

# Improving the quality of handover by addressing handover culture and introducing a new, multi-disciplinary, team-based handover meeting

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## Abstract

Handover is a "major preventable cause of patient harm"[1] and this project aims to improve the quality of night handover within a teaching hospitals general medicine department, resulting in the safe transfer of patient care to the night team.

Quality of handover was assessed both qualitatively, via structured qualitative interviews with trainees and a baseline survey assessing doctor's opinions of night handover, and quantitatively through the collection of a data set during regular observation of night handover.

The initial intervention instituted a new handover meeting with a set time and new location and invited the night nurse practitioner to attend. A prompt card, standardised documentation, defined leadership, and an attendance register were also introduced. Successive PDSA cycles introduced technology to the intervention, enabled the nurse night practitioners to actually attend and re-branded the prompt card as an agenda.

Results show a sustained reduction in length of handover from 70 minutes (n=7) to 34 minutes (n=13) post-intervention as well as a reduction in the number of distractions occurring during each handover from a mean of 14 to a mean of 8.5. An improved quality of handover was also demonstrated with an overall increase in the percentage of task handovers containing hospital number, an admitting diagnosis, comorbidities and a time allocated for the task to be performed of at least 10%. When trainees were surveyed post-implementation they unanimously identified the new handover system as safer than the previous handover process (n=30).

This project demonstrates that replacing an ad-hoc system of handover with a multi-disciplinary, team based approach to handover improves handover quality. In addition it provides a useful guide to introducing a new handover meeting to a department and contains useful lessons on how to combat cultural barriers to change within a department.

## Problem

The general medicine department at the Royal Sussex County Hospital, Brighton has an ill defined handover between the day and night team in the evening. A two hour overlap between the two shifts with no defined handover time within this results in a chaotic approach to handover which includes multiple individualised handovers between staff rather than a unified team approach. Our primary aim is to improve the quality of night handover within the department resulting in a safe transfer of patient care from the day to the night team.

## Background

Handover has been identified by the Royal College of Physicians (RCP) as being a "major preventable cause of patient harm".[1] The risks associated with handover include information not being handed over or being misunderstood [2] which may lead to "serious breakdowns in the continuity of care, inappropriate treatment, and potential harm to the patient".[2] Additionally, with the change in doctor's working patterns there are an increasing number of handovers occurring.[3] As a result there has recently been an increased focus on handover practices with the RCP,[1] BMA junior

doctors committee,[3] and Royal College of Surgeons [4] all releasing guidance on creating successful handover practices. All three institutions define handover as being a transfer of responsibility for patient care between health care professionals.[1,3,4]

The key to a successful handover relies on human factors including both the technical and non-technical skills of team members.[5] Technical skills are often addressed by using handover tools such as SBAR. Non-technical skills are often harder to address, although communication, teamwork, and situational awareness have been identified as contributing to handover quality.[6]

See supplementary file: ds5282.docx - "Table 1 - Interview quotes"

## Baseline measurement

Measuring the effectiveness of handover is a difficult task as raw data doesn't convey the complexity of handover. We therefore decided to use both qualitative and quantitative approaches to evaluate handover.

To help define the current problems with handover, we performed detailed structured qualitative interviews with trainees (for quotes

see table 1). This revealed that handover lacks a set time, the quality of handover is perceived as being dependent on the on-call registrar, and trainees noted that multiple distractions disturb handover.

Using this information and the RCP guidelines [1] we designed a data set to assess the quality of handover (see table 2A and 2B), collecting information about the handover meeting and specific information about each task handed over. To ensure the standardisation of data collection, the same observer attended seven departmental evening handovers prior to designing our initial intervention. Key initial findings (seven handovers, 107 tasks handed over) include the fact that mean handover length was approximately 70 minutes (range: 45 to 92 minutes) and there were around 14 distractions occurring in each handover with an average of 5.5 being due to additional conversations in the background of handover (see table 2A).

