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Quality improvement report: setting up a hospital at night service, limitations of bleep filtering and using an electronic task management system

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ABSTRACT

The 'hospital at night' concept was developed at a joint conference of the London Deanery and Clinical Staff in 2002, as an issue for education and service provision. At the start of the project, our trust had issues with both the structure of the hospital at night handover and the working practices overnight. The vision was to improve team working out of hours, expedite review of sick patients and reorganise care to seek a reduction in bleeps to medical junior doctors overnight in a way that all patients had access to the right person with the right skills for their needs at the right time. The hospital at night project at our hospital was started in 2019 by a multidisciplinary working group. We tried bleep filtering for 4 months and this was later followed on by the development of an electronic out of hour's task list as part of our hospital at night set-up. The bleep analysis data showed an improved distribution of workload but the process was dependent on individuals. The electronic task management system was built in pre-existing online software. The system helped prioritise and review tasks requested by nurses on medical wards. But it was not without its limitations. We worked with the local information technology (IT) team to improve speed and proposed developing an IT solution that is fast and not desktop based to ensure tasks can be assigned and viewed while on the go. The project was overall a success as it demonstrated positive feedback from junior doctors, improved perception of teamwork and ability to take rest breaks. It also demonstrated a drop in ward-based cardiac arrest rates. The hospital at night project at our trust remains a work in progress, but a lot of positive changes have been delivered.

OUTLINE OF PROBLEM

Since the introduction of European working time directive in England in 2003, there has been a reduction in working hours for junior doctors from an average of 78 to 48 per week.[1] In England, the pressure to reduce junior doctors' hours prompted a national project sponsored by the Department of Health: hospital at night (H@N). H@N is a multiprofessional, multispecialty approach to delivering care at night and out of hours, with the aim of improving patient safety. It involves members of medical and nursing staff coming together to form a team that manages patients across many disciplines in a hospital. It was proposed that by using the collective available skills on site out of hours and including other clinical staff would better support clinical care and outcomes for patients and improve training for doctors. By 2008, majority of the hospitals in England had an H@N service.[2] Apart from medical doctors, other key members of an H@N are critical care outreach teams (CCOTs), the resuscitation team and site practitioners. CCOTs are generally experienced nursing staff with prior experience of intensive care. They offer intensive care skills to patients with, or at risk of, critical illness receiving care in locations outside the intensive care unit, for example, on ordinary wards. H@N teams are also supported and on some occasions led by clinical site practitioners. They are senior nurses who coordinate hospital admissions, bed flow and discharges and form the backbone of the H@N service by coordinating tasks. The resuscitation team is responsible for ensuring staff are trained in delivering safe advanced life support skills throughout the hospital and monitor in-hospital cardiac arrests, but they may not be present on site out of hours.

The hospital where the project was delivered serves a population of more than 424 000 across the region and provides clinical services to almost half a million patients a year, including approximately 125 000 emergency department attendances, more than 88 000 admissions and more than 278 000 outpatient appointments on an annual basis. The hospital employs over 4487 staff approximately, including 576 doctors, of which 199 are consultants and 377 are doctors in postgraduate training or in non-training grades.

The project was aimed at improving hospital night service delivered by the medical directorate only. The other specialties which provide out-of-hours cover but were not part of the project were emergency medicine, anaesthetics, intensive care, obstetrics, gynaecology, surgery and paediatrics. At the start of the project, our hospital had issues with both the structure of the H@N handover and the working practices overnight. The medical team was meeting in a small office near an acute medical ward, the handover was interrupted by nurses on the ward and attendance was poor. This handover was followed half an hour later by the cardiac arrest team huddle, led by CCOT. This meant the doctors were not free to be able to start clinical work until after the meeting was over. There was no clinical site practitioner present at this meeting and our CCOT had no overview of sick patients being handed over from day teams to night teams.

