

# Improving the non-technical ward round skills of medical students

**N**ewly qualified doctors (or junior doctors) take part in ward rounds on an almost daily basis and have to complete this challenging, complex and frequently time-pressured role from their first day as a newly qualified doctor. It is a task that graduating medical students appear to be unprepared for (Nikendei et al, 2008) and errors can lead to significant patient harm, with lower quality ward rounds being associated with avoidable complications, delayed diagnoses and more negative patient outcomes (Pucher et al, 2013). The need to improve ward rounds has been highlighted by the Royal College of Physicians and Royal College of Nursing (2012) and attempts have been made to address this issue, for example through the introduction of checklists during ward rounds. There has been increasing recognition that non-technical aspects of performance make an important contribution to avoidable patient harm and medical error. Such non-technical skills have been defined as:

**'the cognitive [such as decision making and situation awareness], social [such as communication, team**

**working and leadership] and personal resource skills [such as coping with stress and fatigue] that complement technical skills, and contribute to safe and efficient performance.'** (Flin et al, 2008)

Despite recognition of the importance of non-technical skills in patient care, and a growing literature illustrating both that non-technical skills can be taught (e.g. Savoldelli et al, 2006) and that training is associated with improved patient outcomes (e.g. Armour Forse et al, 2011), as yet there has been no systematic attempt to teach the non-technical skills used in ward rounds within the standard educational curriculum for medical students in the UK. This pilot study therefore aimed to:

- Develop a framework to help identify and measure the non-technical skills required by medical students during ward rounds
- Evaluate whether an educational intervention could significantly improve these non-technical skills in medical students.

## Method

Ethical approval was sought from the university where the participants were studying. A full ethics submission was not required, as the ward simulation formed an existing part of the curriculum. However, all participants were fully briefed about the research and all provided written consent. Participants were in their final year of undergraduate medical training at a Scottish university. All final year students undertake the ward simulation as part of their training. All those present for the sessions ( $n=217$ ) were invited to participate in the research component and all consented to take part. To guide the development of the non-technical skills framework, the generic non-technical skills taxonomy as described by Flin et al (2008) was used, along with relevant UK policy documents and guidelines (e.g. Francis, 2013) to identify any additional key non-technical skills that may be important for health professionals.

Analysis of ward round simulation footage was used to identify ward round-specific non-technical skills. This footage was obtained from a ward simulation exercise which was led by faculty staff and was undertaken by the participants as part of their training (for details see Harvey et al, 2015). This involved the students role-playing foundation year doctors (either foundation year 1 or year 2), one of four patients or observing. Each patient presented with a particular learning challenge which was derived from clinical adverse event discussions and was chosen to reflect a range of issues that would require both technical and non-technical skills (Table 1). Examples of non-technical skills include communication, decision making, situational awareness and teamwork.

Each simulated ward round was followed by a structured reflective debrief, with the aim of prompting discussion and highlighting learning points. The simulated ward round was then undertaken for a second time with the student participants being assigned to different roles.

Each session lasted 90 minutes and 19 digitally recorded sessions (70 simulated patient interactions) were reviewed and coded by two non-medical researchers, using the coding framework developed by Mellanby et al (2013), in order to develop and evaluate the non-technical skills framework. Exemplars of each generic non-technical skills category were noted and where the data did not fit into the existing framework, new categories were proposed and discussed until consensus was reached.

