘video-reflexive ethnographic’ study. Video-reflexive ethnography involves the following: ‘clinicians observe themselves at work; they openly discuss shortcomings in what they do, and together they design improvements in what they do’. This method ensures that clinicians gain an opportunity to analyse their own practices. As a result, they develop as reflective practitioners.

That is, they become able to use their reflections and collective insights derived from self-observation to change practice.

2.2 Clinical handover as complex communication

Many handover protocols are available in the literature. It is evident that handover protocols are critical for standardising how clinicians communicate. It is also evident however that handover protocols are difficult to impose on professionals because these protocols will be sensitive to some aspects of local practice but not to others. Further, it is now evident that not a particular protocol per se but clinicians’ ability to develop and redevelop a shared agreement about how to collaborate and communicate is critical to safe and high quality care. To achieve and constantly update such shared agreements, clinicians need to engage in reflexive practice.

2.3 The importance of reflexive practice for ‘taming’ complex circumstances

Reflexive practice is critical to handling complexity. Complexity does not always allow clinicians to fall back on pre-made answers and established solutions. They are called on to be flexible and produce new answers and solutions that suit the here-and-now. Indeed, flexibility is a measure of their ability to work with and be sensitive to uncertain and ‘emergent’ information and circumstances.

NSW Health has recently enshrined flexibility, and thereby reflexivity, into its Handover Policy. Frontline clinicians are expected to engage
with handover under the banner of ‘flexible standardisation’. This means that professionals deploy best practice evidence to reflect on emerging circumstances and design practices and protocol in response to those circumstances.

2.4 The achievements of the present project

The present project bears out frontline clinicians’ ability and keenness to engage in reflexive practice. The protocol developed for the Ambulance-to-ED handover arose from an analysis of existing practice, reflection by staff on existing practice and on the analytical results, collective redesign of practice, and ratification by paramedics and ED clinicians and by the Ambulance-to-ED Project Reference Committee.

2.5 Acknowledgements

We thank Barbara Daly and Sarah Hoy for initiating this project.

Our site sponsors were critical to making this project possible at the participating sites:

Tim Green (Royal Prince Alfred Hospital Emergency Department; henceforth ‘RPAH ED’)
Catherine Foster-Curry (John Hunter Hospital Emergency Department; henceforth ‘JHH ED’)
Paul Middleton (Ambulance Research Institute - Ambulance Service of NSW; henceforth ‘ARI-ANSW’)

We wish to thank the following people for their special contributions to the project:

Marea Jones (ARI-ANSW)
Phillip Ebbs (ANSW)
Jacinta Young (ANSW)

We also wish to thank the following people for their time and input:

Samantha Bendall (RPAH ED)
Kirsty Chapman (RPAH ED)
Judy Dixon (RPAH ED)
Jenni Dunlop (ANSW)
Marianne Erwin (RPAH ED)
Michael Fahy (JHH ED)
Carolyn Hullick (JHH ED)
Paul Hudson (RPAH ED)
Kevin Johnston (ANSW)
Leonard Ladia (RPAH ED)
Graeme Malone (ANSW)
Steve Matheson (ANSW)
Clare Richmond (RPAH ED)
Carlie Tighe (RPAH ED)
George Tozanis (RPAH ED)
Jonathon Tuhavasana (ANSW)
Diana Williamson (JHH ED)
Sharon White (ANSW)
3 BACKGROUND: PARTICIPATING SITES’ ORGANISATIONAL CONTEXT

Organisational similarities and differences were evident at both sites. Differences pertained to patient acuity and triage processes. These differences impacted slightly on the issues staff identified for improvement and the speed of uptake of the new protocol.

3.1 RPAH and JHH ambulance patient load: Similarities and differences

The two participating sites are similar yet have many differences in terms of ambulance patient load. RPAH receives between 50 and 55 ambulance deliveries per day, compared to JHH which receives 60 to 70 patients delivered by ambulance per day. Both RPAH and JHH act as trauma centers. However, JHH receives a much heavier case load due to the large area it covers, its proximity to mining and heavy industries, major highways, a high number of horse training yards, various kinds of farming, and coast line activities such as industrial shipping and fishing.

3.2 RPAH and JHH ambulance delivery and triage processes

RPAH and JHH have different entrance procedures for Ambulance deliveries. Patients at RPAH move through triage done in a corridor with a computer. From there, the patient is moved to the appropriate (clinical) area. At JHH, patients are triaged in the ambulance bay. Patients remain in the ambulance bay until a treatment space becomes available. One nurse may stay in the ambulance bay to care for the patient, or s/he may become involved in triaging patients who walk into Emergency off the street. Tensions may arise around the availability of ED clinicians for triage, and the speed of the drop-off process.

3.3 Implications of these differences for the present study

The present study’s success was contingent on the involvement of frontline clinicians and paramedics. Importantly, the high numbers of ambulance patients arriving at both sites did not result in staff not making time to be involved. On the contrary, and particularly at JHH, paramedic and ED clinician involvement was strong.

In contrast, the different triage processes did have implications for the study. The Ambulance triage system at JHH led to paramedics often only handing patients over once. In contrast, at RPAH patients were handed over to the triage nurse, and then were handed over again once the patient had been transferred into an ED bed. The handover protocol decided on for Ambulance to ED allows for both these scenarios to unfold without significantly altering the order of the information components in question. The protocol put forward here allows for both a single-tiered and a two-tiered (more detailed and longer-lasting) handover.

In general, the protocol is designed to enable sufficient flexibility and scope to accommodate different sites’ patient loads, clinical priorities and organisational constraints.
The study was designed as follows:
1. a video-reflexive ethnographic study;
2. an at-work training and feedback intervention;
3. a 5-question pre/post survey evaluation measuring staff perceptions.

We comment on each of these in turn.

4.1 Video feedback or “Video-Reflexive Ethnography”

The video-feedback part of the study draws on a decade of research into clinical practice improvement in the context of patient safety. The technical term for this improvement technique is ‘video-reflexive ethnography’[^3-6]. It includes five separate components.

