

Leadership and working in teams

Alistair Geraghty

Simon Paterson-Brown

Abstract

Leadership and teamwork are essential components of surgical practice and now recognized in the Generic Professional Capabilities framework from the GMC. Surgical application of these skills can be usefully explored through the NOTSS (Non-Technical Skills for Surgeons) taxonomy. This identifies the essential elements of performance in key areas: exchanging information; establishing a shared understanding and co-ordinating team activities (for teamwork); and setting and maintaining standards, supporting others and coping with pressure (for leadership). In addition, there are a number of well-evidenced tools and techniques which can be utilized to improve performance. This includes team briefing and debriefing, closed loop communication, SBAR (situation, background, assessment, recommendation), graded assertiveness and 'flying by voice'. Practising and integrating these techniques into surgical practice can improve individual and overall team performance. Finally, to optimize our performance requires careful balancing of each non-technical element to stretch and develop teamwork while providing support and maintenance of a healthy working environment. And of course, always aligning these developments with the goal of improvement in patient care.

Keywords Communication; leadership; non-technical skills; NOTSS; teamwork

Introduction

Leadership and teamwork are integral components to all surgical competencies. Both feature in the recent General Medical Council (GMC) framework of Generic Professional Capabilities which recognize that good performance in these areas can contribute to improved patient outcomes.¹ The framework includes, among other things, the need to lead and work in teams by:

- demonstrating an understanding of a range of leadership principles, approaches and techniques and applying them in practice
- demonstrating appropriate leadership behaviours and an ability to adapt leadership behaviour to improve engagement and outcomes
- promoting and effectively participating in multidisciplinary, and inter-professional team working.

Alistair Geraghty BSc MRCS is a Scottish Clinical Leadership Fellow at the Royal College of Surgeons of Edinburgh/NHS Education for Scotland, UK and Surgical Trainee. Conflict of interest: none declared.

Simon Paterson-Brown MPhil MS FRCS is a Consultant General and Upper Gastrointestinal Surgeon at the Royal Infirmary of Edinburgh and Honorary Senior Lecturer at the University of Edinburgh, UK. Conflict of interest: none declared.

Despite their prominence, both leadership and teamwork can be challenging terms – intrinsically obvious to all but also less easy to develop, teach and assess. Both subjects are developed over a lifetime of experience at work and play. Leadership in particular can carry strong positive or negative associations related to heroes and villains remembered from history, books, sport or screen. Leadership and teamwork can also be subject to illusory superiority. Data would suggest that many surgeons commonly believe themselves to be better communicators, team players and leaders than measured by their multidisciplinary colleagues.² This is critically important as most people are less motivated to develop areas of practice in which they believe they are already proficient (even though that may not be the case). In order to improve your performance in the areas of leadership and teamwork it is essential that you understand the skills required, while at the same time accepting the need for development and improvement. You must also identify techniques to improve and opportunities to practise.

Non-technical skills (NOTSS)

For the surgeon, essential non-technical skills are defined within the NOTSS (Non-Technical Skills for Surgeons) taxonomy. This taxonomy was developed by industrial psychologists and surgeons in a collaborative process involving a series of cognitive task analysis interviews, workplace observations and an iterative design process before validation.³ The NOTSS taxonomy of four major skill categories: situation awareness; decision making; communication/teamwork; and leadership can be seen in [Table 1](#). Each of the four categories is further broken down into three essential elements; a recent study confirms this format to be the most efficient model for assessing these skills.⁴

The NOTSS taxonomy provides further guidance on each of the skill elements by identifying examples of observable theatre-based behaviours that would be indicative of either good or poor performance in each area.³ It is noteworthy that the NOTSS taxonomy considers communication and teamwork together, due to the essential nature of communication in high performing teams. A further useful adjunct to the NOTSS taxonomy is the Surgeons Leadership Inventory,⁵ which specifically details intra-operative leadership skills. These skills are broken down into four skills related to task performance and three skills related to team performance.

Team performance:

- maintaining standards
- managing tasks
- making decisions
- managing resources.