An average of 15 tasks were handed over each night; of these the registrar witnessed 44% of tasks being handed over and the nursing night practitioner witnessed 0% of tasks being handed over. In terms of the information being handed over, hospital number was handed over 70% of the time, admitting diagnosis 79% of the time, relevant comorbidities 31% of the time, and a time allocated for the task 17% of the time. Patient name, location, outstanding task and active issue were handed over 90% or more of the time and tasks were allocated to a specific individual 90% of the time (see table 2B).

The same observer was used for all data collection, they therefore provided a useful insight into handover. Their observation identified the following themes as having a major impact on the quality of handover: A lack of defined leadership, a lack of standardisation between handovers, multiple avoidable distractions, poor attendance with doctors joining and leaving handover multiple times, the same patients being handed over multiple times and multiple handovers occurring at the same time. It was noted that the use of technology as a central focus aided good handover.

We also created a survey to assess doctors views of night handover (see table 3), using the RCP guidelines [1] and adapting questions from the "hospital survey on patient safety culture".[7] Results suggested a lack of set time for handover, a lack of standardised order of proceedings, that important patient care information is lost and that there were distractions during handover.

These methods of data collection provided different unique insights into the quality of handover and this diversity helped ensure that the complexity of handover wasn't lost in data and statistics during the quality improvement project.

See supplementary file: ds5296.docx - "Table 2 + 3 - Handover data and Survey results"

## Design

These data, along with the RCP's "acute care toolkit", were used to design a new handover meeting which would occur at a set time

(8:00pm) every night in a set location. This location was moved away from the small doctor's office to a large seminar room as it was hoped that moving away from the busy, working environment would promote an increased focus on the task of handing over rather than routine work and therefore reduce distractions.

A prompt card to standardise handover (see appendix A) was introduced and the night registrar was appointed as the handover lead. We provided standardised documentation based on an SBAR format (see appendix B) to record handover and an attendance register was introduced. We also invited the night practitioners to attend handover and promoted the use of the SBAR tool (situation, background, assessment, recommendation) when handing over patients.

## Strategy

PDSA cycle 1 - Implementation of intervention:

After implementation of the new handover meeting we continued to attend handover and collected the same set of data (see table 2A and 2B). Additionally, immediately after each handover meeting, we interviewed either one or two people who had attended handover and asked them three standardised questions about the new handover meeting (what worked well, what didn't work well and what could be improved). We used these data and qualitative views to continually improve the handover meeting.

To introduce the intervention described above, we emailed the department with details of the new handover process and advertised the changes using posters. These initial meetings had reduced numbers of distractions, lasted a shorter period of time, and the registrar witnessed an increased proportion of handover. Feedback from the first two meetings (formal data were only collected for one) identified the absence of technology as being a concern. It was also noted that the prompt card was not being used which was preventing standardisation of the handover meeting.

PDSA cycle 2 - Introduction of technology to the handover process:

We therefore arranged access to a computer and projector in the seminar room. We also sought to increase registrar engagement with the new process after identifying that some registrars were unaware of the existence of the prompt card. We achieved this by explaining the new handover process and its rationale via both e-communications and through direct contact with the majority of registrars.

Data collected show that we were able to maintain the reduced length of handover and the reduction in distractions (see table 2A) and the registrars continued to witness an increased proportion of handover. We also continued to see improvements in the task-specific details being handed over (see table 2B). It was noted that despite inviting the night nurse practitioner, they were not attending the handover meeting and trainees commented that they felt this would be beneficial.

PDSA cycle 3 - Night nurse practitioner attendance at handover:

On further investigation it was revealed that the night nurse practitioner was unable to attend due to a clash with their own departmental handover. We therefore negotiated with the department and agreed that the night practitioners would alter their working patterns, enabling their handover to occur slightly earlier and thus ensuring their attendance at the general medical handover.

Data collected during this period showed the improvements in handover were sustained (see table 2A and 2B) although the prompt card was still not being used preventing full standardisation of handover.