4.1.1 Pre-video focus groups

Pre-video focus groups are designed to allow staff an open forum to identify problems they recognise in current practice within care or the care organisation. In this first component the CHC worked with clinicians and paramedics at both sites to understand the local contingencies and complexities of the handover process.

A total of ten pre-video focus groups were held, each lasting between one and one and a half hours. Three were held at Royal Prince Alfred Hospital with ED clinicians, three at John Hunter Hospital with ED clinicians and four with paramedics from the Ambulance Service of NSW. These focus groups allowed staff the open forum to express their thoughts on handover and the detailed processes that are involved.

4.1.2 Observation and filming of practice

Observation of practice involves researchers first observing in-situ care practices and behaviours. When it is clear which aspects of practice deserve attention, when they should be filmed, who is comfortable with being filmed, and how the filming can be done, real-time filming of handover communication is initiated. The filming focuses on the local complexities and processes of practice that were identified during the focus groups, and ones that became evident during the researcher observation process.

A researcher from the CHC (Chris Ball) spent a total of four weeks observing practice in the ED. The observation of handover practice commenced at RPAH, where the researcher spent two weeks. In total, 90 clinicians and paramedics consented to participate in the study. Besides observing practice, the researcher filmed 33 handovers during this period. At JHH 79 clinicians and paramedics consented to participate in the study. The researcher spent two weeks observing practice, and during that period also filmed a total of 40 handovers.

4.1.3 Formal analysis of pre-intervention handover communication

These 73 pre-intervention handovers were then analyzed. The focus was to uncover existing trends in current patient handover practice. This analysis included examining the individual clinical-information components that made up a whole handover, the non-verbal communication patterns (eye contact, body movements) and handover duration during triage and in the resuscitation bay, in acute, sub-acute and in the trolley-waiting bay. The data was then correlated relative to paramedic level of expertise and the severity of the patients involved. The resulting data was also related back to the views expressed during the initial focus groups.

[^3-6]: Ethics approval has been obtained from the University of Technology Sydney and the participating sites’ Area Health Services.
4.1.4 Reflexive focus groups: Handover protocol development

Reflexive focus groups were convened so that the researchers could feedback to Ambulance paramedics and ED clinicians both the video footage of existing practice and the initial analytical findings. This feedback meeting harboured another critical component: staff reflexivity. Reflexivity involves staff in commenting on and exploring the change potential of their own handover practice. Footage of real-time handovers was edited for presentation at these reflexive feedback meetings in compliance with institutional ethics requirements. The edited footage included five exemplars of handover practice, with each clip lasting less than 3 minutes.

This reflexive methodology proved to be a powerful means for staff to see the need for a change in handover practice, and to identify ways of achieving change. Moreover, all health professionals involved in the project were invited to comment on their current practice and explore possibilities for improvement. This meant that the discussion was less about espoused positions and accepted knowledge than about what was visible in, evident from and made possible by the real-time video footage.

These discussions enabled paramedics and ED clinicians to agree that the tentative structure already evident in how existing handovers were done (and demonstrated by the formal analysis of the first batch of videoed handovers) should be emphasized; that specific components should be made more salient and others added; that some space should be given to questions and comments in order to make the handover more dialogic, and that specific behaviours (e.g. ‘hands off, eyes on’) should be prescribed to raise the effectiveness of the communication process. The handover protocol was further informed by work already undertaken by Jacinta Young of ASNSW, and very generously made available to the present project. The protocol was then refined and ratified by the Ambulance-to-ED Clinical Handover Expert Reference Group.

4.1.5 Protocol dissemination and implementation

The new protocol was then implemented at both RPAH and JHH. Due to the large number of paramedics that may present at each ED, a researcher from the CHC (Chris Ball) met with members from education and area management from the ASNSW. It was agreed that a ‘cluster’ approach would be most effective. This approach involved training paramedics and ED staff on the spot; filming their changed handover practice, and giving in situ feedback about their changed handover practice. To further assist in generating compliance with and awareness of the protocol, ten large IMIST-AMBO signs and five hundred pocket-sized IMIST-AMBO cards were prepared for distribution.
4.2 On-the-spot training and ‘hot feedback’

At RPAH, 60 clinicians and 118 paramedics were trained in the new protocol with several being given ‘hot feedback’; that is, they were given an impression about how they went immediately after enacting the new protocol. This targeted training and feedback took place over three weeks. The same process unfolded at JHH and lasted two weeks. During this period, 48 clinicians and 102 paramedics were trained at JHH, or a total of 150 staff. A further 45 paramedic educators were also trained in the protocol. The grand total of staff trained across both sites is 373 over a total of 5 weeks.

More specifically, the training and feedback processes involved the following. At RPAH, a researcher from the CHC (Chris Ball) and a clinical training officer (CTO) attended the ED each day for the first week of protocol implementation. Both engaged paramedics in on-site training during times of block and while paramedics waited to off-load the patient. At JHH an Ambulance Liaison Officer (ALO) assisted in recruiting paramedics for training.

Another training opportunity offered itself when paramedics waited to offload a patient or be assigned to a new job. Training staff during these times meant that each training session was limited to around five minutes.

To increase awareness of the protocol throughout ANSW, a researcher from the CHC (Chris Ball) also gave a lecture to around forty-five educators from around the state, which has since sparked a large amount of discussion on the topic and request for information about the protocol. For their part, medical and nursing ED clinicians received on-the-spot training during in-service times, bedside teaching sessions and medical teaching sessions.

4.3 Evaluation of the protocol’s impact on handover practice

Evaluation of the protocol was achieved by utilising video ethnographic methods in combination with a 5-question survey.

With regard to the former, and upon completion of the protocol training and in situ feedback, paramedics were given an average of a one-week period before they were filmed as part of the evaluation process. During this period, 31 handovers were filmed at RPA and 33 at JHH, yielding a total of 64 filmed handovers. Further consenting of participants was also required due to some staff not having been present when the researcher originally consented clinicians to do the filming. The total number of consented participants in the study was 67 ED clinicians and 224 paramedics.

The impact of the video feedback, the training and the in situ feedback were assessed by analysing video footage of the new practice, and comparing analytical findings to those produced from the pre-intervention video footage analysis. Results are presented in Section 5.

