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Context, culture and (non-verbal) communication affect handover quality

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ABSTRACT

Background: Transfers of care, also known as handovers, remain a substantial patient safety risk. Although research on handovers has been done since the 1980s, the science is incomplete. Surprisingly few interventions have been rigorously evaluated and, of those that have, few have resulted in long-term positive change. Researchers, both in medicine and other high reliability industries, agree that face-to-face handovers are the most reliable. It is not clear, however, what the term face-to-face means in actual practice.

Objectives: We studied the use of non-verbal behaviours, including gesture, posture, bodily orientation, facial expression, eye contact and physical distance, in the delivery of information during face-to-face handovers.

Methods: To address this question and study the role of non-verbal behaviour on the quality and accuracy of handovers, we videotaped 52 nursing, medicine and surgery handovers covering 238 patients. Videotapes were analysed using immersion/crystallisation methods of qualitative data analysis. A team of six researchers met weekly for 18 months to view videos together using a consensus-building approach. Consensus was achieved on verbal, non-verbal, and physical themes and patterns observed in the data.

Results: We observed four patterns of non-verbal behaviour (NVB) during handovers: (1) joint focus of attention; (2) 'the poker hand'; (3) parallel play and (4) kerbside consultation. In terms of safety, joint focus of attention was deemed to have the best potential for high quality and reliability; however, it occurred infrequently, creating opportunities for education and improvement.

Conclusions: Attention to patterns of NVB in face-to-face handovers coupled with education and practice can improve quality and reliability.

INTRODUCTION

Transfers of care, also known as handovers, remain a substantial patient safety risk and an opportunity for improving the quality of healthcare. From a patient safety perspective, unwanted variation in communication during

handovers represents a vulnerable gap in care. For example, a Joint Commission Report issued in 2010 states, 'Miscommunication between caregivers when responsibility for patients is transferred or handed-off plays a role in an estimated 80 percent of serious preventable adverse events'.¹

Although research on handovers has been conducted for many years, going back to the 1980s,² the science is incomplete. At the same time, organisations such as the Accreditation Council for Graduate Medical Education (ACGME), which accredits the training of resident physicians in the USA, and the Joint Commission, which accredits US healthcare institutions, have *required* performance standards for handovers. ACGME *requires* institutions to: (1) design clinical assignments to minimise the number of transitions in patient care, (2) monitor effective, structured handover processes, (3) ensure that resident physicians are competent in communicating with team members in the handover process and (4) make available schedules that inform all members of the healthcare team of attending physicians and residents currently responsible for each patient's care.³ The 2006 Joint Commission National Patient Safety Goals included a requirement that hospitals implement a standardised approach to handoff communication, including an opportunity for individuals involved in the process to ask and respond to questions.⁴ The need for evidence-based standards and effective improvement interventions makes research in this area both timely and critically important.

The hazards of hospital-based patient handovers have been empirically documented. In a matched case-control study of an inpatient service, the likelihood of preventable adverse events was significantly higher under the care of a cross-covering physician than under the admitting care team.⁵ Similarly, patients

admitted to the hospital by a cross-covering physician (rather than primary physician) had longer inpatient stays and more laboratory tests.⁶ In another study, 31% of paediatric residents said that they were not prepared for events that occurred on their shift, and should have been covered in the transfer of care,⁷ and a survey found that 59% of medical and surgical physicians in training reported harm to patients that arose from poor handovers, with 12% reporting that the harm was 'major'.⁸ Finally, in a study of malpractice claims in surgery, communication breakdowns related to handovers occurred in 43% of the cases, with the most common breakdowns related to omitted information and residents failing to notify the attending surgeon of critical events.⁹ Additional sources of communication breakdowns cited in the literature include wrong or omitted patient information, attributed in some cases to interruptions during the handover.^{8 10 11} The specific mechanisms by which interruptions and other non-verbal behaviour (NVB) compromise quality and lead to other communication challenges are not well known and are virtually unexplored in the research literature on handovers.