PDSA cycle 4 - Rebranding the "prompt card" as an "agenda":

After consultation with multiple registrars, it appeared that the prompt card was too detailed and was seen as being too much effort. It also transpired that there were negative connotations with the term "prompt card". We therefore decided to reduce the amount of information on the prompt card to the absolute minimum and rebranded it as an agenda (see appendix C), ensuring that it was placed in visible locations within the handover room.

Immediately after introducing the new agenda, we continued data collection and repeated the survey assessing doctors views of night handover with an additional question comparing handover before and after introducing the intervention. The final results are discussed below and can be found in tables 2A, 2B, and 3.

Establishing longevity: Longevity of the project has been secured by including the gold standard handover process in the general medical teams induction. We are also currently negotiating for handover to be included in doctors simulation training thus ensuring a continued focus on improving the quality of handover.

The night nurse practitioners provide continuity to the handover process; despite the regular change of medical staff, they have therefore been empowered to ensure best practice during handover itself and to ensure that new staff follow the established handover processes. Additionally, the department has nominated a consultant with responsibility for handover, they will be responsible for oversight of the new handover process.

See supplementary file: ds5292.docx - "Appendix A, B and C"

## Post-measurement

Observational data - handover specific information (table 2A)

Our results show a sustained reduction in length of handover (see run-chart A) with a pre-intervention (n=7) mean of 70 minutes and a post-intervention (n=13) mean of 34 minutes. When these results were placed through a statistical process control (SPC) analysis, it was shown that all of the post-intervention results were at least one sigma level (18 minutes) below the pre-intervention mean, suggesting that the reduction in handover time was related to the intervention.

There was also a reduction in the number of distractions occurring during each handover (see run-chart B) from a mean of 14 pre-intervention to a mean of 8.5 post-intervention. Within this there was a notable reduction in distractions due to conversations unrelated to handover. Attendance was unaffected by the new handover meeting. Interestingly, the mean number of tasks handed over appeared to reduce during the project, although it is difficult to know if this is significant (see run-chart C). This was not an intended aim of the project, although this may be due to the increased scrutiny of handover by the registrar's.

Observational data - task specific information (table 2B)

Introducing the new handover meeting increased the number of tasks that the registrar witnessed being handed over from 44% prior to the intervention (n=107) to 90% during after the intervention (n=145). Similarly by the end of the intervention the nurse night practitioner was witnessing 78% of tasks being handed over (from 0%). This multi-disciplinary element to handover has, according to trainees, been beneficial during the night shift since it is a chance to meet their colleague thus promoting multi-disciplinary team working at night.

The quality of handover appears to have improved with the introduction of the new handover meeting with an overall increase in the percentage of task handovers containing hospital number, an admitting diagnosis, comorbidities, and a time allocated for the task to be performed of at least 10% (see run-charts E and F). One possible explanation for this is that the pressure of handing over in front of the entire team has led to more thoughtful handovers, whereas prior to a formal handover meeting there was less embarrassment associated with a low quality handover. It is also important to note that there was no significant reduction in any aspect of task handover post-intervention.

An unintended benefit of the new handover meeting is that there has been a reduction in the number of tasks being allocated to the night ward-cover SHO from 81% pre-intervention to 62% post-intervention, this reduction in work-load has also been verbally appreciated by the night SHO's. It seems that since the entire night team now meet at the start of the night shift and attend handover, tasks are more often allocated to the night-clerking team whereas prior to the intervention they would not have been present to receive the work.

Survey assessing doctors views of night handover (table 3)

We repeated the survey immediately after implementation of PDSA cycle 4, after the intervention had been in place for four weeks. Results therefore do not reflect views on the new agenda as this was not sufficiently embedded within the department at this point.