The survey questionnaire was distributed using e-tablets which had five questions printed on them. ED clinicians were asked to fill out the survey after receiving a handover both before and after the study intervention. Results are presented in Section 6.
This section of the report sets out the findings of the project and reveals that the project’s findings are both significant and positive.

5.1 Pre-video focus groups

The pre-video focus groups served to highlight a number of key points, with paramedics and ED clinicians raising slightly different points.

ED triage clinicians identified the following concerns:

» the accuracy of information handed over varies due to the variety of patient presentations and approaches taken by paramedics

» triage category 1 and 2 patients require a period of ‘hands off’ (before instituting treatment) which allows all team members the time to actively listen to the ambulance handover

» clinical assessment at triage by nursing staff needs to be possible because it is critical to patient safety

» handover should contain a core of consistent information; however, the depth of information should be allowed to vary between handover-at-triage and handover-at-the-bedside, with the latter involving a more comprehensive assessment and extended communication of the patients’ history.

» intense pressure for an accurate triage

The paramedics identified the following challenges:

» triage processes need to be standardized because:

  ▪ handovers are often required to be repeated
  ▪ ED clinicians receiving the handover may have different information needs
  ▪ ED team leaders are not always quickly identifiable for resuscitation bay handovers
  ▪ hospitals may have different processes relating to incoming ‘code 3’s’ (a call placed ahead of the ambulance arrival to ensure adequate reception on arrival), case sheets and hospital codes
  ▪ there was a feeling of being dismissed by ED staff on some occasions when presenting a patient to the ED

Confirming the findings of previous studies by Evans et al⁷, Gerdtz and Bucknall⁸ and Owen et al⁹, these findings cover both substantive concerns (what is said/heard), and interpersonal ones (how are things said/heard). Both these substantive and interpersonal concerns needed to be resolved in the development of the handover protocol, in its structure, and in its proposed enactment (see below). This research provides preliminary evidence that these concerns were resolved by the IMIST-AMBO protocol.
Nurse

“That’s the thing, these guys are dealing with big adrenaline rushes too. It’s got to be difficult to collect your thoughts and give coherent handover, when you’ve just scooped and run.”

Nurse

“I stood where the ambos stand when they hand over, it is hard if people aren’t listening and are doing other things. How does the ambo keep talking?”
5.2 Observation and filming of practice: Analysis of the data

Analysis of handover video footage highlighted several key trends. The video data was first broken down into each clinical information component of the handover. These components included: patient identification, chief complaint, information relating to the complaint, vital signs, treatment, allergies, medications, medical history, social history and other information (including information provided by the patient, family or carer). This analysis identified a ‘tacit sequence’ in the data. We present the details of this analysis below.

This tacit sequence was apparent as follows. Analysis revealed that 100% of handovers involved paramedics identifying the patient first; 63% then continued onto the chief complaint; 55% then expressed information that related to the chief complaint and 37% of paramedics then handed over the patients vital signs.

However, analysis also showed that other information components following on from this initial sequence (such as treatment given, allergies, current medications, etc) were not handed over in any identifiable order.

Additional matters requiring solutions included the following.

First, triage clinicians asked many questions either during or at the end of the handover. In 93% of handovers clinicians asked questions. 38% of these questions were for information that had already been provided by the paramedic during the handover. These findings pointed to difficulties with ED clinicians comprehending and/or hearing paramedic information.

Second, it was evident that during handover paramedics repeated information in 67% of handovers. 19% of these repeats occurred after being asked a question by the clinician (requesting information to be repeated). Of all the questions asked by clinicians during handover, 33% of their questions occurred after a paramedic had already repeated information. This revealed a potential waste of both paramedics’ and ED clinicians’ time and resources.

Third, handover length was found to vary greatly. The shortest handover recorded was 26 seconds and the longest was 248 seconds. The lengths of handover were correlated with the paramedics’ level of expertise. This data identified that on average a junior paramedics handover takes 95 seconds; an intermediate’s handover takes 91 seconds, and a senior’s handover takes 118 seconds. This suggests that seniority may explain the time taken to conduct a handover. However, handover time may also depend on the patient’s acuity and therefore their triage level. Subsequent analysis revealed that, on average, the longest handover was for a category 1 patient.

1. Triage category 1 – average 115 seconds
2. Triage category 2 – average 112 seconds
3. Triage category 3 – average 104 seconds
4. Triage category 4 – average 78 seconds
5. Triage category 5 – average 64 seconds

Fourth, eye contact was discovered to be a key factor affecting handover length. The length of time was found to decrease depending on the level of eye contact engaged in during the handover process. If there was no eye contact during the handover, its length was 111 seconds on average, compared to 103 seconds average if eye contact was maintained for between 0-30% of the duration of the handover. However if there was eye contact for greater than 30% of the total handover, this eye contact was found to co-occur with a lower average handover length of 85 seconds.
5.3 Reflexive feedback meetings

The reflexive feedback meetings gave paramedics and ED clinicians the opportunity to see and comment on their own practices and our analysis of these practices.

ED clinicians identified the following issues from watching the footage:

» when several ambulance patients are waiting to be triaged, they may need to engage in a pre-triage process to identify and start treating high-urgency cases further down in the ambulance cue
» triage handovers may require less detailed information than do bed-side handovers
» maintaining attention for the entirety of the paramedic handover is sometimes not possible

For their part, the paramedics identified the following issues from watching the footage:

» differences in handover procedure can lead to problems:
  › documenting information appropriately and effectively is critical:
    ▪ paramedic case sheets are not always tailored to enable paramedics to respond to in-hospital information demands
 ▪ sometimes paramedics handover without reference to case sheets
 ▪ paramedics sometimes write information on their gloves to prevent loss of information
 ▪ structuring handover information is important:
    ▪ the triage nurse has a limited time span and paramedics need to deliver all the key information clearly and early in their handover;
    ▪ trauma teams expect a rapid and well-structured handover; if this is not forthcoming clinicians may lose concentration
    ▪ when clinicians ask questions while the paramedic is delivering the handover it may cause the paramedic to lose track of the structure and content of their handover.