Task performance:

- directing and enabling
- guiding and supporting
- communicating and co-ordinating.

While both leadership and teamwork can be applied at any organizational level, for the purpose of discussion we will focus on the clinical application of these skills within surgical teams. We will review each of the communication/teamwork and leadership NOTSS elements but before doing this it will be useful to 'begin with the end in mind' – in other words by first of all establishing what the 'effective team' looks like.

The NOTSS (Non-Technical Skills for Surgeons) taxonomy³

Category	Elements
Situation awareness	Gathering information Understanding information Projecting and anticipating future state
Decision making	Considering options Selecting and communicating options Implementing and reviewing decisions
Communication & Teamwork	Exchanging information Establishing a shared understanding Co-ordinating team activities
Leadership	Setting and maintaining standards Supporting others Coping with pressure

Table 1

The effective team

A standard definition of a team is ‘two or more people who interact, dynamically, interdependently, and adaptively toward a common and valued goal’.⁶ As surgeons we are involved in multiple clinical teams throughout the working day, ranging from the ward round, out-patient department, multidisciplinary team meeting and in the operating theatre. Salas et al. identified five essential components to effective teamwork, with a further three underpinning the co-ordinating mechanism.⁷ These components are outlined in Table 2.

These components explicitly recognize the need for a shared team goal and emphasize the task-interdependency required to reach it. To work effectively, teams need to be aware of other members’ tasks and workloads, with a willingness to support and backfill as appropriate. This requires an over-riding belief that the team goal is more important than individual status. This has broad implications for surgical practice. The qualities of an effective team, as identified by Salas, can be seen reflected in the personal non-technical skills required by individual surgeons in the NOTSS taxonomy.

Exchanging information

The ability to give and receive information from other team members is an essential skill to maintain team adaptability and to foster mutual trust, performance monitoring and back-up behaviours. Teams which exhibit poor information exchange intra-operatively, put patients at a higher risk of post-operative complications and death.⁸ Information must flow evenly between team members and across specialties. Surgeons must be able to update the team regarding the immediate surgical environment, patient situation and goals, while at the same time receiving information from anaesthetic and nursing colleagues concerning cardiovascular status, equipment, drug issues or external events that may influence decision making. Active listening and appropriate responses by all members of the team helps develop a cohesive team spirit where team members feel valued and are more willing to provide information.³ This open exchange of

information is critically important to safety across all high risk industries; with high profile incidents relating to critical information being ignored/dismissed, or team members feeling unable to provide information due to hierarchical barriers, well documented.⁶

Communication tools

There are several communication tools and techniques that can be used to improve the effectiveness of information exchange:

- ‘Flying by voice’, borrowed from aviation, involves the surgeon talking through his actions as he/she performs them. This allows team members to follow the operative

The ‘big five’ of effective team performance and underlying mechanisms⁷

Core component	Explanation
Leadership	The ability to direct and co-ordinate the activities of other team members, assess team performance, develop team knowledge, skills, and abilities, motivate team members, plan and organize, and establish a positive atmosphere. It can refer to a single team leader and to all team members if situational leadership is appropriate
Mutual performance monitoring	The ability to apply appropriate task strategies to develop common understandings of the team environment. This includes an understanding of team mate workload, fatigue, stress, skills, and the environment external to the team itself
Backup behaviour	A person’s ability to anticipate other team members’ needs through knowledge about their responsibilities
Adaptability	The ability to adjust team strategies and alter the course of action based on information gathered from the environment through the use of backup behaviour and reallocation of intra-team resources
Team orientation	An attitude characterized by a propensity to take other’s behaviour and input into account during group interaction and the belief in the importance of team goal’s over individual members’ goals
Underlying co-ordinating mechanisms	
Shared mental models	The shared understanding that team members hold
Mutual trust	The shared belief that team members will perform their roles and protect the interests of their teammates
Closed-loop communication	The exchange of information between a sender and a receiver

(From Salas, E. et al., Does team training work? Principles for health care. *Acad Emerg Med*, 2008. **15**(11): p. 1002–9. With kind permission of John Wiley & Sons.)

