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Electronic display board in operating theatres for easy patient identification

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ABSTRACT

Objective To correct patient identification for surgery nd reduce risk of wrong site surgery.

Surgical care is high risk and complex and errors are associated with huge negative implications. The need to identify patients correctly before surgeries is important to reduce risk of wrong-site surgeries. Operating theatres (OT) are a highly stressful work environment where time and resources are precious and errors are more likely to occur. Having a clear display of the two patients' identifiers improves ease and safety during time out and noting critical results in the OT.

Methodology Deming's Plan-Do-Study-act cycle where the work group meet regularly to review results of various strategies put up and implement further changes.

Results Both the surgeons and nurses found it safer to have patients' two identifiers and nature of operation on display while noting critical results and confirming patients' details during time out.

INTRODUCTION

Surgical care is complex for patients, where potentially devastating errors and near misses can occur. The failure to identify patients in healthcare correctly results in medication errors, transfusion errors, discharging infants to wrong families, testing errors and procedure errors. The UK National Patient Safety Agency reported 236 incidents and near misses related to wristbands, which were either missing or displaying wrong information.[1] The Joint Commission has listed correct patient identification as its first First International Safety Goal introduced in 2003 and continues to be a requirement for accreditation.[2]

One of the objectives listed in the WHO safe surgery 2009[3] involve making sure the surgery is performed on the right patient, right procedure and on the right site. The occurrence of wrong-site surgeries (WSS) (left/right side or wrong body parts), wrong patient and wrong surgery is termed never events, errors that should never occur and indicate serious underlying safety lapses. WSS causes devastating injuries to patients and has negative effects on the surgical team. Such errors occur in approximately 1 in 50 000–100 000 surgical procedures.[4] Among some of the reasons listed for WSS include communication failure, non-compliance to safety procedures, emergency cases, multiple surgeons, multiple procedures, time pressure, unusual set-up, equipment and room changes.[5–7] With this information, the team embarked on the project to ensure safety of patients when they are in the OT.

In the local hospital, the patient must be identified using two identifiers, which include the patient's name and identification card (IC) number. The IC number is unique to each and every Singaporean and Singapore permanent resident.

Routinely, patients planned for operation undergo several checks at various points en route to the operating theatre (OT). The checks are in the form of checklists, and the nurses involved in the checks are required to sign their names at every checkpoint. Patients' exact location is displayed on the OT dashboard by scanning the patients' wristband as they make their journey through the OT.

In the induction room, the surgeons verify the patient's name, IC number, nature of operation and do site marking with the patient fully awake. Time out is a brief pause just before incision for the whole surgical team of nurses, surgeons and anaesthetist to confirm the patient's identification, the site and the correct operation. The Joint Commission requires that all the team members are present during time out and be actively involved in the process. The checklist used during time out is documented and filed.

The following were the challenges at time out for our surgeons:

- lack of a clear display of the patient's name and IC number; the surgeons recall the patient's details from memory
- time-consuming and inconvenient to verify with patient's wrist tag for name and IC number, from under the sterile towels.

Critical results are often called through to the OT via telephone and communicated to the medical or nursing staff. The lack of patient's name and IC number on clear display causes delay as the nursing staff needs to check with the patient's case notes in order to verify.