Both professional groups saw that their handover practice needed to be better structured, given more clarity, conducted in a quieter environment, and invested with greater interpersonal attention (e.g. through eye contact). These matters were focused on during the protocol development phase of the project.
5.4 Protocol development

As noted, analysis of existing handover practice revealed a tacit and tentative handover structure. This tacit-tentative structure was made the basis of the proposed handover protocol. Extending out from this tacit-tentative structure, the handover protocol was broadened on the basis of what paramedics and ED clinicians saw as critical components of ambulance handover. These components were derived through analysis of what was most often repeated during handovers, and of what was most frequently asked.

The mnemonic adopted was IMIST-AMBO. IMIST-AMBO was originally designed by Jacinta Young, an intensive care paramedic from Urunga. Jacinta developed this mnemonic to solve the difficulties she and fellow paramedics had encountered with handover in the Northern regions of NSW. IMIST-AMBO was consistent with our analyses of the video footage and resonated with our syntheses of paramedics’ and clinicians’ comments made during the reflexive meetings.

IMIST-AMBO harbours the tacit-tentative initial structure found in existing handovers (‘IMIS’), as well as the information components that paramedics and clinicians focused on during the remainder of their existing handovers, albeit in an often chaotic and unpredictable way. Moreover, IMIST-AMBO as formulated here includes handover of trauma as well as general patients. IMIST-AMBO also affords a moment of pause (1-2 seconds recommended) where the paramedic can now expect questions and comments from the triage clinician – hence the dash between IMIST and AMBO.

The IMIST-AMBO mnemonic is defined as follows:

- **I** – Identification
- **M** – Mechanism/Medical complaint
- **I** – Injuries/Information relative to the complaint
- **S** – Signs
- **T** – Treatment & Trends
- **A** – Allergies
- **M** – Medication
- **B** – Background history
- **O** – Other information

The formulation of IMIST-AMBO accomplished agreement on the substantive structure of the paramedic to ED clinician handover. Three further issues were identified during the focus groups and feedback meetings as critical to how and where IMIST-AMBO is delivered:

- The handover is to be an interruption free zone
- “Hands off, Eyes on”: twenty seconds are to be reserved for the paramedic to convey IMIST-AMBO. During this twenty-second period ED clinicians should minimize patient and equipment handling. Eye contact with the paramedic during this time will enhance the handover process through ‘shared attention’. In extenuating circumstances, such as active CPR and/or an unstable trauma this rule may need to be ignored.
- ED staff role identification: The trauma team leader needs to ensure they can be easily identified for paramedic handover: medical and nursing team leaders wear blue gowns, for example.

5.5 Protocol implementation

Implementation was achieved through on-the-spot training in the new protocol of all staff, including people who had not attended the reflexive feedback meetings. Implementation of the protocol began at RPAH. During a three-week period, 60 clinicians and 118 paramedics were trained in the new protocol. Implementation at JHH lasted for two weeks. 42 clinicians and 102 paramedics were trained.
In total 108 ED clinicians and 265 paramedics were trained over 5 weeks in the new handover protocol. This training was reinforced with distribution of a summary of the IMIST-AMBO protocol printed on pocket-sized plastic cards.

5.6 Protocol evaluation

Evaluation of the new IMIST-AMBO protocol took place in three ways: video-filming of handovers realising IMIST-AMBO; 5-question surveys distributed to relevant ED clinicians using e-tablets, and feedback of analytical and survey data to paramedics and ED clinicians.

5.6.1 Video-analysis and evaluation

This section discusses the impact on handover practice of the reflexive video feedback, the IMIST-AMBO protocol training, and the in situ feedback when staff were beginning to enact IMIST-AMBO. A comparison is presented of pre-intervention handovers (73 filmed) and post-intervention handovers (64 filmed). As these sections reveal, improvements were achieved on a number of fronts.

5.6.1.1 Improvement in information component delivery: Order and frequency

The following graphs display an analysis of the order in which paramedics deliver the information to ED clinicians. The graphs are a comparative analysis of pre and post-intervention data gathered. The graphs highlight the sequence in which paramedics deliver the individual information components during handovers. The data has been broken down into individual information components that are part of the IMIST-AMBO protocol. The likelihood that these information components occur in the IMIST-AMBO order is represented as a percentage. Thus, 100% (see graph 5.1) refers to the information component ‘I’ being delivered first in all pre- and post-intervention handovers analysed. 63% (graph 5.2) refers to ‘M’ occurring in second position in 63% of pre-intervention handovers. The key on the right-hand side of the page matches each information component with a colour: [identification] is blue, [mechanism/medical complaint] is red, and so on.

Nurse

“I’ve actually said, can everybody be quiet please because we can’t hear the ambulance officer.”
Graph 5.1 – First in sequence

Graph 5.2 – Second in sequence

Graph 5.3 – Third in sequence

Graph 5.4 – Fourth in sequence

Graph 5.5 – Fifth in sequence
Graph 5.6 – Sixth in sequence

Graph 5.7 – Seventh in sequence

Graph 5.8 – Eighth in sequence

Graph 5.9 – Ninth in sequence

Graph 5.10 – Tenth in sequence
The important thing to note about graphs 5.1, 5.2, 5.3 and 5.4 is that, pre-intervention, a sequence is somewhat evident in what paramedics say. We see 100% of paramedics deliver I[dentification] first, then 63% of paramedics delivered M[echanism/medical complaint] second, 55% then delivered I[njuries/information relative to the complaint] third, and 37% went on to deliver S[igns] fourth. This points to the presence of a ‘tacit’ sequence in pre-intervention paramedic handovers.

Our study sought to take existing practice as its baseline, and develop the protocol in such a way as to support existing practice. It is suggested that the success of this study is due to this intervention principle (derived from close analysis of existing practice), and is evident from the post-intervention handovers displaying a higher degree of consistency and order. Consider again graphs 5.1, 5.2, 5.3 and 5.4. The post-intervention handovers show that information components were delivered with greater frequency in the appropriate (for IMIST-AMBO) position.

