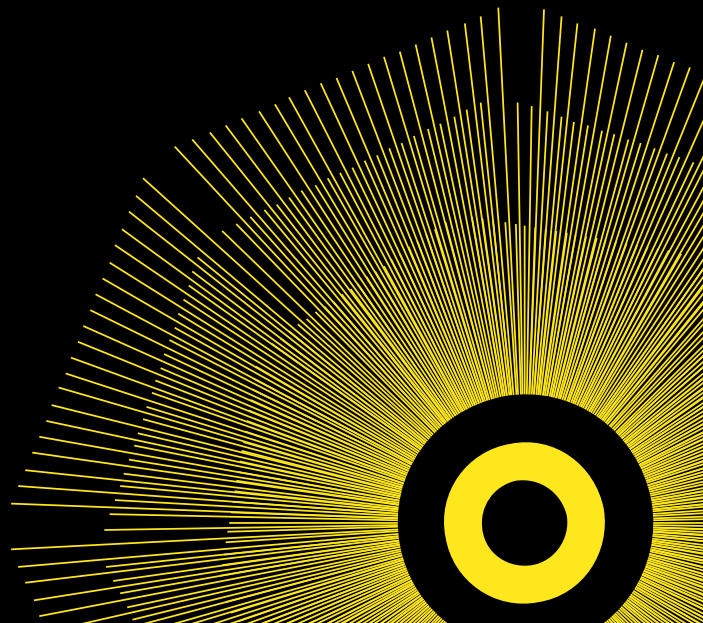# Shine 2014 final report

Using an adapted NOTSS (Non-Technical Skills for Surgeons) system and a ward round based structured checklist to reduce errors and improve safety on surgical wards.

Royal College of Surgeons Edinburgh

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Part 1: Abstract

Project title: Using an adapted NOTSS (non-technical skills for surgeons) system and a ward round based structured checklist to reduce errors and improve safety on surgical wards.

Lead organisation: Royal College of Surgeons Edinburgh, Patient Safety Board

Partner organisations: NHS Lothian, University of Edinburgh

Lead Clinician: Mr Paterson-Brown, Chairman Patient Safety Board, Royal College of Surgeons of Edinburgh and Consultant General and Upper GI Surgeon

Abstract:

Surgical ward rounds are fast-paced, covering a large number of patients with varying conditions, over a short period of time. These factors combined have the potential to impact the quality of patient care and experience. It has been shown that our non-technical skills (NTS) contribute just as much as our technical skills, if not more, to the quality of care we provide. Furthermore, the introduction of consistent structure to operating procedures with introduction of the WHO checklist has proven to greatly improve outcomes.

Staff in our department indicated that the emergency surgical ward rounds lacked structure and consistency, which was felt to impact the quality of patient care. We aimed to improve the quality of emergency surgical ward rounds by educating staff on NTS and introducing a quality improvement tool to help bring consistent structure to surgical ward rounds. Different ways of structuring ward rounds had been explored by teams in multiple specialties, however none of them had been paired with a dedicated NTS training program.

The setting for the intervention was a general surgical unit in a university teaching hospital. Medical staff and psychologists developed the training program, with input from subject matter experts. The program format included dissemination of pre-course reading, followed by a 40-minute training program supplemented with video scenarios and activities, finishing with a group discussion. The program was delivered to nursing staff, junior doctors, surgical trainees and consultants. The quality improvement tool was based on a literature search of previous interventions used to structure ward rounds in other specialties. It was then developed through focus groups with staff.

We decided to assess both the clinical and NTS quality of the emergency surgical ward rounds. The clinical quality of a ward round would be determined by the completion of particular clinical tasks during a surgical ward round, which staff had indicated were essential for good patient care. The NTS quality of a ward round would be determine by the presence of particular behaviours, which staff had indicated contributed to good patient care. Baseline data was collected on the clinical and NTS quality of emergency surgical ward rounds over a six week period for a total of 284 patient interactions. The data collected highlighted deficits in clinical task completion and good NTS. A statistically significant correlation was shown between clinical task completion and NTS.

The NTS training program was then delivered to the majority of nursing and medical staff over a period of four weeks. Following this period the quality

improvement tool was introduced and data was collected on the same variables as pre-intervention, for to measure potential change. Encouragingly, post-intervention data collection revealed a statistically significant improvement in both clinical task completion and NTS.