Surprisingly few interventions have been rigorously evaluated and, of those that have, few have resulted in long-term positive change.¹² A recent systematic review of the literature on handovers stated:

'There is remarkable consistency in anecdotally suggested strategies [for improvement]); however, there remains a paucity of evidence to support these strategies. Overall, there is a great need for high-quality handoff outcomes studies focused on systems factors, human performance, and the effectiveness of structured protocols and interventions'.¹³

Two key elements of the practice environment may explain these disappointing results. First, handovers occur in small units of work known as 'microsystems'.¹⁴ Microsystems are the smallest natural grouping of clinicians and staff working together with the shared clinical purpose, to provide care for a population of patients.¹⁵ According to Wasson *et al*, 'Clinical microsystems are the essential building blocks of all health systems. At the heart of an effective microsystem is a productive interaction between an informed activated patient, and a prepared proactive practice staff'.¹⁶

Like all human systems, microsystems vary in the extent to which their customs, rules, boundaries and outcomes can be maintained and enforced. Microsystems are characterised by unpredictable emergent events, such as errors and near misses and, in the context of handovers, do not conform to the same standards as a machine bound by linear rules and interchangeable parts.¹⁷ Achieving quality in such systems is less about blind adherence to rules and regulations and more about understanding cultural norms that guide

the behaviour of social actors who exist in a web of relationships. Differences in local culture have been identified as contributing to variations in microsystem performance and may, in part, explain why interventions that call for rigid adherence to uniform standards have not been successful.^{15 18–20}

Handovers involve coordinated exchanges of information from one clinician to another using a variety of modalities including: (1) the use of formal and informal artefacts such as written sign-out sheets or 'cheat sheets'; (2) information that is delivered verbally that includes paralinguistic features such as pitch, pace, intonation and hesitations and (3) NVB that includes information delivered through gesture, posture, bodily orientation, facial expression, eye contact and physical distance.

Handovers occur in a complex web of face-to-face and asynchronous interactions and relationships that make up the workflow of any medical professional. Beyond being assessed for their technical quality, little is known about the moment-by-moment microinteractions that characterise them, and the effects these may have on workflow and quality. Our work aims to illustrate how NVB affects handover quality, accuracy and reliability and, through this, the safety and effectiveness of care.

THE ROLE OF NON-VERBAL BEHAVIOUR IN HANDOVERS

The conversations that take place between providers when care is transferred are both complex and nuanced.²¹ Their complexity is due to factors that include the number of patients involved in the handover, their level of acuity, the number of individuals or teams involved in the care process, competing cognitive demands, time pressures, fatigue and the physical and cultural aspects of the handover process. Another part of the complexity results from the ways in which incoming and outgoing medical professionals share time and space together.

To illustrate, we describe the role of NVB in handovers. Our observations come from a series of studies conducted in Veterans Administration Medical Centres and nationally over the past several years, and from a recently completed video-based observational study of resident and nurse handovers in medicine and surgery.^{22–24}

Researchers in medicine and in high-reliability industries agree that face-to-face handovers are preferable to those that exclude a face-to-face conversation.^{25–27} But, exactly what does face-to-face mean? Does it mean simply being physically copresent or, does it mean to be copresent in particular ways that facilitate communication? We argue that it is the latter; and, our research suggests that some ways of physically sharing space and time

are more conducive to high-quality handovers than others.

METHODS

Videotaping

For the present study, we video recorded nursing and physician handovers to understand variations in NVB during the face-to-face conversations. As compared with second-order data sources, such as interviews, direct observation allows researchers to describe the constitutive elements of an event, ceremony or drama as it occurs in real time.^{28 29}

A research assistant approached potential participants (incoming and outgoing residents, nurses and nurse practitioners) to explain the voluntary nature of the study procedures, answer any questions, and obtain consent (including consent for audio/video recording) to enrol them in the study. Addressing ethical considerations, special care was taken to assure participants that their information and the videotapes would remain secure and be viewed only by study personnel. Once video and audio tapes had been obtained, they were immediately downloaded to a secured drive maintained by the Veterans Administration Medical Centers and encrypted.

The study was approved by the Indiana University institutional review board (IRB), study number 0807-53.