The remaining graphs 5.5 to 5.10 show less difference. Despite this, graphs 5.5 and 5.6 do show evidence of post-intervention handovers comprising more information components, and that they are presented in a better order. In addition, post-intervention handovers had a minimum of 5 information components, against pre-intervention handovers only 3. This shows the intervention had encouraged paramedics to present more appropriate information.

### 5.6.1.2 Length of handover

Table 5.11 – Handover duration

<table>
<thead>
<tr>
<th>Triage Category</th>
<th>Pre-implementation</th>
<th>Post-implementation</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>115s</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>112s</td>
<td>73s</td>
<td>-39s</td>
</tr>
<tr>
<td>3</td>
<td>104s</td>
<td>95s</td>
<td>-9s</td>
</tr>
<tr>
<td>4</td>
<td>78s</td>
<td>80s</td>
<td>+2s</td>
</tr>
<tr>
<td>5</td>
<td>64s</td>
<td>60s</td>
<td>-4s</td>
</tr>
</tbody>
</table>

Another critical point is that this increase in information that is handed over has not come at the cost of increasing the length of time required to deliver the handover. Despite our inability to capture triage category 1 handovers post intervention, there is an overall reduction in handover duration, as is evident in the average time per triage category. Category 2 saw a reduction of 39 seconds, category 3 saw a reduction of 9 seconds, category 4 saw a slight increase of 2 seconds while category 5 saw a reduction of 4 seconds.

Each handover was calculated to assess the overall averages for handover duration, both pre- and post-intervention. The average duration pre-intervention was 96 seconds. The average duration post-intervention decreased to a total of 83 seconds. This has resulted in a saving of 13 seconds and a decrease in handover duration by 13.5%. This decrease in time is quite significant when compared to the number of presentations to hospital by ambulance each day. JHH has had up to 80 ambulances arrive in one 24hr period. With a saving of 13 seconds, this would create a spare 17 minutes for ED clinicians for other tasks.

### Nurse

“Triage works much better now.”
5.6.1.3 Questions in handover

Tables 5.12 and 5.13 present an analysis of questions that are asked during handover, both before and after the intervention. Table 5.3 shows that questions were asked in 93% of pre-intervention handovers. Of those questions, 38% requested information that had already been handed over. In Table 5.13 we can see a decrease in the number of questions asked from 93% to 41%. Moreover, of these questions only 15% requested information that had already been given. The introduction of the protocol decreased not just the need to ask questions by 52%, but also increased ED clinicians' comprehension of information by 23%.

<table>
<thead>
<tr>
<th>Table 5.12 - Questions asked and information provided in response, pre-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times questions are asked during handover</td>
</tr>
<tr>
<td>Questioning already given information</td>
</tr>
<tr>
<td>Times paramedic will repeat info post question</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5.13 – Questions asked and information provided in response, post- intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times questions were asked during handover</td>
</tr>
<tr>
<td>Questioning already given information</td>
</tr>
<tr>
<td>Times paramedics repeated information post question</td>
</tr>
</tbody>
</table>

This marked increase in comprehension could be due to a multitude of factors addressed by means of the protocol. A critical role here may be played by the increased predictability of the kind and placing of the information given, the creation of a specific point at which ED clinicians can now ask questions (during the 2 second break between IMIST and AMBO), and the improvement in the amount of eye contact between the handing over paramedic and the clinician receiving the information (as explicitly prescribed by the protocol).

There is also a decrease to information being repeated by paramedics during handover after a question had been asked. Table 5.3 shows that paramedics repeat information post-questions 19% of the time, compared to only 8% as shown in Table 5.4. This drop of 11% may be due to the paramedics now having a set order to follow for their handover with set times and places for ED clinician questions (minimising confusion caused by being asked questions at unexpected moments). Post-intervention, and upon being asked questions, paramedics were more easily able to revert back to their original place in the handover protocol.

5.6.1.4 Repeated information overall

Tables 5.14 and 5.15 present an analysis of information repetition during the handover. The comparative tables reveal a decrease in the amount of information repeated during handover by 34%. Analysis of the post-intervention handovers reveals this considerable reduction following paramedics' and ED clinicians' adoption of the new handover information structure, IMIST-AMBO.

<table>
<thead>
<tr>
<th>Table 5.14 – Information repetition, pre-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information repeated by paramedic during handover</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5.15 – Information repetition, post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information repeated by paramedic during handover</td>
</tr>
</tbody>
</table>
5.6.1.5 Variations in handover length

Above we commented on overall duration of the handover. In diagrams 5.16 and 5.17 we address the variance per triage category.

Graphs 5.16 and 5.17 display each observed handover duration across the triage categories. A large spread of handover durations is evident in graph 5.16, which is markedly reduced in 5.17. The variance in handover duration pre-implementation was 139 seconds, compared to 101 seconds post, giving a reduction of 27% in the variance of handover. This enables ED clinicians expectations of the length of information required per triage category to be similar.

Diagram 5.16 – Pre-intervention

Diagram 5.17 – Post-intervention

5.6.1.6 Eye contact

The data displayed in diagrams 5.18 and 5.19 show the link between handover duration and eye contact. The biggest disparity between the pre-intervention and post-intervention handovers is that all handovers given post-intervention included some degree of eye contact (diagram 5.18). The graphed data also denotes that the increasing degree of eye contact appears to associate with reduced handover duration. This association between eye contact and shorter handover duration is evident in both diagrams, but is especially prominent in the diagram 5.19. Eye contact for more than 30% of the handover duration associates with a handover length that is reduced by several seconds.

This improvement in eye contact is important of course because it suggests there is a higher level of shared attention. Shared attention is critical to avoiding errors and ensuring patients’ safety.