The key learning from this project was that involving staff in the development of the quality improvement tool from the beginning was essential for successful implementation. Even staff members who were initially resistant to our proposals participated after they were involved in the planning process.

Part 2: Quality impact: outcomes

We performed qualitative and quantitative outcome assessments during out project.

We performed baseline questionnaires with staff to assess what they felt were the main issues concerning the emergency surgical ward rounds. Several general themes of ward rounds issues emerged:
1.) Inconsistency in how the ward rounds are led, such as:
    a. How long they take
    b. How thorough they are
    c. How much info/what type of information is covered
    d. What decisions are made
2.) Inconsistency in what information is checked during the ward round, for example:
    a. Deep Vein Thrombosis Prophylaxis
    b. Blood results
    c. Medications/Drug Charts
3.) Inconsistency in the way the surgical team meets prior to the ward rounds, leading to:
    a. Tasks not always being delegated
    b. Not everyone being aware who everyone is and what their role is
    c. Clear instructions not always being provided
4.) Inconsistencies in note-taking, leading to:
    a. Missing information because there wasn't enough time to write everything down
    b. Missing information because the note-taker had to leave ward round temporarily
    c. Miscommunications between consultant and note-takers
        i. Misunderstanding about what information needs to be taken down vs what information is just general thoughts or discussion points
5.) Lack of confidence from both junior staff and patients to ask questions and clarify things during the ward round
6.) Relevant staff members were not always told the ward round was about to begin (e.g. nurses from each ward) or were not always available to attend.
7.) Junior doctors can be disproportionally overloaded during the ward round (e.g. with folders, note-taking, etc.) compared to other team members, with some other team members performing no tasks at all.

We also conducted patient interviews to assess what their experience of the emergency surgical ward rounds was. Several themes emerged here as well:
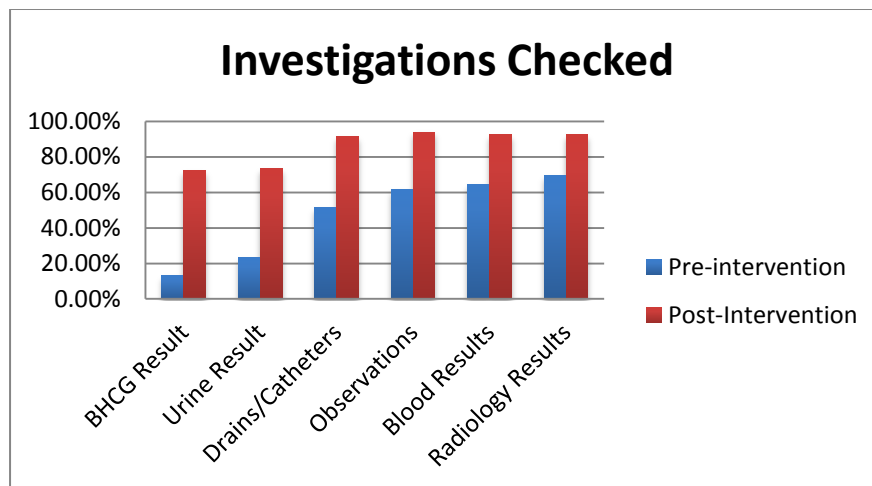1.) Patients were often uncertain whether parts of conversations were directed at them or staff members
2.) Patients were not always introduced to team and it wasn't always clear what the roles of different team members were (e.g. who was the consultant)
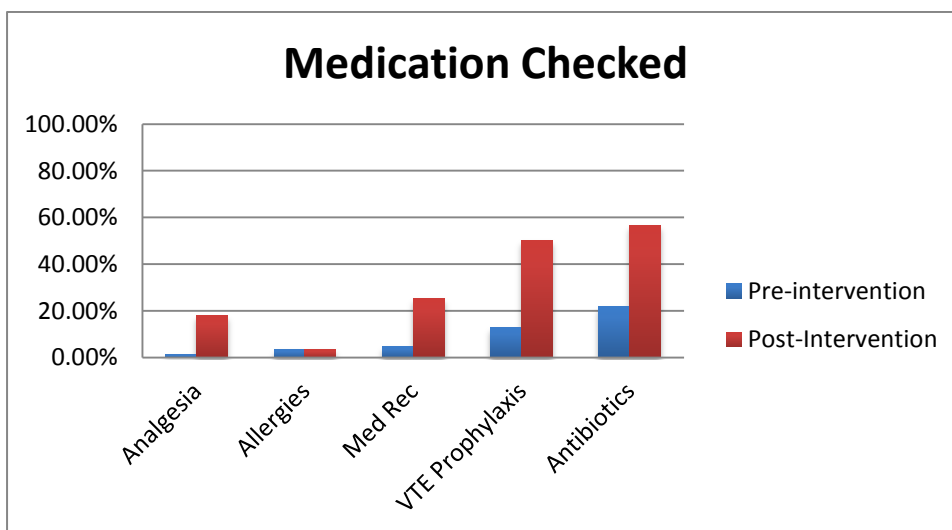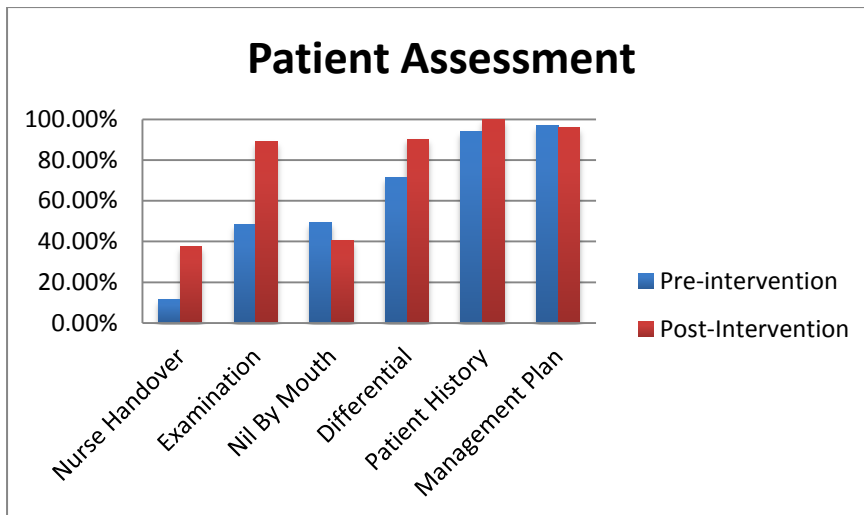
3.) Ward round could be intimidating for patient, due to:
   a. Large amounts of staff being present
   b. The rapid pace of the ward rounds
   c. Their questions not always being addressed
   d. Staff talking over the patient
   e. Staff using language the patients didn't understand