Table 2

course as well as highlighting the surgeon's immediate interpretation of the environment.^{3,9} This can be a highly effective educational strategy for trainees (assuming the lead surgeon is the consultant) and the wider team but also invites challenge should there be a different interpretation between colleagues.

- **Closed-loop communication**, involves team members handing over and acknowledging the handover of information.^{3,6,9} This allows team members to delegate and offload tasks effectively. By notifying the team when tasks are complete, team members can make themselves available for redeployment. This is a highly effective co-ordinating mechanism.⁷
- **Graded assertiveness** is a technique which involves altering the assertiveness of your communication according to the urgency of the situation. Language can be made more assertive by increasing volume, removal of superfluous language and directing towards specific team members (*'would someone mind running round to pick up the...'* versus *'John, get the defibrillator.'*).⁹ Additionally there are tools that can be used for particular situations; for example, the CUSS tool (Box 1) provides a series of escalating statements that can be used to challenge colleagues in difficult situations.³
- **Using names of team members** (aided of course by the 'pre-list brief' – see below) is a valuable adjunct to improving communication across all team members, especially when workload and stress levels increase.

Shared mental models

Having a shared mental model ensures all team members know the ultimate team goal, current situation and task priorities going forward. This empowers team members to act proactively rather than having to wait for instructions to react to events.³ For example, if a patient's condition is identified as deteriorating on the ward round, immediate actions are required. However, by sharing concerns and agreeing plans for further monitoring and possible additional intervention (such as transfer to critical care) with the other members of the wider team (including the nursing staff) a more pro-active approach can be provided. Without establishing this shared mental model, future patient deterioration may only be detected at the next round of routine observations; medical staff may then be re-contacted but none of the pro-active steps have been taken earlier to prevent deterioration. Techniques to develop shared mental models include:

- A **team brief** at the start of the working day or theatre list provides the opportunity to identify the names and status of all team members, additional equipment required or specific task assignment to be agreed, as well as potential

problems which might arise and how they might be dealt with.³ Again, any briefing should involve an active exchange of information to facilitate team engagement, reduce hierarchy and open up lines of communication.

- A **team pause** (sometimes described as a 'time out', or the phenomenon of 'slowing down when you should')¹⁰ can be used for un-anticipated events during an operation; it allows for re-assessing the goals and re-establishing the mental model.³ For example if major bleeding occurs – pressure is applied to get control of the immediate situation, following which a pause will allow the surgeon to alert the other team members, optimize the environment (lighting, etc.) and prepare the necessary equipment to safely proceed.¹⁰

Co-ordinating team activities

Co-ordination of tasks within a team is essential to maintain effective working and the best strategy is highly dependent on the stability of team membership and task familiarity.³ Within a stable team performing a familiar task, the majority of co-ordination can take place implicitly; activities are already assigned by role and each member can anticipate the next step. In these instances, an operation can appear beautifully fluid and choreographed (think 'Formula one pit crew'). However, with the introduction of new or additional tasks, co-ordination needs to become more explicit. This can take place pro-actively at the team brief or may take place in real time for un-anticipated events. For newer teams the majority of co-ordination needs to take place explicitly – *'in a few moments we will be ready to remove the specimen; can we prepare the pathology container and start preparing for anastomosis'* - to allow for pro-active preparation by the team. Perhaps the most challenging situation, and frequently encountered within health-care, is a semi-stable team where it is very easy to assume implicit understanding given the familiarity of some team members. It is not until the next step is reached and the equipment is not available, or the wrong suture is handed to the surgeon, that the mismatch becomes apparent. The best teams, be they stable or new, are always adaptable and able to respond to new situations; co-ordination is an essential element of this.