Analysis of videotapes

There were 31 nursing handovers covering 137 patients, and 21 resident handovers covering 101 patients included in this study. Videotapes were analysed using immersion/crystallisation methods of qualitative data analysis.³⁰

With no pre-existing framework developed in advance for analysis, an inductive approach was used to discover patterns of NVB in the data. A team of six researchers met weekly for 18 months to view videos together. Using a consensus-building approach based on a combination of field notes, 'opportunistic' interviews with the participants, and repeated viewing of the same material, sometimes many months apart, we eventually achieved consensus on verbal, non-verbal, and physical themes and patterns observed in the data. Finally, as a test of 'goodness-of-fit', we carefully reviewed the videotapes for any 'deviant' cases that did not fit the categories we had developed.

RESULTS

We identified four patterns of NVB that relate to handover quality and have dubbed them: (1) joint focus of

attention; (2) 'the poker hand'; (3) parallel play and (4) kerbside consultation. Each pattern constitutes a 'transfix', or systematic way of participating non-verbally in the care transfer process. And, although there are variations in each pattern, we have been able to code virtually every handover we have observed in nursing, medicine and surgery into one of these four categories.

Joint focus of attention

'Joint attention refers to the ability to consider information about one's own visual attention in parallel with information about the visual attention of other people'.³¹ In studying handovers, joint focus of attention refers to the fact that the outgoing and incoming physician or nurse coordinate their verbal and visual attention jointly on an artefact, be it a sign-out tool, computer screen or list of patients. The concept of joint focus of attention has been studied extensively in the field of human factors engineering. For example, aircraft flight decks are designed so that the captain and cocaptain have the same array of instruments in front of them and virtually the same field of view when looking out of the flight deck window. Redundancy in the visual field creates an instantaneous 'joint focus of attention' using simultaneous inputs. Aural inputs are also redundant with each crew member tuned to the same radio frequency as air traffic control.

In clinical communication, there is ample evidence that NVBs, such as mutual eye contact, body posture and voice tone (all proxies for joint focus of attention) in the interactions between physicians and patients relate to both patient satisfaction and care outcomes.³²⁻³⁵ The literature in disparate fields, such as human factors engineering and clinical communication, suggests that critical tasks, such as flying an airplane or communicating information in a dyadic relationship, are best achieved through a joint focus of attention.

The concept is reflected in Situation Awareness (SA), a framework for understanding how humans perceive and comprehend environmental elements and project their status into the future.³⁶ SA is comprised of the following three levels: (1) perceiving information or cues in one's environment, such as patient information on a sign-out sheet; (2) comprehending and integrating perceived information and (3) projecting future events based on the status of current environmental elements. As this description suggests, SA refers to an individual's internal cognitive representation of the environment at a specific point in time. 'Team SA' involves multiple activities and individuals coordinating actions and information³⁷ and includes the shared understanding of the status of a group of patients for whom two or more clinicians have responsibility at a single point in time (the

handover). A high level of team SA suggests comprehensive and high-quality communication between the incoming and outgoing clinician with a joint focus of attention.

High reliability is achieved in the joint focus of attention from redundancy in communication channels and the ability to compare and contrast aural and visual information, and detect when they are in and out of sync with one another. As an example of this synchronicity, in one handover with a joint focus of attention, the outgoing resident could observe the notes that the incoming resident made on the shared artefact as he listened. Additionally, the incoming resident referred to the sheet to ask the outgoing resident, 'Any one on this list that you're more worried about?' In another handover, the outgoing resident's train of thought had been interrupted. When he returned to the handover list he said, 'So the next guy on the list (pause) ... is Mr. Y'. After hesitating a moment, the outgoing leaned over to look at the shared handoff sheet and corrected himself by saying, 'Oh. Mr. X. So Mr. X had a' In effect, these actions allowed the residents to coordinate their efforts through a joint focus of attention, thereby reducing the chance of a transmission error.

Although it perhaps comes closest to the ideal in terms of information transfer, in our studies, joint focus of attention occurred infrequently. **Figure 1** is a re-enactment of a handover with joint focus of attention.