In order to determine inter-rater reliability of the coding, 34 out of the total of 70 patient observations (49%) were scored by two researchers as poor to marginal = 1 or acceptable to good = 2. These ratings were based on exemplars in respect of each non-technical skill, which in turn were drawn from the existing literature (e.g. Flin et al, 2008; Francis, 2013; Mellanby et al, 2013) and discussion with the medical practitioners and educationalists in the wider research

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**Table 1. Overview of the four simulated patient scenarios and some of the learning challenges being highlighted by each**

Simulated patient scenario	Example learning challenges	Overall learning objectives
Patient 1 is suffering from community-acquired pneumonia on a background of alcohol misuse. He is exhibiting symptoms of delirium tremens	<ul style="list-style-type: none"> <li>■ Dealing with aggression</li> <li>■ Dealing with individuals with poor communication</li> <li>■ Recognizing alcohol withdrawal and dehydration</li> <li>■ Gathering information from alternative sources</li> </ul>	<p>Students will obtain a practical understanding and some experience of the skills to be used in relation to:</p> <ul style="list-style-type: none"> <li>■ Accurate note taking and job list development during the ward round</li> </ul>
Patient 2 is a medical student who has been admitted with glandular fever but is fit for discharge. She is a medical student and is demanding attention. Nursing staff are keen for the patient to be discharged as beds are needed	<ul style="list-style-type: none"> <li>■ The need to prioritize ward tasks</li> <li>■ Dealing with potentially conflicting demands of patients and nursing staff</li> </ul>	<ul style="list-style-type: none"> <li>■ Understanding the hierarchies that might exist on a ward round and how these could impact on the process of clinical care</li> </ul>
Patient 3 has been admitted following a fall at home. He is frail and on warfarin (aortic valve replacement 4 years previously). His international normalized ratio is raised and this has been reversed but overnight the patient has developed a new right-sided hemianopia which only becomes apparent on the ward round	<ul style="list-style-type: none"> <li>■ The need to prioritize</li> <li>■ Integrating new information in order to come up with an appropriate course of action</li> <li>■ Referral for urgent computed tomography</li> </ul>	<ul style="list-style-type: none"> <li>■ Experience in managing interruptions during a ward round</li> </ul>
Patient 4 has a urinary tract infection (background history of ischaemic heart disease, hypertension, congestive cardiac failure and acute on chronic renal failure) with resultant confusion. She has an allergy to penicillin. She is also distressed because she has lost an important item. She has difficult relatives who phone demanding information and wanting to make a complaint	<ul style="list-style-type: none"> <li>■ The need to review existing information and share this with the wider team (allergy is noted in the case notes)</li> <li>■ The need to address practical issues that cause distress and/or provide appropriate reassurance</li> <li>■ The need to prioritize</li> <li>■ Dealing with phone calls and data protection issues</li> </ul>	<ul style="list-style-type: none"> <li>■ Understanding some key issues to be addressed during a ward round for every patient, including cardiopulmonary resuscitation status documentation, escalation plans, and deep vein thrombosis prophylaxis</li> </ul>

team (see *Table 2* for some examples). If the skill was not present, this was coded as 1.

In order to establish whether the ward simulation educational intervention impacted on non-technical skills, each non-technical skills category within the final framework was coded 1–4 where 1 = poor, 2 = marginal, 3 = acceptable and 4 = good. The performance of the total student group was rated before and after the debrief session in relation to the four learning scenarios depicted.

## Results

### Developing a ward round non-technical skills framework

The following categories from the original non-technical skills framework were retained as they reflected non-technical skills that were observable in the ward round: communication, decision making, situational awareness, teamwork and task management. Two new categories were also developed: student initiative and responsiveness to patient.

Student initiative allowed some of the behavioural characteristics which are normally coded under the ‘leadership’ category to be scored in relation to the students, while taking account of their more

limited role and remit in a ward round. Examples included volunteering for tasks or trying to organize the group to achieve a goal. This category was scored if the student acted without being prompted based on his/her perception of what was required within the particular situation at that particular time. Responsiveness to patients was introduced in light of recommendations made from policy documents (e.g. Francis, 2013), which highlighted the importance of the patient voice and reflected student attempts to include the patient in discussions, respond to the patient’s communication and elicit patient opinion.

### Inter-rater reliability

*Table 3* illustrates the kappa values and level of agreement for each behavioural category. Agreement was found to be ‘fair’ or better for all categories with the exception of situational awareness where it was less than chance.