Overnight, the junior member of the medical team or a member of the CCOT was typically the first to be called to attend to a deteriorating patient. Senior doctors were usually called later and only if the junior doctor or CCOTs thought it was necessary. A National Confidential Enquiry into Patient Outcome and Death in Acute Hospitals in 2009 demonstrated that this was often the root cause of a poor outcome.[3]

BACKGROUND

The national healthcare system cannot overlook the impact of long working hours and in particular of working at night on junior doctors. The acuity of decision-making overnight can be impaired and simple tasks might take longer to perform. Medical errors, adverse events and attention failure have been noted in doctors working extended shifts (those greater than 24 hours).[4] A systematic review of the impact of working long hours (more than 48 per week) and shift work revealed adverse effects on the worker's health as well as on his or her family and social life. System inefficiencies prevent the completion of routine daytime tasks, which are rolled over to the night, and so most night-time calls prove not to be of a 'life-and-limb' nature.[5]

Keeping this evidence in mind, all efforts should be focused on moving maximum possible care being provided during working hours and attempts to be made to reduce non-urgent clinical activity out of hours. Doing this not only ensures well-being but also improves patient safety. The H@N project gathered evidence and provided guidance for the development of safe and functioning teams to care for patients at night. It is clear that good team functioning is critical for delivering high-quality and safe care both during the day and at night.[6]

As a hospital's first priority is ensuring patient safety, any proposed solution to set up an H@N service had to improve patient care. The reason to set up H@N for the medical directorate was to improve team working out of hours, expedite review of sick patients and reorganise care to seek a reduction in bleeps to junior medical doctors overnight in a way that all patients had access to the right person with the right skills for their needs at the right time. Attention was also put to providing improved rest periods overnight for staff and also to monitor for a drop in trust cardiac arrest rates.

MEASUREMENT

We started our project by setting up a multidisciplinary working group involving key stakeholders and gathered informal feedback exploring current issues. A junior doctor survey at baseline and towards the end of the project was also conducted. Feedback was sought continuously. Bleep data were analysed for 4 months (a month prior to start and 3 months into the project). Understanding the nature of clinical work done at night is key to developing organisational structures that support safe patient care.

Baseline survey was conducted by sending an electronic form to approximately 35 trust grade medical doctors, out of which 17 responded. Respondents were asked to rate the urgency and appropriateness of tasks they were bleeped about overnight on a scale of 1–5: 1 was non-urgent that is, can wait until morning/not appropriate, could have been done by day teams, and 5 was defined as urgent—needs completion in 15 min/appropriate and required intervention out of hours. In the initial survey, none of the respondents chose scale 5 and no one described the tasks they were being asked to do out of hours as urgent enough or appropriate. Many of the tasks that doctors undertook 'out of hours' were deemed to be routine, inappropriate or unrelated to acute needs of the patients. We also analysed trust cardiac arrest data for medical wards during this time.

DESIGN

The multidisciplinary working group involving key stakeholders met on a weekly basis. The meetings were structured, minutes were kept and we maintained an action log which was tracked. This meeting brought together senior clinical managers, consultant physicians, junior doctor representatives, CCOT and site practitioners. This was a phased improvement project. We introduced a structured checklist for the H@N handover meeting, changed location of the initial meeting to a bigger meeting room with access to a computer showing patients admitted during the day. We also introduced a '5 min warning' bleep to signal the start of the H@N meeting.

We commenced 'bleep filtering' by clinical site practitioners to reduce junior doctor workload and allow for equal workload distribution among the night team. Bleep filtering meant that all calls from nursing teams were sent to the central site office to be prioritised by clinical site practitioners instead of the junior doctor. The site managers who are senior nurses were asked to filter out unnecessary or non-urgent jobs and helped medical teams prioritise tasks overnight and expedite review of sick patients. We were looking at reduction of bleeps

to the most junior doctors of the team and increasing access to more senior clinical decision-makers such as the medical registrar overnight to expedite review of the sickest patients.

Strategy for change

The project to deliver a comprehensive H@N service was started in 2019 .We found that the current policy in our hospital around H@N was last updated in 2005. So an updated hospital policy document was created which set the standards for the procedures and working standards expected from multidisciplinary on-call teams. The policy documents also incorporated key handover times and roles and responsibilities of all teams.

We identified the need for an additional clinical support worker overnight who commenced working with the site team and were able to do basic procedures which are often requested to be done by medical juniors. Clinical support workers are also sometimes known as healthcare assistants and they support in the delivery of patient care.