Diagram 5.18 – Eye contact (%)/Time (seconds), pre-intervention

Diagram 5.19 – Eye contact (%)/Time (seconds), post-intervention

5.7 Conclusion

This chapter has set out an analysis of the handovers video data captured pre-intervention (73 handovers analysed) and post-intervention (64 handovers analysed). The analysis has shown that the IMIST-AMBO protocol associates with improved ordering of the information components. Further, handovers contained all the necessary information components more frequently. Post-intervention handovers also included more frequent eye contact between paramedics and ED clinicians. Information was less often unnecessarily repeated and less often requested again after having been provided. Finally, eye contact had improved between the parties involved in handover.
6 TRIAGE PERCEPTIONS TO HANDOVER PROTOCOL IMPROVEMENT

6.1 Introduction

This study, besides analyzing the video records of pre-intervention and post-intervention handovers, also included a pre/post survey asking ED clinicians to rate paramedic handovers. Triage perception questionnaire surveys incorporating five questions were made available at both sites using e-tablets. The tablets were taken away from the triage area during the one-week intensive training and implementation of the protocol at the sites.

The tablets contained 5 questions, each allowing for 4 answers: strongly agree, agree, disagree and strongly disagree. The tablets were supposed to perform daily downloads of response data. However often this feature was not working and required manual downloads by staff at the hospital. Due to workload pressures these manual downloads were not always done. The tablets also required daily recharging. This meant that tablets often went for days without being re-charged as there was not always someone able to perform this task. Due to these factors the data yield was more limited than planned during some periods of the study. Several tablets at JHH malfunctioned and some disappeared.

The tablets were made available in the triage area at RPAH from the 5th of July 2010 through till the 12th September 2010. Due to problems at JHH, tablets there failed to yield useable responses. Results presented here refer only to surveys filled out at RPAH. On completion of the study a total of 416 questionnaire surveys (all at RPAH) were completed.
6.2 Survey findings

The data presented in diagrams 6.1 and 6.2 relates to whether the ED clinicians perceived information given during the patient handover to be sufficient to triage the patient. The main difference between diagram 6.1 and 6.2 is that triage clinicians’ perceptions post-intervention rose by 10% from agree to strongly agree with minimal change to the other categories.

The diagrams 6.3 and 6.4 relate to the order of information that is handed over to the triage clinician. Comparison of the data presented in these two diagrams shows that respondents indicated they more strongly agreed (by 8%) and fewer (by 2%) strongly disagreed with the statement ‘The handover information was structured in order of importance’.

The data presented in diagrams 6.5 and 6.6 relates to the duration of the handover. Triage clinicians’ perception in this area changed only to a minimal degree. However, slight swings are evident away from strongly agree post-intervention (4%) with strongly agree responses remaining the same. Agree responses went up by 5% and disagree responses went down by 2%.
These results point to mixed responses to the new (reduced) duration of paramedic handover. The data suggests that, despite a fall by 13% in the length of time it takes for handover post-intervention, triage clinicians were not prepared or able to record this as an advantage.

The information in diagrams 5.17 and 5.18 relates to the perceived relevance of the information handed over by the paramedics to the triage clinician. This data set displayed less positive results. Strongly agree responses fell marginally by 3%, agree responses saw no change, disagree responses rose by 6% and the strongly disagree responses fell by 3%. Both response sets record ED clinicians as perceiving handover information to be relevant in 81% of handovers received.
This lack of apparent improvement in perceived usefulness of the information received is difficult to rhyme with the objective video-based analysis presented in the previous section, pointing to significant improvements in handover order, duration and comprehensiveness. This divergence between actual practice improvement and perceived degree of improvement cannot be easily explained, other than by pointing perhaps to cultural inertia: practitioners often have reservations about changing their habits. Longer term evaluation of IMIST-AMBO training and implementation may be called for.

The diagrams in 6.9 and 6.10 present responses about the perceived need for triage clinicians to ask questions either during or post-handover. Somewhat in contradiction with responses given to the previous item presented in diagrams 6.7 and 6.8, data presented here shows the perceived need for questions fell by 9% in the strongly agree category whilst it rose by 13% in the agree category and fell by 4% in the disagree category and by 2% in the strongly disagree category.

6.3 Conclusion

This analysis of ED-clinician survey responses has shown that post-intervention perceptions of handover order, information relevance and need to ask questions improved. On the other hand, their post-intervention perceptions of handover length were less confirming. This latter finding may point to a discomfort with a more efficient use of time and information, and a feeling that this change impacts on the adequacy of the handover. Further enquiry into ED clinicians’ perceptions of the new handover protocol may be needed.
7 DISCUSSION

7.1 Project work discussion

The previous two Sections of this report have shown that implementation of the new handover protocol resulted in a change of practice targeting handover communication between ambulance paramedics and ED clinicians. The most critical aspect of this change was to improve paramedics’ and ED clinicians’ awareness of the structure of handover communication and their ability to intervene in it.

Despite these positive outcomes of the study, a number of constraints deserve to be mentioned for their potential impact on the ultimate success of the study.

First, the highly complex environment of the ambulance to ED transfer of care provided many challenges with regards to training of all staff involved. Training staff at work needs to be sensitive to tasks that take precedence over the training. This required constant vigilance on the part of the trainer. Training was further complicated by the sheer number of paramedics involved in addition to their intermittent arrival at the participating emergency departments.

Second, due to tight time constraints, the main training method was fast turn-around instruction and feedback on site. This method allowed up to 5 minutes of training time per paramedic. Extra time was gained by approaching the paramedic after doing the handover and providing in situ feedback about their enactment of the new protocol. This method ensured the majority of paramedics presenting to each site were trained in the new handover protocol, with several having received (and some having requested) ‘hot feedback’. Knowledge sustainability however remains uncertain and requires future evaluation.

With regard to nursing and medical staff of the ED, less time was needed for protocol training. The emphasis of the training here was on active listening in response to paramedics’ delivering the new IMIST-AMBO handover protocol. This centred on the need for ‘hands off – eyes on’ while being given the handover information, and for specific opportunities available for clinicians to ask questions (in between IMIST and AMBO). Finally, IMIST-AMBO provides the potential to be tailored to two separate handovers: one at triage (IMIST) and one at the bed-side (IMIST-AMBO), enabling paramedics to go into different levels of detail.

The results post-implementation demonstrated changes in the time required to deliver handover, a reduction in the number of questions asked, improvements in ED clinician comprehension of information and an increased degree of eye contact that associated with more efficient use of time. The new protocol also allowed a space for additional detail and display of clinical aptitude.