### The impact of the ward simulation learning intervention on student skills

*Table 4* illustrates the mean scores pre- and post-intervention for each non-technical skills category and for all categories combined (significant results are marked with an asterisk).

## Discussion

The identified non-technical skills categories reflected the specific context of the ward round as well as the wider NHS context. For example the adaptation of the category leadership to student initiative reflected the fact that, in practice, the leadership role in a ward round would be held by the consultant rather than by a more junior member of the team. Likewise, the introduction of the category responsiveness to patients reflected the NHS priorities of patient-centred care and patient involvement (e.g. Francis, 2013). As ward rounds have been shown to induce anxiety and feelings of intimidation in approximately one-third of patients (Montague and Hussain, 2006), this suggests that responsiveness to patients represents an important area requiring further investigation.

In general the inter-rater reliability for the ward round non-technical skills categories was ‘fair’ or better, although the poor agreement within the category of situational awareness may reflect the fact that the raters were non-clinicians who may not have the same awareness of what constitutes important situational factors that needed to be acted upon in a ward round context. This suggests the need for further clarification of

**Table 2. Examples of skills in each non-technical skills category**

Category	Examples	
Communication	Operates to exchange of information, feedback, ideas or feelings in a structured, coherent way	<ul style="list-style-type: none"> <li>■ Sending and receiving information</li> <li>■ Identifying and addressing barriers to effective communication</li> <li>■ Using frameworks to structure communication effectively, e.g. assessment framework, protocol or checklist</li> </ul>
Decision making	Demonstrates the process of reaching a judgement or choosing a course of action to meet the needs of a given situation	<ul style="list-style-type: none"> <li>■ Generation of different options</li> <li>■ Selection of an option</li> <li>■ Reviewing decisions that have been made</li> </ul>
Situational awareness	Operates to gather relevant information in the current situation, illustrates the comprehension of the meaning of this information in that context for the patient and the ability to consider how this will impact on the patient's status in the near future. In this context the 'information' may be gathered from the patient, charts, communication and behaviour of staff	
Teamwork	Demonstrates the skill of working with others in a team context	<ul style="list-style-type: none"> <li>■ Supporting others</li> <li>■ Resolving conflicts</li> <li>■ Helping others to coordinate or complete activities</li> </ul>
Task management	Demonstrates the skill of managing resources and organization of tasks to achieve goals,	<ul style="list-style-type: none"> <li>■ Using skills relating to planning and preparation</li> <li>■ Prioritizing</li> <li>■ Providing and maintaining standards</li> <li>■ Identifying and using resources</li> </ul>
Student initiative	Demonstrates initiative appropriate to the situation	<ul style="list-style-type: none"> <li>■ Showing readiness to accept and follow through with tasks that have not been previously allocated</li> <li>■ Responding to the needs of the situation within the limits of the role</li> <li>■ Seeking clarification and asserting opinions that are relevant to the situation</li> </ul>
Responsiveness to patient	Demonstrating awareness of and respect to the patient	<ul style="list-style-type: none"> <li>■ Acknowledging the patient</li> <li>■ Responding to the patient's communication</li> <li>■ Eliciting the patient's opinion</li> <li>■ Checking patient understanding of patient plan</li> <li>■ Awareness of patient privacy and preferences</li> </ul>

this category if non-medical staff are to use the framework in the future.

Importantly, the framework was found to have educational utility, with the educational intervention resulting in a significant improvement in scores in all of the categories which were based on the original framework outlined by Flin and colleagues (2008), with the exception of teamwork, and in total scores for all categories. While no significant changes were found in relation to student initiative or responsiveness to patients, these were new categories that were

introduced after the educational intervention had been completed. As such, they were not explicitly targeted by the intervention and so significant changes in these two areas would not have been expected.