The 'poker hand'

The 'poker hand' describes a pattern in which the outgoing resident or nurse holds a paper artefact, for instance, a printed patient list or handover tool, in such a way that it cannot be seen by the incoming resident or nurse, and uses it to convey information to the incoming professional. The fact that at least some of the information that is transferred comes from a document that the

other cannot see creates the potential for errors in both transmission (a lab value on the written document is misquoted by the outgoing professional and incorrectly transcribed in the incoming professional's notes), and reception (a correct lab value from the written document is misheard or misunderstood and incorrectly transcribed). These handovers do not share a simultaneous focus on a single source of information, and create an asymmetric information transfer situation since there is no way to check that what is said by the outgoing clinician and what is written by the incoming clinician is accurate and complete. There is an increased risk of significant error when information is transferred without an opportunity to confirm accuracy.³⁸

Likewise, when there is a lack of redundancy in aural and visual inputs, the potential for error, mishearing and misunderstanding increases. The reduction in access to types of information represented by the poker hand is analogous to the increased difficulty the lack of non-verbal cues introduces in telephone conversation, and the further reduction in being able to detect meaning and intention in email and text messages.³⁹ In one handover, an outgoing resident began to read off lab values for one patient while the incoming resident documented these values as belonging to a different patient. Fortunately, this 'transcription' error was discovered later in the handover, and the incoming resident was able to correct the information. Nonetheless, this represented a 'near miss' in terms of information transmission. Despite its associated communication risks, the 'poker hand' was the most frequent pattern we observed. **Figure 2**, is a re-enactment of a 'poker hand' handover between two residents.

Parallel play

Parallel play refers to a pattern in which the outgoing and incoming professionals may be working in the same

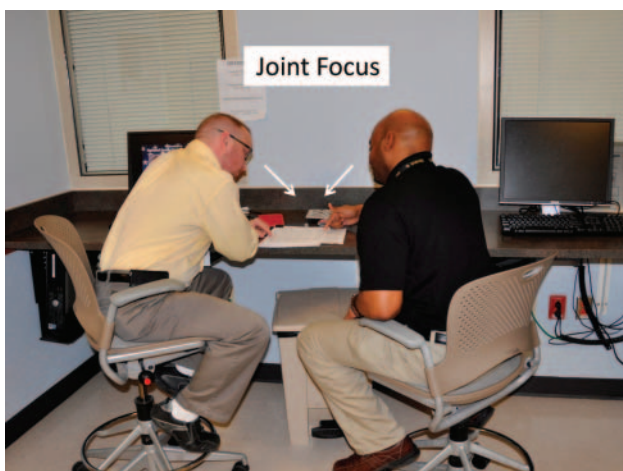


Figure 1 Joint focus.



Figure 2 Poker hand.

physical space, but their activities do not have a joint visual focus of attention. That is, either the incoming or outgoing professional shifts his/her focus away from the other. For example, an outgoing nurse or resident may be seated and looking at a computer screen with his or her back to the incoming clinician. In this pattern, it is not possible for the outgoing to monitor the rate at which the incoming is processing the information that is being transmitted, or observe any reaction by the incoming to the information being conveyed.

We observed several instances in which an incoming interrupted an outgoing's presentation and asked them to 'slow down' so that the information could be absorbed. We also observed instances where the incoming appeared to ignore information they had missed and moved on to the next piece of information. Finally, we observed instances in which the very activities in which each clinician was engaged began to diverge. In one nursing handover, for instance, the incoming initiated a phone call about a patient that had been discussed several minutes earlier at the same time that the outgoing was continuing to provide updates on other patients. This phase shift increased the risk that important information about patients currently under discussion would be missed, because the two clinicians were operating in two parallel activity systems. It also suggests that handovers are more complex than the mechanical passing of a baton from one clinician to another, a popular image used to describe handovers. Parallel play was the second most frequent pattern we observed (figure 3).

