Teams, tribes and patient safety: overcoming barriers to effective teamwork in healthcare

Jennifer Weller, Matt Boyd, David Cumin

Centre for Medical and Health Sciences Education, Faculty of Medical and Health Sciences, Grafton Campus, University of Auckland, Auckland, New Zealand

Correspondence to
Associate Professor Jennifer Weller, Centre for Medical and Health Sciences Education, Faculty of Medical and Health Sciences, Grafton Campus, University of Auckland, Private Bag 92019, Auckland 1142, New Zealand; j.weller@auckland.ac.nz

ABSTRACT
Modern healthcare is delivered by multidisciplinary, distributed healthcare teams who rely on effective teamwork and communication to ensure effective and safe patient care. However, we know that there is an unacceptable rate of unintended patient harm, and much of this is attributed to failures in communication between health professionals. The extensive literature on teams has identified shared mental models, mutual respect and trust and closed-loop communication as the underpinning conditions required for effective teams. However, a number of challenges exist in the healthcare environment. We explore these in a framework of educational, psychological and organisational challenges to the development of effective healthcare teams. Educational interventions can promote a better understanding of the principles of teamwork, help staff understand each other's roles and perspectives, and help develop specific communication strategies, but may not be sufficient on their own. Psychological barriers, such as professional silos and hierarchies, and organisational barriers such as geographically distributed teams, can increase the chance of communication failures with the potential for patient harm. We propose a seven-step plan to overcome the barriers to effective team communication that incorporates education, psychological and organisational strategies. Recent evidence suggests that improvement in teamwork in healthcare can lead to significant gains in patient safety, measured against efficiency of care, complication rate and mortality. Interventions to improve teamwork in healthcare may be the next major advance in patient outcomes.

INTRODUCTION

Modern healthcare is delivered by teams rather than individuals and requires the cooperation of healthcare professionals from multiple disciplines. However, the evidence suggests that these changes in healthcare delivery have not been supported by changes in the systems for communication between health professionals, especially across disciplines. Approaches that may have been effective in earlier, less complex and less distributed environments no longer reliably work.[1] We know that failures in interprofessional teamwork and communication lead directly to compromised patient care, staff distress, tension and inefficiency[2–7]; make a substantial contribution to medical error[8–13]; and are a contributory factor in 61% of sentinel events.[7]

In this review, our focus will be on improving sharing of important clinical information between healthcare professionals. We will first describe the features of effective teams. We will then discuss the evidence on information sharing between different members of the team and categorise the challenges to interprofessional teamwork and communication in healthcare into three domains: educational, psychological and organisational. Finally, we will suggest a range of solutions to these challenges, synthesising these into a seven-point plan to promote effective healthcare teams. While our focus is predominantly on hospital-based teams, we believe lessons can be generalised to wider healthcare settings.

Features of effective teams

Following an extensive review of the factors associated with team performance across a range of industries, Salas[14] proposed a model for five key dimensions of effective teams: team leadership, mutual performance monitoring, backup behaviour, adaptability and a team orientation. These are coordinated by the underpinning mechanisms of mutual trust, closed-loop communication and shared mental models. Leadership involves not only task coordination and planning, but development of the team, motivation and establishing a positive atmosphere. Mutual performance monitoring requires sufficient understanding of the environment to enable monitoring of other team members to allow identification of lapses or task overload, while backup behaviour requires sufficient understanding of others' tasks to enable supportive actions to be taken by team members, such as redistribution of workload or support. Adaptability enables a team to respond to changes in the environment and change the plan for patient management. Team orientation is the willingness to take other's ideas and perspectives into account and a belief that the team's goals, which should be aligned with what is best for the patient, are more important than an individual's goals. To achieve these five dimensions of effective teams, members of the team must respect and trust each other in order to give and receive feedback on their performance, must have good communication skills to accurately convey information and must have a shared mental model. Shared mental models have been identified as one of the critical underpinning mechanisms for effective teamwork in general[15] and specifically in healthcare.[14 16 17] Shared mental models lead to a common understanding of the situation, the plan for treatment, and the roles and tasks of the individuals in the team. This is often described as the team being 'on the same page'. A shared mental model enables anticipation of other's needs, identifying changes in the clinical situation and adjusting strategies as needed. Without a shared mental model, the different members of the team cannot fully contribute to problem solving and decision

making.[18] A fundamental requirement for developing a shared mental model, and for effective team performance, is sharing of information between team members.