Tools for co-ordinating teams

Team members must develop transferrable skills that allow them to tailor their co-ordinating strategies, whether in a leadership or supporting role, for any given task. It is clear that good communication is essential for good teamwork. Tools and techniques to help with team co-ordination include

- **'Flying by voice'** and **'closed-loop communication'** as described above.
- **SBAR** (situation, background, assessment, recommendation) can also be a highly effective co-ordinating tool.^{3,6,9} SBAR provides a concise framework to establish a shared mental model and hand over of key information to the receiver before delegating a task; at the conclusion of a ward round for example it could be used to co-ordinate junior colleague activity (Box 2).

Setting and maintaining standards

It is essential that surgeons work to maintain standards of clinical care. This involves the use of clinical guidelines to steer patient

The CUSS tool for challenging colleagues

I am *concerned* that...
I am *uncomfortable* that...
I am *seriously concerned* that....
Stop

Box 1

An example of SBAR being used to co-ordinate team activities (in conjunction with closed loop communication)

'The patient I'm concerned most with is Gillian Smith. She is 7 days post Hartmann's procedure for perforated diverticular disease and now has a new temperature and rising white count. Her chest is clear, but she has increased tenderness in her lower abdomen. I'm concerned she has a pelvic collection. As a priority can you arrange an urgent CT of her abdomen and pelvis with IV contrast this morning and let me know when it is completed.'

Box 2

management, adhering to standard operating procedures such as handwashing and sterility protocols; and also professional behaviour such as timeliness, interaction with other specialties/disciplines and candour with patients following adverse events.³ It is noteworthy that knowledge of 'acceptable behaviour' is transferred through a hidden curriculum based on observation of (usually senior) colleagues.³ It is therefore essential that observed behaviour matches verbal/written instruction and that consistency is always maintained.

Surgeons also have to ensure that standards are maintained in alignment with the overall team values/goals and facilitating safe, effective, efficient and compassionate patient care. Some of the leadership inadequacies highlighted in large organizational failures (such as described in the 2013 Francis report) were that process standards, such as waiting time targets and efficient discharge criteria, were maintained at the cost of clinical standards and overall patient care.¹¹ If decisions have to be made which appear to violate protocols, then sharing the reasoning/context of these decisions with the team will help avoid unintentionally lowering standards or altering care pathways.³

Standard setting

Techniques to help with standard setting include:

- **Role modelling** is the simplest and most effective technique to maintain standards (on the assumption that the role followed is appropriate, sadly in surgery some respected role models have propagated negative behaviour). Senior clinicians need to be aware that their behaviour is being constantly observed and adopted by more junior team members. The tone of the whole department is derived from this behaviour. Consider how you react if you encounter a problem on the morning ward round where standards have fallen; how do you demonstrate the standard expected and how it can be reached/maintained without denigrating anyone in front of the patient or other staff? Remember that the standard you walk past (i.e. accept) is the standard others will follow.
- A **team brief** can again be used to reinforce standards.³ This could be in the form of explicit discussions of particular audit standards, or perhaps more globally used as an opportunity to discuss the over-arching team value/goals by which all other decisions will be made. Active participation in a team brief or the surgical checklist also sets the standard that these procedures will be followed correctly.

Leadership styles: supporting others

Supporting other team members is essential to develop the team orientation, mutual performance monitoring and back-up behaviours necessary for good teamwork. Importantly this support should be focussed on team member development rather than simply task completion. **Transactional leadership** is predominantly focussed on the task; it is a functional and efficient style, ensuring task completion with maintenance of standards. The transactional leader will tell the team what to do but may not actually get involved in the work. An alternative and more effective longer-term style is **Transformational leadership**, where the leader is seen to lead the team by demonstrating how to do things at the given standard and facilitates the involvement of all other team members. Importantly this motivates the team to work beyond expectations rather than to meet standards. An observational study of surgeons demonstrated very similar levels of transactional behaviour but a much larger variation in transformational content.¹² Transformational leadership was demonstrated through social dialogue showing interest and concern for individual team members, with regular communication to stimulate members intellectually and regular positive feedback.¹² For each incremental step toward a transformational style (as measured on the Multifactor Leadership Questionnaire) there was a 300% increase in team information exchange,¹² a key determinant of patient outcome.⁸ There is a danger, as we focus on the skills, tools and techniques of non-technical performance, that we can become functional and task orientated; maintaining a warm, enthusiastic personal style is likely to promote team performance even further. Surgeons therefore need to provide both cognitive and emotional support to team members.