In contrast, the survey conducted of triage clinicians’ perceptions revealed that the impact of the new protocol was not seen to be as dramatic as was suggested by the objective analysis of the data in the post-intervention handovers. The result may be due to only 10% of the paramedic workforce having been trained in the new protocol. Further training and dissemination of the protocol in addition to more evaluation of its impact will be necessary.
### 7.2 NSW Health clinical handover key principles

The Garling Report\(^\text{11}\) identified the need for recommendations to develop handover policy. After state-wide consultation NSW Health developed a set of standard key principles for clinical handover that are required to be met by any proposed clinical handover tool. The IMIST-AMBO handover protocol is able to meet all of these requirements as detailed below:

<table>
<thead>
<tr>
<th>Garling Recommendations</th>
<th>IMIST-AMBO protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A requirement that part of the handover occurs at the patient’s bedside</td>
<td>Paramedics deliver clinical handover in many different locations of the ED, including triage, the resuscitation bay, trolley bay, acute, sub-acute and paediatrics. Despite its various locations, handover is always communicated next to the patient’s stretcher/bed.</td>
</tr>
<tr>
<td>2. A requirement that sufficient time designated for handover is built into the rostering system</td>
<td>The Ambulance to ED handover is currently seen by practitioners as an essential part of practice ensuring appropriate continued management of their patients. Rostering accommodates this practice. The handover at triage assists the triage nurse in determining the acuity of the patient and the care needed. The subsequent handovers in acute, sub-acute, etc. are essential for the planning of treatment and the proposed trajectory through the ED.</td>
</tr>
<tr>
<td>3. A requirement for the information which is to be conveyed during handover</td>
<td>IMIST-AMBO details the exact information components that are required during the Ambulance/ED handover. Aided by research, a collaborative of ED clinicians, ANSW paramedics and members of the project steering committee determined the exact information components required during the Ambulance to ED handover. These components were ordered in descending criticality. This order also matches the ‘tacit’ sequence that was identified during the initial analysis of the data collected and the order required for a quick triage.</td>
</tr>
<tr>
<td>4. A requirement that a written or electronic record be made of the handover</td>
<td>The handover delivered by paramedics is an accumulation of the objective and subjective information that has been gained prior to ambulance presentation at the ED. This information (despite being given in a verbal handover) is also entered into the patient health care record.</td>
</tr>
</tbody>
</table>
The Standard Key Principles for Clinical Handover, as designed by NSW Health, can be found in “Implementation Toolkit: Standard Key Principles for Clinical Handover”. The majority of these standard key principles are satisfied by the IMIST – AMBO handover protocol.

<table>
<thead>
<tr>
<th>Standard Key Principles</th>
<th>IMIST-AMBO protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Leadership – Nominate a leader at each clinical handover.</td>
<td>In a trauma handover situation, the handover leaders will be identified in the specially-coloured gowns. In general handovers, the leader is the triage nurse.</td>
</tr>
<tr>
<td>2. Valuing handover – Set the expectation that clinical handover is valued and an essential part of daily work. Ensure staff are available to attend the handover of all patients relevant to them.</td>
<td>The handover delivered by ANSW paramedics is considered essential to the continuation and the planned trajectory of care. The handover is seen as an expected part of the patient transfer process from the ambulance to the acute care setting. The ‘hands-off/eyes-on’ rule further strengthens staff awareness of the importance of handover information delivered to them.</td>
</tr>
<tr>
<td>3. Handover participants – Identify and orient handover participants. Involve them in regular review of the clinical handover process.</td>
<td>The participants involved in the ambulance to ED handover often vary. Despite this variance paramedics are easily identifiable due to the difference in uniforms. However ED clinicians are somewhat more difficult to identify. This point was raised during the initial phases of the study and was the basis for the process change that resulted in the implementation of identifying the trauma team leaders in resuscitation bay handovers. During a trauma handover there are often multiple people present and paramedics need to identify who will receive the handover. The implementation of team leaders identifying themselves with blue gowns further strengthens paramedics’ ability to identify relevant staff.</td>
</tr>
<tr>
<td>4. Handover time – Set an agreed time, duration and frequency for clinical handover to occur</td>
<td>The set time for Ambulance to ED handover is upon Ambulance presentation to the ED, which enables triage to take place. The duration of handover as identified in this report showed an increase in duration correlated to patient severity. The frequency of ambulance to ED handover is often twice per patient, but depending on severity and ED-department patient load this can range between once and three times.</td>
</tr>
<tr>
<td>5. Handover place – Set a specific location for clinical handover to occur</td>
<td>Ambulance to ED handover usually occurs once at triage and then once again upon transfer of care to the ED clinician in the department.</td>
</tr>
</tbody>
</table>
### Standard Key Principles

6. Handover process – Define the clinical handover process including:

- **Standardised Protocol:** Clearly identify the patient, you and your role, state the immediate clinical situation of the patient list the most important and recent observations, provide relevant background/history to the patient’s clinical situation, identify assessments and actions that need to occur, identify timeframes and requirements for transition of care, promote the use of the patient record to cross-check information, ensure documentation of all important findings or changes in condition and ensure comprehension, acknowledgement and acceptance of responsibility for the patient by the clinician receiving handover.

Where the condition of the patient is deteriorating – escalate the management of these patients as soon as a deterioration in condition is detected.

Other critical Information – Prioritise alerts for any other important information (e.g. Outstanding actions, planned patient moves, Occupational Health and Safety risks impacting staff or patient safety).

### IMIST-AMBO protocol

The handover process is defined as follows:

a. **IMIST-AMBO standardises all handover communication between ambulance and ED.**
   - **I** – Identifies the patient
   - **M** – States the immediate clinical situation
   - **I** – Provides an assessment of the patient and relevant background/history to the patient’s clinical situation
   - **S** – Most recent observations
   - **T** – Identifies the treatment that was required and how the patients condition has changed
   - **A** – A period provided for questions allowing for a cross check of information and ensures clinician comprehension
   - **M B O** - The protocol then completes A, M, B and O, extra essential information that is required for the ambulance to ED handover
   - **?** – Upon completion of the acronym another period of time is available for further questioning and ensuring that the responsibility of the patient has been taken over.

b. **This is an important element to be conveyed by ambulance Paramedics. Patients are usually undifferentiated at this stage and therefore highly likely to deteriorate.**

c. **Other critical information can be provided in the information component O - the final information component of handover. This is for paramedics to handover any other information that they determine to be essential.**
7.3 How do ISBAR and IMIST-AMBO work together?