Kerbside consultation

Kerbside consultation refers to a pattern in which one professional (typically the outgoing) stands while the other (incoming) sits during the handover. What distinguishes kerbside consultation from the other categories

of NVB is that the outgoing professional is standing. While a joint focus of attention may be possible with this NVB model, for the most part handovers using kerbside consultation appeared cursory and hurried, with fewer clarifying questions asked by the incoming and the elapsed time for these handovers tended to be shorter than for the other patterns. The risk involved in the kerbside consultation is that short shrift may be given to all but the most pressing patient care issues, and that important information may be lost.

In the context of clinical care, standing on the part of one person (the doctor or nurse) and sitting or lying on the part of the other (as in the case of a patient in their hospital bed) creates a power imbalance and makes for more truncated and less satisfying interaction.⁴⁰ This may also be the case for handovers involving this communication pattern. The kerbside consultation model was least frequent among the handovers that we observed, and typically occurred when multiple residents or nurses handed-off to a cross-covering individual (figure 4).

DISCUSSION

The requirement to include a face-to-face conversation as part of a handover is considered to be a critical element for ensuring reliable handovers. However, as we have demonstrated, variation in how these face-to-face conversations occur suggests gradations in how they impact handover accuracy and reliability.

Because so little is known about the role of NVB, and other microinteractional occurrences in handovers, we suggest that methods of direct observation, ethnographic and videographic, be used in conjunction with measures of technical quality to document how variations in NVB affect outcomes. The results can then be used to optimise



Figure 3 Parallel play.

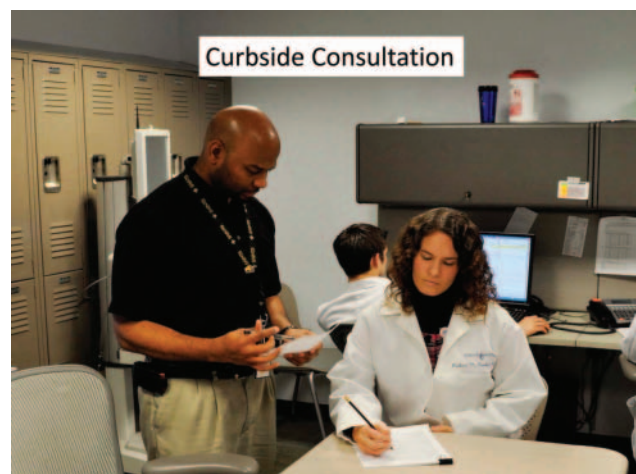


Figure 4 Kerbside consultation.

information exchange during handovers, by offering recommendations for enhanced use of effective NVBs, as one more approach to enhance 'common ground' in communication among individuals involved in handovers.^{41–42} For learners and practitioners interested in improving handovers, we recommend incorporating into physician and nurse education what has been discovered and confirmed in other high-reliability industries such as aviation, where problems like joint focus of attention and use of teach-backs, talk-backs and checklists by air crew members have long been studied by human factors researchers.⁴³ Self-study through audio or videotaping one's own handovers (with permission of those involved) is another useful improvement technique as is obtaining coaching and video review with experts.⁴⁴ Role play, small group discussion and trigger tapes using simulated video clips of the different variations of the NVB handoff patterns identified here can also be used with resident and nursing learners to outline risks, as well as stimulate commentary and analysis of how we can further optimise the quality of information transfers. These have all been found effective in adult learning contexts, such as resident and continuing medical education.⁴⁵

CONCLUSIONS

Research on handovers is maturing rapidly. Interventions to improve handovers that capture and integrate elements of local context along with a focus on technical quality have a greater promise of success. During handovers, incoming and outgoing health professionals may share the same space and time, but may still have divided attention, with potential consequences of this being a suboptimal transfer of information. Based on the findings of this study, joint focus of attention during handovers facilitates synchronicity of information transfer, accuracy and understanding between the incoming and outgoing professionals. Focusing on NVBs during handovers will contribute to refinements in educational interventions and through these, to improvements in handovers.

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project. CO'B was involved in the analysis of the data and write up of the manuscript. ZF was a research assistant who collected data and was involved in its analysis. AA was a research assistant who collected data and was involved in its analysis. AH was the project manager and was involved in the analysis of the data as well.

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