Based on the interviews with staff and patient with identified both clinical and NTS variables that would serve as indicators for the quality of an emergency surgical ward round. The clinical variables were defined as specific clinical tasks which staff felt needed to be performed on a ward round to ensure good patient care. The NTS variables were defined as specific behaviours which staff felt needed to be exhibited to ensure good patient care. We then conducted a 6-week period of data collection, during which we observed the completion of these clinical and NTs variables for 284 patient interactions.
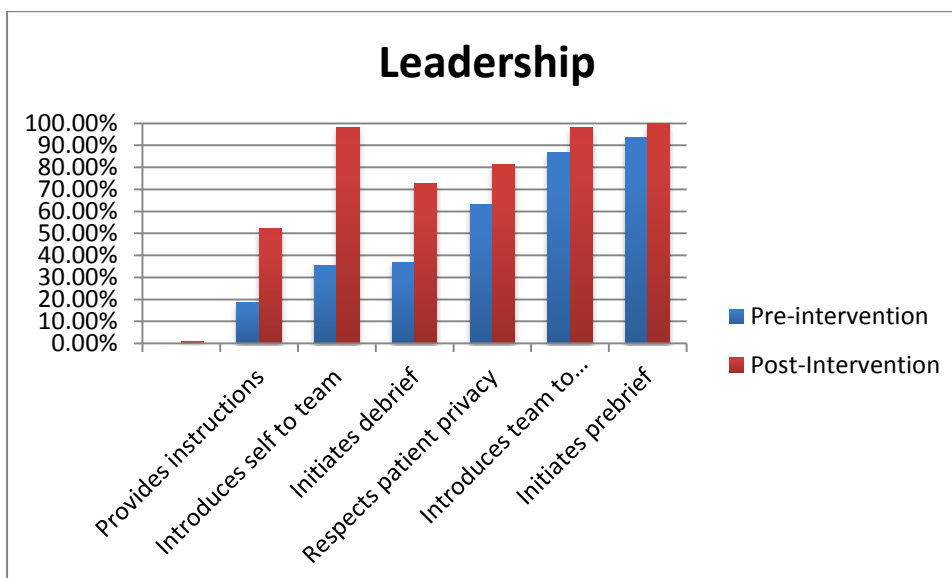
Following the delivery of our training program and the introduction of our quality improvement tool we conducted a 5-week period of post-intervention data collection. We conducted patient interviews to assess the impact on patient experience and observational data collection of the clinical and NTS variables, as performed pre-intervention. We were unable to conduct staff interviews post-intervention, because the juniors doctors and trainees who were observed post-intervention had not been measured during the pre-intervention phase.
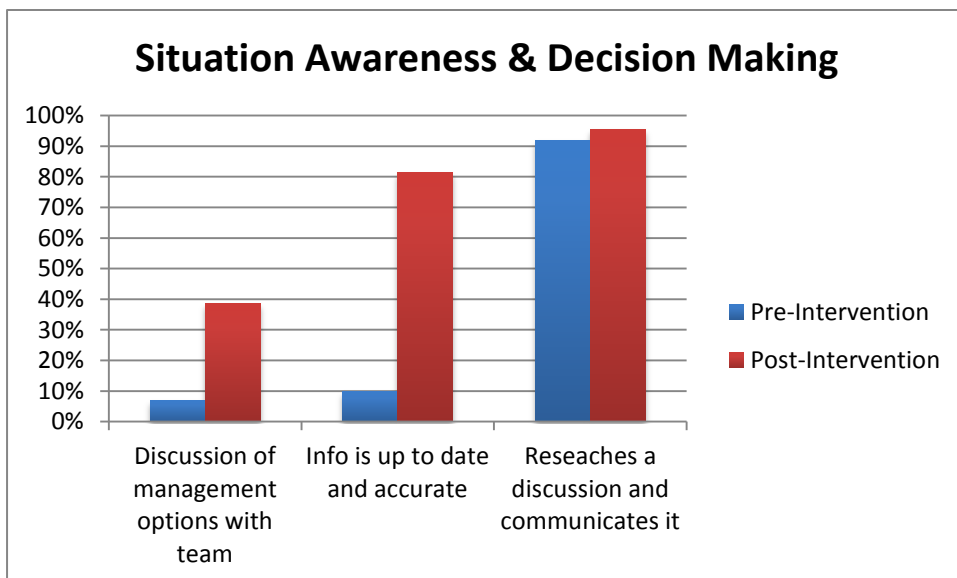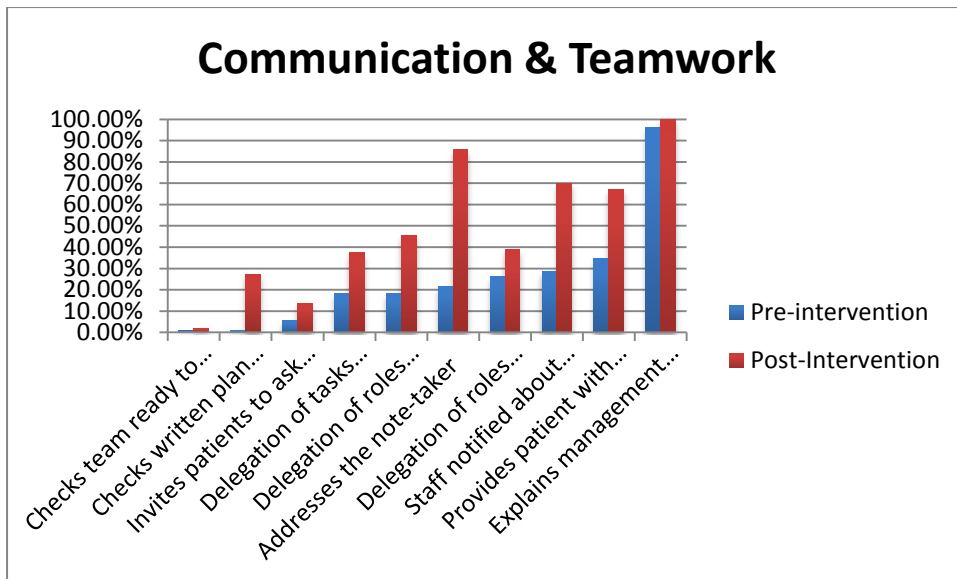
Clinical Variables