Identification Situation Background Assessment Recommendation (ISBAR) prescribes an order of general topics of information (the exact clinical content of which is left for the clinician to determine), rather than specific clinical contents (such as ‘vital signs’ and ‘allergies’). As a mode of topic standardization, SBAR (the original acronym that was based on a US Navy protocol, and which forms the basis of ISBAR) enjoys a popularity that may be explained by the general nature of its components, enabling it to be applied across multiple contexts.

The foregoing may explain why ‘MIST’ (Mechanism of injury/illness, Injuries sustained, Signs, and Treatment given) has traditionally been regarded as more appropriate for the paramedic-to-emergency department staff handover. Different training, limited (ambulance) treatment options and street-based practice mean that paramedic care-in-transportation harbours fewer clinical-medical commonalities with the emergency department and other medical specialties, than those hospital specialties may share with one another. In contrast to SBAR, MIST is prescriptive about the clinical specificities that are to be handed over. MIST’s greater content specificity aids communication across significantly different institutions, aims, practices, and educational backgrounds.
## ISBAR & IMISTAMBO working together

| I | The ISBAR and IMIST-AMBO mnemonics both start off with the letter I; however, it can perform a slightly different function. The I in ISBAR stands for introduction, which can include introduction of the clinician themselves and of the patient. The I in IMIST-AMBO stands for identification of the patient, including the patient’s name and age. |
| S | The second component of both handover mnemonics relates to the explanation of what has occurred for this handover to be taking place. In the ISBAR mnemonic S[ituation] asks the person handing over to explain the immediate situation of the patient including chief complaint and patient stability. In IMIST-AMBO the M[echanism of injury] for a trauma patient, or M[edical complaint] for all other admissions, asks the person handing over to give a specific explanation of the patient’s presenting problem and why they have been transported to hospital. |
| B | The third component of ISBAR is also quite broad compared to that of IMIST-AMBO. In IMIST-AMBO the I[njuries] in a trauma case, or I[nformation relating to the complaint] in other handovers, is similar in part to the B[ackground] of ISBAR. However, B[ackground] is defined as including the date of admission, diagnosis, treatment and test results up to this point in the patient’s hospital journey. |
| A | A in ISBAR stands for assessment, requiring the person handing over to give a clinical assessment of the patient’s condition. The fourth component of IMIST-AMBO, S[igns] also looks at assessment of the patient, however it quite specifically requires detailing of the patient’s vital signs and GCS. |
| R | In ISBAR, the fifth component R[ecommendation] is the point of transition of responsibility and accountability for patient care. This could include a request for the patient to be reviewed. In IMIST-AMBO the Emergency Department takes over responsibility of the patient at the completion of the handover, with ED staff deriving their own conclusions about what needs to happen for the patient. Further components of IMIST-AMBO include A[llergies], M[edications], B[ackground] and O[ther issues]. To ensure components are not lost, IMIST-AMBO requires their specification as this is the only opportunity for this information to be handed over. |

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**Nurse**

“Ambulance handovers have improved massively.”
8 RECOMMENDATIONS

Statewide consultation with ASNSW and NSW Health will need to occur for further progression and implementation of IMIST-AMBO. If formal adoption occurs, state-wide implementation may need to include the following recommendations from this study and its outcomes.

First, **handover needs to become integrated in formal educational resources for paramedic trainees and clinician trainees.** Such education needs to involve more than prescription of the protocol. It needs to encompass scenario-based simulation, as well as reflexive practice using real-life video and on-the-spot evaluation of acquired handover skills.

Second, **education of the IMIST-AMBO protocol will need to encompass several strategies:**
- inclusion of the handover protocol into the paramedic syllabus (ANSW already has plans to do this);
- education of all currently practicing paramedics across the state;
- adoption of a train-the-trainer approach: people highly skilled in the new handover protocol delivering education sessions around the state to paramedic educators and clinical training officers;
- integration of IMIST-AMBO into the ‘Between the Flags’ observation sheets accompanied with relevant training.

Third, **ED-induction programs will need to include instruction in and simulation of IMIST-AMBO behaviour and communication.** This could be achieved by a specially designed staff induction component combined with a train-the-trainer instruction component. To ensure all ED staff are aware of the IMIST-AMBO protocol and the role they play in its enactment, an induction DVD could be produced on the correct methods of handover and what is expected of the person receiving the handover.

Fourth, **effective use of IMIST-AMBO is contingent on all ambulance-ED handover channels being trained in and conforming to the protocol.** Attention needs to be paid to communication channels external to the paramedic-ED clinician interface. Examples of external handovers are: ambulance-to-control centre calls, control centre-to-ED, and handover between first response paramedics to general duties paramedics.

Fifth, **hospital responses to trauma need to be aligned.** Where some hospitals expect patients to be given spinal precautions in the case of trauma, others do not. Some hospitals prefer to receive a ‘code 3’ call for all traumas, while others only expect ‘code 3’s for life-threatening cases.

Sixth, **an appreciation of staff roles; that is an equal understanding of the pressures and dynamics placed on paramedics and ED clinicians.***

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*These ‘external’ handovers were targeted with considerable concern and critique during the current study’s focus groups. The main concern was the frequent inaccuracies regarding information relayed between the different interfaces. This became particularly evident on two occasions when patient information was incorrectly relayed via these ‘external’ channels. For example, an 80-year old patient arrived at the ED, but a paediatric trauma team was called to take reception of an 8-year old. Another example includes a patient arriving with SVT3 of 205bpm, but doctors were called as the patient had been described as having a heart rate of 105bpm. Finally, several ‘code 3’ calls did not enable the hospital to ensure that it was adequately prepared for patients’ arrival. These examples show the importance of improving the accuracy of information channels that link paramedics, the control centre and the hospital.*
9 REFERENCES