Techniques to facilitate this include:

- Ensuring accessibility and availability for team members.⁶
- Personalized management of team members through developing understanding of social circumstances, competencies and career goals. Tasks can then be delegated to stretch individuals and coax improved performance. An awareness of upcoming exams or wish to develop specific skills allows the surgeon to build specific questioning or practice into work. Having an awareness of challenging life-events or illness may allow workload to be tailored to ensure team members are returned to full-strength more quickly.¹²
- Providing constructive feedback is an important aspect of providing support. This should be given honestly and fairly; always with intent to enhance performance.³

Bullying and undermining behaviour

The antithesis to supporting others is the bullying and undermining behaviour which sadly remains commonplace within healthcare.¹³ This type of behaviour is completely unacceptable and proven to impede the diagnostic and procedural performance of not just the individual involved, but the entire team who witness the assault.^{13,14} It is important to appreciate that simply perception of intimidating or unjust behaviour by the receiver or team will still impede performance regardless of intent.^{13,14} Such unintentional behaviour could occur through mismatch in shared mental models such that the surgeon (feeling the situation is urgent) uses a strongly assertive style; the receiver (not believing

the situation to be urgent) finds the surgeon aggressive. Similarly, if mismatch of implicit/explicit team co-ordination (as described in 'Co-ordinating team activities' above) results in a frustrated outburst of 'we do it THE SAME EVERY WEEK!' this will only serve to persecute the team members unfamiliar with the tasks and impair their further performance. Non-technical skills need to be honed to minimize these types of mismatch situations; should they occur it is important to firstly recognize it, apologise when able and discuss the miscommunication during debriefing to ensure it will not impede future team performance.

Coping with pressure

Surgery by its very nature will involve stressful situations related to the urgency or complexity of conditions, unexpected events or high workload. An important leadership criterion is the ability to cope with this pressure and have a calming influence on the team to maintain an effective working environment.³ As the urgency or intensity of a situation increases, so too do leadership responsibilities. The most important aspect of dealing with pressure is to avoid it in the first place through good preparation. By ensuring good knowledge and preparation of procedures and anticipating potential difficulties, many challenges can be mitigated. Good and detailed discussions at the pre-list brief, arranging additional equipment or personnel on standby and decisions made with contingency plans, are all vital parts of this process.³ Similarly, any unanticipated problems which do occur (bleeding for example) could be used to improve the skills of the team for the future. Scrubbing time can be used for mental rehearsal of potential adverse events with the trainee; aiding avoidance by priming knowledge of the injury but also facilitating speedy repair should it occur – '*how are we going to manage unexpected bleeding if it occurs?*'. Dealing with pressure encompasses a number of the skills already discussed:

- Maintaining shared mental model means team members are already alert to high risk situations and may be able to take pro-active steps.
- Having good knowledge of your team and their abilities allows for efficient delegation of tasks; with closed loop communication and SBAR used to do this efficiently.
- Assertive communication can be used safely; with good working relationships the team members understand it is related to the urgency of the situation and there are no negative consequences for performance.
- A team debrief following a high pressure episode allows for objective consideration of team performance with discussion on how to improve for the future.

Optimizing performance: balancing the elements

While it is useful to consider each of the teamwork/communication and leadership NOTSS elements in isolation, mastery of these skills requires a careful balance. For any given task we have to balance our judgement between intervening (coping with pressure – the overarching team goal is more important), stretching our team to optimize performance (setting standards) and guiding a colleague through the process (supporting others). These are complex decisions that will differ with every situation, every trainee and every team and so we need to be aware how we are making these decisions and reflect on them. We need to

consider whether we are meeting our goals of good patient care, improving performance and supporting the team.