Patient Assessment

Medication Checked

Non-technical Skills Variables

Leadership

Communication & Teamwork

Situation Awareness & Decision Making

Statistical Analysis

Correlation
A Pearson's correlation indicated that the clinical outcomes were significantly positively correlated with the behavioural outcomes (r= .530, n = 266, p < .001).

Clinical Variables Overall
There was a significant difference in clinical scores between the pre (M=6.77, SD=2.57) and post (M=8.62, SD=2.93) intervention conditions; t (527.61) = -7.85, p < .001.

Behavioural Variables
There was a significant difference in clinical scores between the pre (M=6.92, SD=2.99) and post (M=13.41, SD=2.88) intervention conditions; t (548) = -25.84, p < .001

Average Patient Assessment Times
Average Patient Assessment Time (Pre Intervention): 5.9 mins
Average Patient Assessment Time (Post Intervention): 4.3mins

The Course of the Interventions

We had two interventions in our project the first being our NTS training program and the second being our ward round quality improvement tool.

We based the design of our training program on the NOTSS (Non-Technical Skills for Surgeons) training program, which teaches surgeons about NTS in the operating theatre. This training program uses a NTS taxonomy, exhibiting examples of good and poor behaviours, as its pre-course teaching material. The course is then taught by means of lectures on NTS and watching example videos followed by group discussion on observed NTS, often using the NTS taxonomy as a point of reference. We used this design as a blue-print for our training program.

Therefore, we set about developing our own NTS taxonomy for the emergency surgical ward round environment. We did this by conducting interviews with staff and patients to identify good and poor behaviours on emergency surgical ward rounds. We then grouped these behaviours under the appropriate NTS categories to complete the taxonomy. The taxonomy was then reviewed by subject matter experts involved in the development of the NOTSS taxonomy before it was finalised. We then created a course booklet in which we introduced the basics of NTS and provided the taxonomy as guidance. We disseminated the course booklet as pre-course reading.

Next, we developed a structured training program starting with a lecture covering the basics of NTS to consolidate participants' knowledge from the pre-course reading. We then followed this with videos displaying different clinical scenarios on surgical ward rounds. Participants were then asked to note down all the good and poor NTS they observed in each scenario. All the scenarios were then covered in a group discussion. The video scenarios were scripted to represent realistic clinical scenarios, though the focus was not on the clinical validity of the scenarios but rather on the behaviours exhibited by team members. The behaviours represented in the scenarios were based on the NTS taxonomy and written with input from subject matter experts.

We started the development of our quality improvement tool by performing a literature search to assess methods employed by teams in other specialties, as well as surgery, to structure their ward rounds. On the basis of this literature search we found that a physical prompting 'tool' to structure ward rounds had proven effective in multiple specialties. We then designed our own structured ward round tool on the basis of clinical tasks and NTS which we felt were important to perform on emergency surgical ward rounds. We then held focus groups with nursing staff, junior doctors, trainees and consultants to give feedback on what we had designed and also provide suggestions for modifications. We then incorporated the suggestions from staff and performed six test-of-change cycles. The resulting structured ward round tool we then used as our intervention. Most of the modifications during our tests of change surrounded the layout and whether the tool

was going to be used as a means of documentation, or not. The final design served as a documentation proforma, to be used for the first assessment of a new patient by the surgical team, which included ten key steps that needed to be completed.

Adjustments

We found that measuring 'global outcomes' such as morbidity, mortality, critical incident or adverse event numbers for the emergency surgical team pre- and post-intervention was not feasible. This was because we would have to follow the patient journey of every patient observed during data collection to assess whether any of those outcomes were applicable to them at any point in time. We lacked the time and resources to be able to do this for all 284 patient interactions. Also ascribing any particular 'global outcome' to any particular clinical variable or NTS variable would be very difficult. There is a hospital wide reporting system in place on which nursing staff log the amount of mortalities, etc. however these were staggered per ward. There were multiple surgical teams covering each ward as well as boarders from other specialties. Therefore, it would not be possible to discriminate whether those numbers belonged to the emergency surgical team or other teams.