Information sharing: a challenge for healthcare teams

A meta-analysis of 72 independent studies (incorporating 4795 teams) across a range of industries showed that information sharing positively predicted the performance of the team.[19] There are multiple interfaces where transmission of information between members of the healthcare team is needed for safe and effective patient care. Particular areas where information sharing has been shown to be inadequate are the interface between contexts, such as interdepartmental transfers,[20] or transfers from primary to secondary care[21]; high-acuity settings, such as the emergency department[22] or the operating room[2]; patient handovers at change of shift[23]; and information sharing across professional boundaries, for example, between doctors and nurse.[24]

In a study on medical ward handovers, less than half of residents felt confident in their patient handovers.[23] In an observational study of operating room communications, Lingard[2] classified over a quarter of communication events as failures, and 36% of these had visible adverse effects, including inefficiency, waste, delay, tension and procedural error. Mazzocco et al.[25] found that teams who shared information about the patient less frequently at the start of a surgical case and at the handover postsurgery had more than double the risk of surgical complications than teams that shared such information frequently. Observers of postoperative handovers found that much critical information (eg, allergies or intraoperative problems) was not communicated from OR doctors to ward nurses.[26 27] There is also evidence suggesting that specific techniques to improve information sharing can improve clinical management, such as, in the high acuity setting, declaring an emergency and sharing information about a crisis with the team[28] or 'thinking aloud'—verbalising observations and decision-making processes to the team to share your mental model.[29]

The failures in information sharing described above, so critical to effective team communication and safe patient care, are sequelae of educational, psychological and organisational factors.

Educational factors

While considerable attention has been paid to doctor–patient communication in the undergraduate medical curriculum, less is being done to train medical students on how to communicate with other health professionals.[30–32] Each professional group has different ways of organising information due to their different educational programmes. Different professional groups have different expectations concerning the content, structure and timing of information transfer[33], and may not understand the role and priorities of other groups.[34] Education for health professionals remains largely discipline-specific with minimal interaction between healthcare disciplines.[35] Training occurs largely within professional 'silos', and few healthcare providers receive specific training in teamwork.[36 37] Such separation of disciplines and differences in education does little to address understanding of others roles, responsibilities or priorities, and may contribute to problems when interprofessional teamwork is required.

Psychological factors

While development of a professional identity as a doctor or a nurse is a key part of professional education, there are some downsides. Psychologically, the distinction between 'ingroup' and 'outgroup' is strong[38 39] and social identity theory explains that members of a professional group (eg, medicine, nursing or the allied health professions) tend to see the attributes of their group as positive and those of other groups as less desirable.[40–42] Certain types of people are also attracted to certain professions and specialties,[43] strengthening this 'tribal' phenomenon. These professional allegiances can lead to tensions when different professional groups have different expectations about how things should be done.[44] This is reflected in the findings of The Joint Commission International, whose international patient safety goals include improving effective communication among clinical staff.[45] A further psychological barrier to effective communication is the hierarchical structure in healthcare. Although senior staff are happy to use commands, less senior staff may not feel they can challenge decisions or offer suggestions or alternative diagnoses and so may conceal their concerns.[32 46] This hierarchical structure has been proven to have disastrous consequences in aviation crews where junior pilots failed to challenge misguided decisions of their superiors.[47]

Organisational factors

The physical geography of a hospital and the geographical location of patients within the hospital can affect the efficient scheduling activities of the patient care team, such as ward rounds, or scheduled meetings to discuss patient management plans. These geographical and organisational factors act as barriers to information sharing, with junior doctors describing the difficulties in coordinating patient care across multiple wards, with multiple different staff, relying on 'opportunistic meetings' with nurses or physiotherapists to convey important information.[1] Likewise, nurses, who may know the patient best, may not be present when key decisions are made about their patient. The reality is that staff may know what sort of communication is required, but the environment is not conducive to actually doing this. Additionally, different clinical areas may use different forms or incompatible software, making it difficult to access or interpret information.[40] The interface between electronic patient notes in primary and secondary care is one example.