We sent out multiple communications using trust emails and designed trust screensavers to communicate these changes. Laminated posters were put up in key clinical areas and a point of contact for feedback was also provided. A standard operating policy was written and circulated among all clinical staff in the medical directorate. A bleep-filtering algorithm was also designed and distributed. The bleep-filtering algorithm helped the nursing staff on wards prioritise requests for routine needs overnight. All these documents were uploaded on a trust-wide policy platform. Regular feedback was sought from key stakeholders and multiple discussions were held with junior doctors to ensure engagement.

Based on feedback from stakeholders, we started a trial of an electronic out of hour's task list using pre-existing hospital online software. This list was designed to be used by the H@N multidisciplinary team. We decided that instead of bleeping for non-urgent tasks, nurses can request these jobs using the electronic task list.

The trust bleep system was reserved only for requesting urgent sick patient reviews as per the hospital deteriorating patient policy.

We liaised with the information technology (IT) system manager and designed an electronic out of hour's task management system. The IT training was rolled out throughout the medical directorate. We hosted training sessions and attended various pre-existing staff meetings to share the purpose of setting up this task management system and explained how to use it. We updated the training for this online software for nurses and doctors to ensure all new staff are aware how we use this system. Further follow-up drop-in sessions were organised for junior doctors, senior nurses and site practitioners explaining the expectations and sharing vision for use of this system.

RESULTS

The changes made to location of meeting and use of a structured safety checklist demonstrated a reduction in handover time by consolidating the cardiac arrest huddle and medical handover into one. This also improved attendances to these meetings which was evidenced by attendance form fill-in rates.

We collated informal feedback for bleep filtering from junior doctors, clinical site practitioners and nursing teams. The feedback about bleep filtering was mixed as some junior doctors felt that bleep filtering was dependent on the site practitioner on call and did not always work. A 4-month audit of bleep data supported this feedback. The overall bleep numbers increased by 3% as nurses were having to bleep the site practitioners first and the site practitioners were then filtering bleeps and passing on to the medical team. The bleep data showed an improved distribution of workload among the medical juniors, the ward cover senior house officer bleeps were reduced by 10%. There was a 26% increase in bleeps for the ward cover registrar as they were being contacted for urgent tasks and sick patient reviews directly. The nurses welcomed bleep filtering as it gave them an opportunity to speak to someone for support and on occasions this also helped expedite review of very sick patients. But for non-urgent requests, nurses felt that it was an additional step in the process. It also significantly increased the workload of the site team that felt stretched. The bleep data supported this feedback from site practitioners as they experienced a 16% increase in bleep activity (figure 1).

Subsequently, the introduction of electronic task management system enabled nurses to request non-urgent jobs quickly and gave the night team a bigger picture of jobs waiting to be done which enabled safe prioritisation of tasks. This also meant that tasks were equally distributed between various team members, leading to observational reduction in bleep activity and improved rest breaks.

Apart from informal feedback, a repeat junior doctor survey (N=16) showed that 10 of 16 (62.5%) people saw the new system as an improvement. Fourteen of 16 responded to ability to take breaks, out of which 8 reported that they are now able to take uninterrupted rest breaks during night shift as compared with none prior. There was also a reported improvement in the appropriateness and urgency of bleeps overnight (figures 2 and 3).

Simultaneous improvement strategies working alongside H@N have seen the hospital go nationally from seventh worst for 'ward-based' cardiac arrests 2 years prior to now being better than the national average, according to the latest National Cardiac Arrest Audit data from 2019 to 2020, indicating an improvement in patient safety.[7]

LESSONS AND LIMITATIONS

The key to successful implementation of these changes was to involve those responsible for delivering the changes in the planning process and to manage the changes in clear phases. We used evidence from the first phase to