Validity and reliability of the data

Data collection sheets were developed for the observational data collection period. These were tested between researchers on emergency surgical ward rounds prior to data collection, showing 85% agreement between researchers.

Part 3: Cost impact

This section is intended to review the confidence you have in your measures of cost and to highlight the outcomes you have had (up to 500 words). It may be helpful to think of this as describing the input costs and any consequences or benefits of the intervention versus the baseline relevant for a business case arguing for sustaining your intervention.

In this project we did not set out to measure the financial impact of our intervention and therefore do not have any formal cost measures. However, our project did display a decrease the amount of time taken for patient assessment. Therefore, we this could represent an increase in productivity and efficiency.

One of the aims of this project was to reduce errors on ward rounds. It was not possible to measure errors for all patient interactions due to multiple factors contributing to patient care and the ever changing nature of a patient's hospital stay (boarding to other wards, discharge home, clinical deterioration, etc.). Even if we would have been able to measure errors it would have been difficult to attribute the reduction in error specifically to the intervention. However, we were able to measure the completion rate of clinical tasks which were deemed to be essential for high quality clinical care. The failure to complete many of these clinical tasks are closely linked to errors. Therefore, an improvement in the completion of these clinical tasks likely had an impact on the occurrence of related errors.

There were no existing non-technical skills training programs or structured ward round interventions prior to our intervention.

This project was heavily dependent on input from staff in terms of interviews, observational data collection, staff focus-groups, expert input, stake holder consultation, delivery of training programs and tests of change. Therefore the main cost of this intervention in this project was attributed to the hiring of team members and subject matter experts. This hiring of team members contributed to the set up, development and implementation of the intervention. During this project a large part of the intervention was educational, therefore the development and delivery of the intervention incurred costs in terms of 'man-hours' from team members and the production of educational material. The implementation of the structured ward round intervention incurred moderate costs due to the need to print structured ward round proformas. However, as the project progressed the costs for production were taken over by the resident department and incorporated into their clerical budget. The longevity of the educational aspect of this intervention is currently dependent on staff being able to deliver the material. There is no specific funding for this to continue beyond the scope of the SHINE project, however team members are still planning to continue delivering the material on voluntary basis. Developing the training program in to a e-based module may ensure that delivery and dissemination can continue without the dependence on staff to deliver it, allowing it to run on it's own.

Part 4: Learning from your project

We achieved a statistically significant improvement in both clinical and non-technical skills variables post intervention, which was what we hoped for. Further, we hoped to achieve staff buy-in, which we managed to achieve from the majority of the staff by the end of the project.

The nursing staff, consultants, trainees and juniors doctors all expressed interest in changing the emergency surgical ward rounds in the beginning of the project. However, when it came to the development and implementation process the nursing staff were particularly enthusiastic and consistently supportive. This was incredibly important since nursing staff and consultants are the only staff members consistently present in a department, since trainees and junior doctors rotate constantly. The support for an intervention from the nursing staff stemmed from an overall poor experience of the emergency surgical ward round. Nurses on our ward are responsible for usually around 8-10 patients at any one time and therefore need to be aware of changes to management plans for any of those patients. Therefore, it is essential for them to be on the ward rounds or, at least, receive feedback from the ward rounds. They felt the ward round often had passed them by without being notified, leading them to have to contact juniors doctors during the rest of the day to clarify changes to management plans. They also felt that their input often was not sought with regards to patient care, even though they spent the majority of the day looking after the patients. The support of the nursing staff offered consistency and provided a platform for implementation.

Many consultants were supportive of our project, though it was a lengthy process to gain consistent buy-in. During the interview phase of our project many consultants expressed issues with the emergency surgical ward rounds and were generally supportive of the need for a change. However, some consultants were sceptical, firstly as to whether there were any issues with the ward rounds and secondly about how we proposed to improve them. This is why we conducted a period of baseline data collection; so that we could identify if there were any issues on ward rounds, and if so what they were. During out period of baseline data collection we identified multiple clinical and non-technical skills deficits on our ward rounds. We then presented this data at a departmental meeting. At this stage some consultants who previously had denied there were any issues on ward rounds were convinced by the evidence. By that time the majority of consultants were in agreement that there were issues on the ward rounds that needed to be addressed. However, amongst the consultants who agreed an intervention was required there was still disagreement as to what the intervention should be. We anticipated that this might occur and explained to staff that the development of the intervention would require their input. We held focus-groups with nurses, junior doctors, trainees and consultants during our development phase, to give staff ownership of the project and increase their involvement. We found that this greatly improved the support given, by medical staff in particular. Furthermore we actively engaged with the consultants who were resistant to the project to include them in the development process. Also we found that as the post-intervention phase started and several consultants found that our intervention helped their ward rounds, word spread to their colleagues. To quote one of the consultants, who had been incredibly resistant to the project, after our intervention had commenced: "It is not the way I usually like to run my ward rounds, but I can appreciate that it is important, so I'll do my best." Now, this might not sound like a convincing statement, but this did create an atmosphere where the