SEVEN INTERVENTIONS TO IMPROVE TEAM INFORMATION SHARING

Given that there are many challenges to successful information sharing and the formation of shared mental models among modern, distributed healthcare teams, no one solution is likely to be adequate in alleviating the problem. If we are to enhance effective information sharing and therefore reduce harm to patients, then healthcare must take a multifactorial approach that addresses education, psychology and organisational factors. Rather than specific training, much of this is about creating conditions that prompt, reward or facilitate appropriate behaviours, such that health professionals actually do what they already know how to do.

Learning how to improve and enhance their communication is a priority for today's healthcare teams. Other industries have identified effective approaches,[48] and these can inform strategies for helping healthcare teams. Broadly, the barriers to effective communication in healthcare teams are educational, psychological or organisational. We have put together the following seven approaches to overcoming these barriers that should help healthcare teams determined to improve communication (table 1).

OVERCOMING EDUCATIONAL BARRIERS
Teach effective communication strategies

A number of strategies have been suggested to improve information sharing in healthcare. Reviews of these exist, arguing that

Table 1 Seven actions to overcome barriers to team communication in healthcare

Action	Description
Teach effective communication strategies	Teaching structured methods of communication, such as 'SBAR' handovers, can improve patient outcomes.
Train teams together	Teams that work together should train together. Training that includes all members of the team improves outcomes.
Train teams using simulation	Using simulation is a safe way to practice new communication techniques, and it increases interdisciplinary understanding.
Define inclusive teams	Redefine the team of healthcare professionals from a collection of disciplines to a cohesive whole with common goals.
Create democratic teams	Each member of the team should feel valued; creating flat hierarchies encourages open team communication.
Support teamwork with protocols and procedures	Use procedures that encourage information sharing among the whole team, such as checklists, briefings and IT solutions.
Develop an organisational culture supporting healthcare teams	Senior champions and department heads must recognise the imperative of interprofessional collaboration for safety.

health practitioners' 'verbal dexterity' should equal their procedural dexterity and factual knowledge.[32] Some of the more researched tools are given with references in table 1. One area where communication strategies may be most useful is at patient handover.[49] Many staff feel that handovers are not effective enough,[23] and data are emerging regarding what factors constitute good quality handover.[50] Higher ratings of handover quality from those receiving the information were found when the person handing over made more of an assessment of the patient. This is likely to be because information unknown to the receiver is highlighted. Staff also feel that handovers are of better quality when the person receiving the handover needed to do less information seeking.[51] Handover quality can be improved, self-reported sentinel incidents avoided and unexpected deaths reduced by implementing a simple structured handover tool,[23] one version of which comprises the acronym SBAR or ISBAR [52] (see table 2).

TRAIN TEAMS TOGETHER
Education is one approach and is supported by the U.S. Institute of Medicine (IOM) recommendation that teams who work together should train together.[36] This is directly related to the IOM core competency of 'working as interdisciplinary teams'. Training together can promote better understanding of others' roles. Training that includes all members of the team has been shown to improve patient outcomes. For example, comprehensive team training in obstetrics and in surgery has been shown to prevent errors and improve patient safety. Merién et al.[58] reviewed teamwork training in obstetrics and reported studies that not only improved team knowledge but improved APGAR scores and reduced hypoxic ischaemic encephalopathy. Neily et al.[59] reported a 50% decline in the risk-adjusted surgical mortality rate in the team-training group compared with controls across over 100 hospitals.

TRAIN TEAMS USING SIMULATION
Working together in an immersive simulation can be a powerful intervention to trigger discussion about roles, responsibilities and information sharing around patient management. Simulation, with appropriate postscenario debriefing, provides insights into how other professional groups think and feel, and a better understanding of how to support each other and maximise everyone's input to patient care. Such opportunities present a chance for culture change, through developing mutual respect and trust, an orientation to team rather than individual, and an appreciation of the value to the patient of a shared mental model.