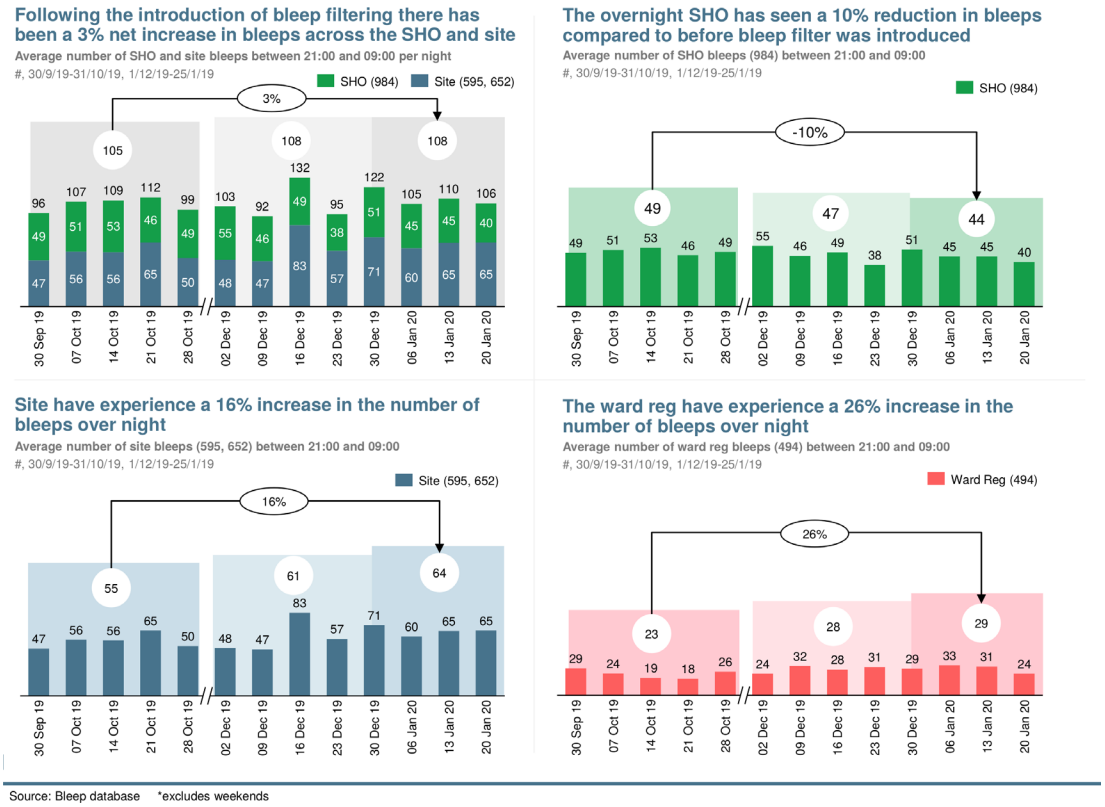

Figure 1 Bleep data. SHO, senior house officer.

build up confidence and share our vision with all the teams involved; this allowed us to progress to the further phases of implementation. We encouraged direct and indirect feedback so that problems could be dealt with straight away and successes celebrated as soon as possible.

Developing a strong multidisciplinary working group at the start meant that every member brought a different insight and allowed interventions to be bolder. Staff engagement has been challenging at times and team members have needed to develop and use their leadership skills.

The project enabled 'on the ground' leadership by junior doctors, nursing teams and clinical site practitioners. The bleep-filtering system was designed to use the knowledge and leadership skills of senior staff and also gave them an insight into their development needs.

Our project had several limitations. We focused only on the medical directorate. It will be beneficial to identify leads from other specialties and involve teams that will like additional support out of hours.

Another limitation was collecting bleep data. This involved getting raw data from a trust switchboard which was not compatible for download on trust computers. The data had to be analysed on different online software and the process involved rigorous analysis to filter down to specific times and particular bleep numbers. As the coronavirus pandemic affected staffing levels across all hospitals in England, an assessment of repeat bleep data was not possible due to increased medical staffing and change in bleep allocation to ward-cover doctors.

Another limitation was getting feedback from doctors. It is a challenge to get already busy clinical staff to fill in surveys.

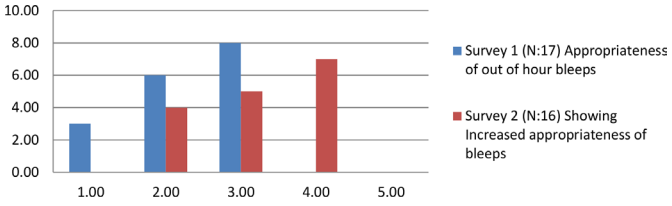

Figure 2 Junior doctor survey comparing bleep appropriateness. (1) Not appropriate, could have been done by day teams; (2) not appropriate but do not mind doing; (3) needs doing but can be done at any time; (4) appropriate and needs doing within the next 3 hours; (5) appropriate and required.