It was unclear why the educational intervention did not impact on teamwork. One explanation may be that the students all changed roles following the debrief session and therefore the original ward round team was disrupted. This reflects the reality of clinical practice where medical students and junior doctors may regularly

**Table 3. Kappa values and level of agreement for each behavioural category**

	Pre-intervention	
	Kappa	Level of agreement
Communication	0.355	Fair
Decision making	0.895	Almost perfect
Student initiative	0.479	Moderate
Situational awareness	-0.095	Less than chance
Teamwork	0.374	Fair
Task management	0.642	Substantial
Responsiveness to patient	1.00	Perfect

join unfamiliar teams. This highlights the challenge to teach teamwork skills that can easily be implemented as the doctor moves from team to team.

Finally, while the ward round simulation was developed by experienced medical researchers and clinicians in order to reflect the situations faced by junior doctors on ward rounds, and allowed teaching to take place under controlled conditions, the simulation was just that – it could only approximate the real experiences of a ward round. As the pilot study has demonstrated that the development and application of a non-technical skills framework to a simulated ward round is possible, future research can now evaluate its use in a real ward round setting.

### Conclusions

It was found that a pre-existing framework could be adapted and extended to capture some key ward round non-technical skills which were thought to be relevant to final year medical students. This framework was also found to have utility in measuring change in non-technical skills following a ward simulation exercise. Further research into the application of the framework in practice and with qualified staff is needed. **BJHM**

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**Table 4. Mean scores pre- and post-intervention for the behavioural categories coded**

	Pre-intervention			Post-intervention			Comparison	
	N	Mean	Standard deviation	Mean	Standard deviation	t value	Degrees of freedom	Significant
Communication	69	2.89	0.36	2.98	0.27	-1.838	68	0.035*
Decision making	70	2.80	0.47	3.06	0.34	-4.060	69	0.000*
Student initiative*	52	2.44	0.67	2.38	0.69	0.477	51	0.318
Situational awareness	70	2.87	0.48	3.03	0.34	-2.488	69	0.007*
Teamwork	68	2.91	0.33	2.97	0.17	-1.425	67	0.079
Task management	68	2.91	0.45	3.01	0.21	-1.722	67	0.045*
Responsiveness to patient†	51	1.63	0.72	1.57	0.81	0.490	50	0.313
Total mean score	49	18.49	2.06	19.12	1.79	-1.951	48	0.0285*

\*This category was developed from the 'leadership' category described by Flin et al (2008) and was used to reflect the reality that students would not be in a leadership position at their stage of training. †This category was a new category added by the researchers

Conflict of interest: none.

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## KEY POINTS

- Non-technical skills are known to contribute to patient outcome, but no framework currently exists to evaluate the ward round behaviours of medical students.
- Analysis of medical student behaviour during ward round simulations was used to adapt and extend a non-technical skills framework for this group.
- The final non-technical skills framework comprised seven categories, five which corresponded with existing categories (communication, decision making, situational awareness, teamwork and task management) along with two new categories (student initiative and responsiveness to patient).
- The framework also had utility as an evaluation tool, with significant improvement found in all the original non-technical skills categories, with the exception of situational awareness following the ward simulation exercise.

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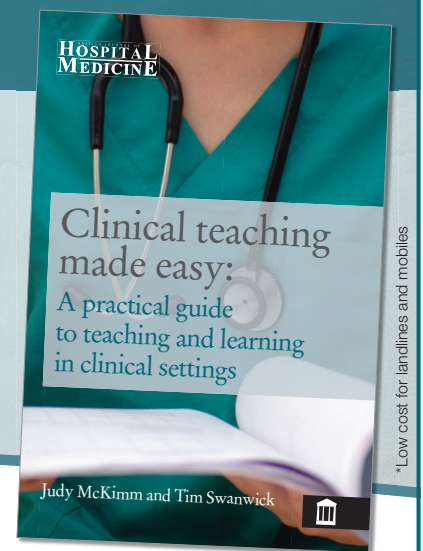
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