Simulation is a safe environment for deliberate practice of particular communication strategies, for example, those described in table 1. Learning can be facilitated by structured debrief with the opportunity for participants to view video-recordings of their own communication behaviour. Seeing how you appear to others can be a powerful motivator to change. A meta-analysis of 609 studies has demonstrated that simulation can unequivocally enhance knowledge, time management skills, process skills and product skills.[60]

OVERCOMING PSYCHOLOGICAL BARRIERS
Define inclusive teams
To overcome the barriers that ingroup/outgroup psychology poses, there is a need to redefine the 'team' of healthcare professionals from a collection of discipline-based teams to a cohesive healthcare team. Salas' model of teamwork emphasises the need for a team orientation, but Burford[41] explains that staff self-categorise and identify with different groups at different times. Where the environment can be manipulated to emphasise and value the input from all health professionals to the care of a patient, the importance of belonging to the whole healthcare

Table 2 Strategies to improve communication

Tool	Brief description
Step-back (call-out)[32 48]	Stepping back from and taking an overview of the situation, the health professional who is leading the team calls the attention of the team and provides an update of the situation, the plan and invites suggestions.
Closed-loop communication[40 53 54]	This three-step strategy involves; the sender directs the instruction to the intended receiver, using their name where possible; the receiver confirms what was communicated as a check on hearing and understanding the instruction, seeking clarification if required; the sender verifying that the message has been received and correctly interpreted.
Structured information transmission (SBAR/ISBAR)[52 55 56]	This is a widely used acronym to help structure verbal at handover or patient referral. The original version (SBAR) has been expanded in some reports to ISBAR, starting with Identify yourself: Identify →Situation→Background→Assessment→Recommendation.
Structured handover[23 57]	Simple templates for summarising important patient information at handover
Graded assertion (PACE)[48]	Escalating concern (Probe, Alert, Challenge, Emergency)

team will be emphasised over the single discipline subteam. Such environmental manipulations exist in the chronic care specialities where multidisciplinary team meetings are well established. This model could be extended to acute inpatient care, for example, scheduled inpatient ward rounds where all relevant health professionals are able to attend and all have a role, or whole team briefing at the start of a day's operating theatre list. Such interventions could overcome psychological barriers to interprofessional communication and enhance a sense of belonging to an inclusive patient care team.

CREATE DEMOCRATIC TEAMS

Structured communication strategies can help to create more democratic teams, where all members are confident of being heard. Bleakley argues that such a democratic communication framework is needed in healthcare.[61] Every member of the team needs to be empowered to contribute their information to decision making. In Salas' model of teamwork, mutual trust is a central factor. If all team members are valued, and feel their contributions are important and acknowledged, then trust can be established. Structures that encourage open team communication, such as flat hierarchies or the WHO surgical safety checklist,[62] aim for an inclusive team and work to mitigate barriers to information sharing and therefore decrease the potential for patient harm. Graded assertion is a technique for escalating the force with which information is presented to ensure transmission, particularly up a hierarchy. The PACE technique (Probe, Alert, Challenge, Emergency)[48] is one such tool. If everyone on the team is familiar with structured communication techniques such as time-out or PACE, then their use can be accepted and welcomed.

OVERCOMING ORGANISATIONAL BARRIERS
Support teamwork with protocols and procedures

Effective information sharing may require support from organisational protocols. Structured operating room briefings that are timetabled into the day's activities are an opportunity to share the mental model and have been demonstrated to enhance patient safety, for example, by increasing timely prophylactic antibiotic administration.[63] Procedures should be instituted that ensure all team members (including the patient) are present, and all information is available, when important decisions are made. At Emory University Hospital, the structured interdisciplinary bedside rounds (SIBR) system is a new procedure that brings the multidisciplinary ward team together routinely in time and place for rounds.[64] This is an organisational procedure that overcomes the geographical and temporal challenges often faced by healthcare teams where patients and team members are spread across the hospital and belong to a number of different teams. Early findings suggest a significant reduction in patient complications and mortality. It is likely that the significant reductions in patient morbidity and mortality associated with the introduction of the WHO Surgical Safety Checklist similarly arise partly from the participation of all staff in the same place at the same time to share patient information, plans and potential concerns for patient care.[31] Other ways of enhancing structures to make them more conducive to information sharing are to align paperwork and IT systems so that data are recorded consistently and in familiar formats, that crucial information is highlighted and that red flags are identified with mandatory reporting requirements. An example of this is the New South Wales Health 'between the flags' project, which mandates escalation of abnormal patient observations.[65]