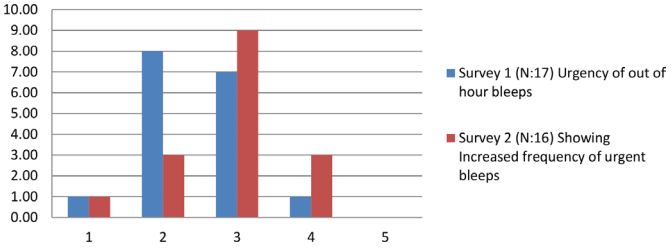

Figure 3 Junior doctor survey comparing bleep urgency. (1) Non-urgent, can wait until morning; (2) not urgent but do not mind doing; (3) needs completion overnight but can be done at any time; (4) semiurgent and needs completion within the next 3 hours; (5) urgent, needs completion in 15 min.

Staff who have no issues with current systems might not find the motivation to feedback anyways. We tried to limit this by carrying out various formal and informal conversations.

Financial impact of this project was not analysed.

The electronic task management system had several limitations. It was initially limited by intranet speed with users reporting increased time spent logging in and engaging with the system leading to waste of precious time available to teams out of hours. This hindered engagement out of hours. To use this system, individuals had to log in from a desktop computer which was not deemed feasible during a fast-paced out-of-hours shift.

CONCLUSION

The H@N model in its purest form meant forming an integrated team that covers the hospital site, ensuring efficient multidisciplinary handovers, juniors from different specialties performing generic roles and dividing tasks, and support from highly skilled nursing staff. We did not involve other specialties in our project and focused on delivering this within the medical directorate.[8] Developing an H@N service still remains a major piece of work across some National Health Service (NHS) trusts and effective multidisciplinary team communication is vital to implementing change of this magnitude. Likewise, the H@N project at our trust remains a work in progress but a lot of positive changes have been delivered since this project was undertaken. We proposed developing an IT solution that is fast and not desktop based to ensure tasks can be assigned and viewed while on the go. Since undertaking this project, our organisation had started working on getting an electronic patient record and a mobile H@N task allocation system. Adopting the new technology will make the handover much more efficient, less disruptive and aid overnight communication and task allocation as seen in other organisations. In 2014, Portsmouth Hospitals NHS Trust introduced a mobile-enabled H@N to improve out-of-hours care for patients, this has subsequently been rolled out across some other sites nationally. Using this online software meant that ward nurses requiring support entered a request into the online software. On receiving the request, H@N coordinators receive the request via a personal computer or tablet, triage it for urgency, and then assign it to a relevant doctor, nurse or technician. The clinician receives the request electronically and clicks once it is complete, providing an accurate view of what is happening across the hospital overnight.[9]

During our project, we also learnt that feedback, even hostile, must be encouraged and actively sought. This allows for rapid corrective changes to be implemented. We chose not to delay the implementation of proposed improvements. It is very important to maintain two-way communications to ensure all concerns are addressed and emphasise the need for ongoing improvements.

We felt that sustainability is ultimately the responsibility of senior leaders. It also requires practical direction, support and recognition for frontline clinical leaders, those who most directly impact patient experience of care.[10] We were fortunate enough to have that support of senior leaders while delivering this project. To ensure sustainability of this work, we proposed that hospitals promote development of staff involved in delivering care out of hours and ideally have an out-of-hours services lead.

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Contributors I can confirm all authors contributed towards the development and implementation of the hospital-wide project and contributed to authorship of the article as follows: AS led the design and delivery of the project and overall writing of the project. KC hosted all the site working group meetings, set up the team and engaged key stakeholders. LR led the site practitioners and helped maintain good communication. EC led the critical care outreach teams and enabled amalgamation of arrest huddles and hospital at night handover. KM involved nurses and helped communicate with nurses and heads of nursing. TS helped collect bleep data, involved patient deterioration teams and analysed cardiac arrest data. SB helped draft a hospital at night policy and reviewed standard operating policies related to the project.

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