The most significant result is that trainees have validated the new handover meeting by unanimously backing it as the safer of the two handover systems. Trainees also now feel that there is "often" a standardised order of proceedings (from "sometimes"), that it is "often" possible to complete all of the tasks accepted at night handover (from "sometimes"), and although they previously

"agreed" with the statement that "important patient care information is often lost during the change from day to night shift", they now "neither agree nor disagree" with this statement. Additionally they "rarely" get distracted by people answering their bleeps (from "sometimes") and they "sometimes" note simultaneous unrelated conversations during handover (from an even split between "often" and "sometimes"). They now acknowledge that there is a set time for handover and an increased percentage of night ward cover SHO's know how to contact the night nurse practitioner. Interestingly there was no change in views regarding leadership during handover.

See supplementary file: ds5640.docx - "Run-charts A-F"

## Lessons and limitations

When collecting pre-implementation data we discovered that there were multiple handovers occurring at once in multiple locations. This made data collection challenging as it was impossible to capture the entirety of handover. As a result we shadowed the night ward cover SHO as, from experience, they received the vast majority of tasks handed over. This technique allowed us to standardise our data collection but likely resulted in an underestimation in the volume of work handed over and the amount of task handovers witnessed by the night registrar. Similarly it is likely that the proportion of task handovers witnessed by the night SHO were over-estimated.

The data collected during handover is likely subject to an observer bias since the person observing all handovers also designed the intervention and was therefore personally invested in the project, possibly displaying a subconscious desire to validate the intervention. This was unavoidable as this project formed the basis of the first authors academic rotation and so they were the only individual available to attend night handovers and commit sufficient time to the project. We tried to combat this by standardising the method of data collection, such as applying strict definitions for what constitutes a distraction. Additionally we included a strong element of qualitative feedback to ensure an independent assessment of handover was included in analysis.

Another concern with the data collected is that because participants were aware that the quality of handover was being observed, they may have changed their behaviours accordingly. Although it is likely that this occurred, it may have affected the pre-intervention and post-intervention results equally and therefore should not alter the final conclusions.

The challenge of this project was to address a handover culture which had been deeply embedded within the department for multiple years. This task was made more difficult due to the fact that the person introducing the intervention was a foundation year 2 doctor within the department; relatively junior within the medical hierarchy. Additionally, the registrars only worked within the general medicine department and as a result may not have witnessed an alternative handover system for several years so it was difficult to persuade them of the benefits of a new handover system.

These challenges were addressed in multiple ways. The support of the department consultants was invaluable as it allowed us to borrow their authority when talking to trainees about handover. To address registrar engagement we sought not only to interact with the registrars in person (rather than purely by electronic means), but we also ensured that we had firm qualitative and quantitative evidence as to the inadequacies of previous handover arrangements and how the new handover system would address these.

Interestingly, although we succeeded in gaining registrar support for the new handover meeting, we were unable to encourage a sustained uptake of the prompt card or agenda. With hindsight we wonder if we may have been too ambitious, establishing a new handover meeting was a major challenge to the departments handover culture. When tackling a cultural barrier to accepting change, it may be better to make that change in small, unnoticeable increments rather than giant leaps. For instance, with this project we could wait a few months until the handover meeting is truly embedded within the department and then re-introduce a bare bones agenda (see appendix C) for the handover meeting. Once this has been fully adopted we could slowly expand the agenda until it contained all of the details in the initial prompt card (see appendix A).

## Conclusion

This project has demonstrated that replacing an ad-hoc system of handover with a multi-disciplinary, team-based approach to handover not only improves the quality of handover but also reduces the length of time handing over and the number of distractions occurring during handover. Additionally, perceptions of the quality of handover within the department were also improved.

This project not only provides a useful guide to introducing a new handover meeting to a department, with associated handover tools, but it also contains useful lessons in how to combat cultural barriers to change within a department. By providing strong arguments for change, engaging seniors on an individual, personal basis, and borrowing authority from supportive consultants, it is possible for junior doctors to challenge widely accepted cultural norms within a department.

## References

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## Declaration of interests

None to declare

## Acknowledgements

None

## Ethical approval

This project was considered exempt from ethical approval since there are clear handover guidelines recommended by multiple organisations (1, 3, 4). This project sought to implement these guidelines to the department and measure improvements in compliance as a result of the auditing and regular feedback described.