DEVELOP AN ORGANISATIONAL CULTURE SUPPORTING HEALTHCARE TEAMS

Organisational culture is an important element in the prevention of error,[42] and this culture is established by those in leadership roles at both institutional and healthcare team level.[66 67] The organisation has a financial interest in improving information sharing as failures in information exchange leads to inefficiencies and increased costs. Delays in treatment, waste of resources and prolonged hospital stays have been observed as a direct result of communication failures in the operating room[2] and seem likely to occur in all aspects of healthcare. If healthcare institutions are to evolve adaptively, then senior champions, department heads and individual clinicians must recognise the imperative of interprofessional collaboration and teamwork for safe and efficient patient care.

Self assessment questions

1. A shared mental model is a critical requirement for effective teamwork. Which of the following is not a component of a shared mental model?
   A. All team members understand the general plan
   B. All team members know each other's roles
   C. All team members can perform all of the required tasks
   D. All team members are 'on the same page'
   E. All team members know each other's capabilities
2. Failures in communication in healthcare teams have been shown to
   A. Contribute to 61% of sentinel events
   B. Result in visible adverse events over one-third of the time
   C. More than double the risk of surgical complications
   D. All of the above
   E. None of the above
3. Which psychological and organisational factors are challenges to effective interprofessional teamwork in healthcare?
   A. Hierarchical structures
   B. Colocation of patients and the patient care team
   C. Development of professional identities
   D. A&B
   E. A&C
4. What training strategy has been shown to reduce risk-adjusted mortality rates by 50% across over 100 hospitals?
   A. Teaching effective communication strategies
   B. Training together as a team
   C. Using simulation-based training
   D. All of the above
   E. None of the above
5. Which of the following is not an example of a successful initiative to support teamwork with protocols and procedures?
   A. Using discipline-specific IT systems and paperwork
   B. WHO surgical safety checklist
   C. Structured daily briefings
   D. Emory University Hospital SIBR system
   E. New South Wales Health 'between the flags' project

CONCLUSION

With increasing complexity and even more specialisation of skills, the current healthcare environment demands effective communication and teamwork to reliably deliver best patient care. We have perhaps paid insufficient attention to the new challenges the modern healthcare environment poses to the effective sharing information between providers. The aim is to ensure all team members have a shared understanding of the situation and are working towards the same goals in patient care. This article has provided a review of these challenges and presented a range of strategies to address them. Ongoing research should evaluate interventions to structure communications and support information sharing. Interventions to improve team communication may be the next major advance in improving patient outcomes.

Main messages

▶ Compelling evidence now exists relating reduced patient complications and death to improved teamwork in healthcare.
▶ Challenges to effective teamwork arise due to the way different disciplines are trained, psychological factors and the culture and administration of healthcare organisations.
▶ Strategies exist to improve the function of healthcare teams at the level of individuals, patient care teams and organisations.

Current research questions

▶ Elucidate the association between patient harm or inefficient care, and failures in teamwork and communication.
▶ Develop and evaluate interventions to improve teamwork and communication with safe and effective patient care as the primary outcome.
▶ Translational research to embed evidence-based teamwork and communication interventions in clinical and organisational practice.

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Answers

1. A-T, B-T, C-F, D-T, E-T
2. A-T, B-T, C-T, D-T, E-F
3. A-T, B-F, C-T, D-F, E-T
4. A-F, B-T, C-F, D-F, E-F
5. A-T, B-F, C-F, D-F, E-F