Similarly, standard setting judgements between acceptable and unacceptable performance can be very challenging and may involve increasingly high stakes dependant on the situation. Consequences could range from simple feedback, to remediation, loss of licence, or even incarceration depending on the circumstances. There is a delicate balance between understanding the personal circumstances, rota, team and environmental factors involved in an individual's performance (supporting others) and ensuring patient safety (maintaining standards). Maintenance of a 'just culture' with appropriate and consistent balance of safety and accountability is an essential component to maintaining workforce morale; with significant impact on recruitment and retention of staff, sickness absence and overall performance.¹⁵ It is through such day-to-day judgements within the immediate team that a unit's culture is developed. As with all non-technical skills we need to appreciate the impact of these decisions, practise our skills, reflect and seek feedback to improve our performance.

Conclusion

Leadership and teamwork have always been essential components of surgical practice and with improved understanding of non-technical performance we can analyse these skills more deeply. There are tools and techniques that can improve performance but as with any skill these require practice. By developing your own skills, you will improve the outcome of patients treated in your organization, and propagate positive behaviour to your team and trainees. Team performance will be optimized further through concern for the global development of both individual members and the team as a whole. Performance in the areas of leadership and teamwork is complex and decisions require a fine balance to consistently maintain effective performance and a healthy working environment. ♦

REFERENCES

- 1 General Medical Council. Generic professional capabilities framework. Manchester: General Medical Council, 2017.
- 2 Flin R, et al. Attitudes to teamwork and safety in the operating theatre. *Surgeon* 2006; **4**: 145–51.
- 3 Flin RH, Youngson GG, Yule S. Enhancing surgical performance: a primer in non-technical skills. CRC Press, 2015.
- 4 Yule S, Gupta A, Gazarian D, et al. Construct and criterion validity testing of the Non-Technical Skills for Surgeons (NOTSS) behavior assessment tool using videos of simulated operations. *Br J Surg* 2018; **105**(6): 717–29.
- 5 Henrickson Parker S, Flin R, McKinley A, Yule S. The Surgeons' Leadership Inventory (SLI): a taxonomy and rating system for surgeons' intraoperative leadership skills. *Am J Surg* 2013; **205**: 745–51.
- 6 Flin RH, Crichton M, O'Connor P. Safety at the sharp end: a guide to non-technical skills. CRC Press, 2008.
- 7 Salas E, DiazGranados D, Weaver SJ, King H. Does team training work? Principles for health care. *Acad Emerg Med* 2008; **15**: 1002–9.
- 8 Mazzocco K, Petitti DB, Fong KT, et al. Surgical team behaviors and patient outcomes. *Am J Surg* 2009; **197**: 678–85.
- 9 Brindley PG, Reynolds SF. Improving verbal communication in critical care medicine. *J Crit Care* 2011; **26**: 155–9.

- 10 St-Martin L, et al. Teaching the slowing-down moments of operative judgment. *Surg Clin North Am* 2012; **92**: 125–35.
- 11 The Mid Staffordshire NHS Foundation Trust Public Inquiry. Report of the mid staffordshire NHS foundation trust public inquiry: executive summary. R. Francis, 2013.
- 12 Hu YY, Patel P, Gallinger J, Moulton CA. Surgeons' leadership styles and team behavior in the operating room. *J Am Coll Surg* 2016; **222**: 41–51.
- 13 Illing JC, Carter M, Thompson NJ, et al. Evidence synthesis on the occurrence, causes, consequences, prevention and management of bullying and harassing behaviours to inform decision-making in the NHS. Final Report. National Institute for Health Research Service Delivery and Organisational Programme, 2013.
- 14 Riskin A, Erez A, Foulk TA, et al. The impact of rudeness on medical team performance: a randomized trial. *Pediatrics* 2015; **136**: 487–95.
- 15 Dekker S. Just culture balancing safety and accountability. Farnham, England: Ashgate, 2012.

FURTHER READING

The Royal College of Surgeons of Edinburgh website contains online learning resources and a handbook on non-technical skills taxonomy for surgeons, and how these skills can be observed and rated, which you can download. <https://www.rcsed.ac.uk/professional-support-development-resources/learning-resources/non-technical-skills-for-surgeons-notss>.