rest of the team felt comfortable to comply with the intervention and a large improvement was observed. Getting consultant buy-in was essential to allow other teams members to comply with the intervention, since the consultant is seen as the team leader. Many junior medical staff were motivated to comply with the intervention but were not always confident to do so if their consultants did not appear to comply.

Junior medical staff and surgical trainees actively engaged with the project during the development phase and were forthcoming with input and feedback. However, the fact that the members of the team constantly rotated meant that every time new staff came around they would have to be educated about the intervention. Unfortunately the effect that this had was that many of the junior medical staff and surgical trainees who had been involved in the development of the intervention were not part of its implementation. We feel that if that had been the case there have been even more buy-in since they would have felt a sense of ownership of the intervention.

Looking back at our project there are several factors that aided the introduction of our intervention. Firstly, timing was important, since we introduced our intervention in a department which had indicated informally the needed for an improvement in the emergency surgical ward rounds. Therefore, there at least was a foundation of interest. Secondly, announcing to staff that the project was going to commence several months before the start time allowed staff to get used to the idea so it didn't come as a surprise. Thirdly, early staff involvement; we conducted staff interviews of the first couple of weeks of our project. This had the benefit of providing us with information that we needed as well as serving as an 'ice-breaker' with staff and involving them in the project from the beginning. Lastly, keeping staff up-to-date about the progress of the project ensured that it didn't disappear in to the background.

Many of these factors that contributed to the successful implementation of our intervention laid the foundation for its sustainability. Two other important contributing factors to successful sustainability are buy-in and staff consistency. If there is a high level of buy-in from a range of senior and junior staff in different roles it allows for sustainability to be pushed forward by the entire team. Also, there needs to be a consistent group of staff members who actively comply with intervention to remain in a department to ensure consistency even if other staff change.

Part 5: Plans for sustainability and spread

Our structure ward round tool has become standard practice in the department where have implemented it and is being used consistently. There has been a large amount of interest from the elective surgical teams in the department to develop a similar type of structured ward round tool for their ward rounds. We are currently in the process of acquiring a Clinical Development Fellow, funded by NHS Lothian and Edinburgh University, to undertake the development of a ward round tool for the elective surgical teams under our supervision.

There are currently four large teaching hospitals in Scotland (Raigmore Hospital Inverness; Ninewells Hospital, Dundee; Aberdeen Royal Infirmary; and the Southern General Hospital, Glasgow), which have expressed interest in trailing our intervention in their surgical units. We have introduced our intervention to the surgical department at Raigmore Hospital Inverness but it has not been implemented yet. We will take a step-wise approach with the introduction of the intervention to other hospitals, covering one at a time. We aim to get feedback from other hospitals to improve the intervention.

Our Wardround Non-Technical Skills for Surgery (WANTSS) training program has been incorporated into the curriculum of the Scottish Surgical Bootcamp, which is a training program for surgical trainees, as of September 2015.

Also, we are currently developing an online module of our WANTSS training program on Learnpro, which is an NHS staff teaching portal. The aim of the module is to provide staff with a general understanding of non-technical skills, followed by example scenarios and to complete the module staff will have to rate the non-technical skills observed in specific scenarios. Upon completion of the module staff will get a certificate, which could be used at induction to a new department, to show they have had WANTSS training.

Furthermore, we are currently developing a Ward Round Surgical Toolkit quality improvement package to be placed on the Royal College of Surgeons of Edinburgh website. This has the aim of allowing other clinicians to view the work and will provide them with the tools to apply similar interventions in their own ward rounds.

Lastly, we are in talks with clinicians involved in the Scottish surgical simulation training about the potential to further develop a taught WANTSS program combined with simulation training.