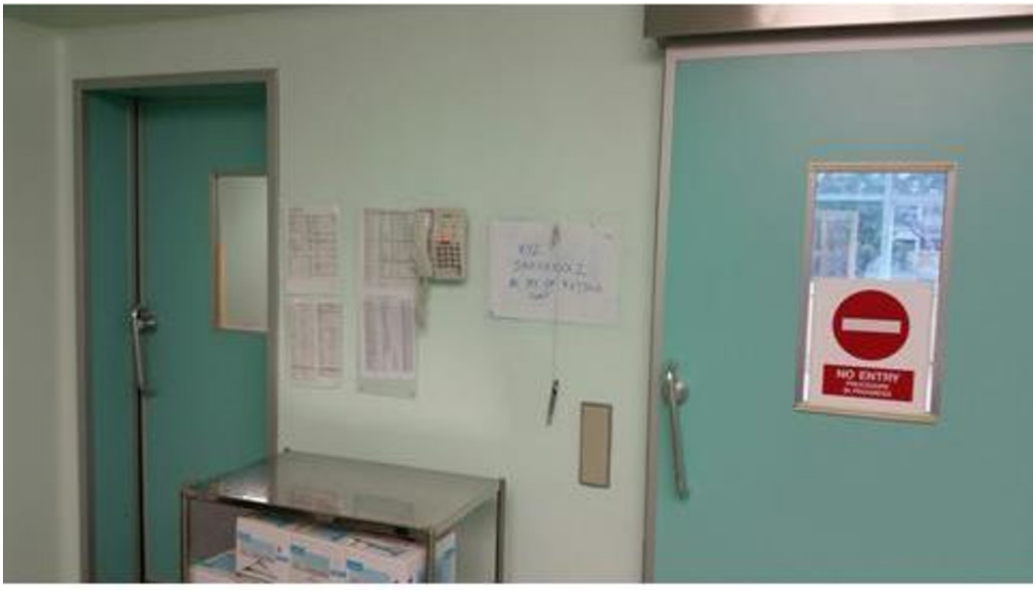

Figure 1 Makeshift whiteboard

With this information, the team embarked on the project to ensure safety of patients when they are in the OT.

Project aims

- improve ease of verification of the patient's identity, with two patient's identifiers during time out and acknowledgement of critical results in the OT
- display of the nature of surgery and the patient's drug allergies for ease of verification
- reduce the future risk of wrong patient, site and surgery.

METHODOLOGY

The project was planned and carried out using Deming's Plan-Do-Study-Act cycle.

A workgroup comprising surgeons, hospital's information technology (IT) team and the OT nursing staff was formed to explore various ways to put up a display of the patient's name and IC number. Ten meetings were held, and during the first meeting the members brainstormed and explored various ways to put up a display of the patient's name and IC number. The Ishikawa diagram was used to chart the issues and the challenges faced are listed below:

- the ideal location for putting up the display (figure 1)
  - If the display board is near the wall telephone, it is convenient for the receivers to note the two patient identifiers when calls come through.
  - However, the wall telephone where critical results are called through is a distance away from the operating table.
  - Visibility of information being displayed on the wall is poor from the operating table where the surgical team works. This is an important factor to consider during time out when the surgical team needs to actively check the patient's information.
  - Display board placed near the operating table is convenient for the surgical team for time out, but may not be clearly visible from the wall telephone when receiving critical results.
- visibility of display from both the wall telephone and the operating table
- transcribing errors
- regular update of information on display after every changeover of patients.
  - The previous patient's identifiers, nature of surgery and drug allergies are replaced with the current patient's details.

Before embarking on the project, the team collected baseline information using a survey form on the need to have the patient's name and IC on display in the OT. More than 70% of the general surgeons and OT nurses agreed that there is a need to have their patient's name and IC on display, and over 80% agreed that the aim for doing so is to improve patient safety, particularly during time out, and to check the correct site and correct operation.

The next priority was to decide what patient details to display on the board to reduce the risk of WSS and making sure the results being called through to the OT belong to the correct patient. The survey results showed 73% of surgeons and 64% of OT nurses would like to have the nature of operation on display to facilitate time out.

Strategy 1

The team proposed to start with a conventional whiteboard near the wall telephone since it was cheap, durable and readily available. Drilling the OT walls is discouraged because the walls in OTs consist of sandwich layers of concrete, air and lead in order to maintain the positive pressure within the OT. Therefore, the team created a makeshift whiteboard using a laminated piece of A3 paper, which was glued to the wall (figure 1).

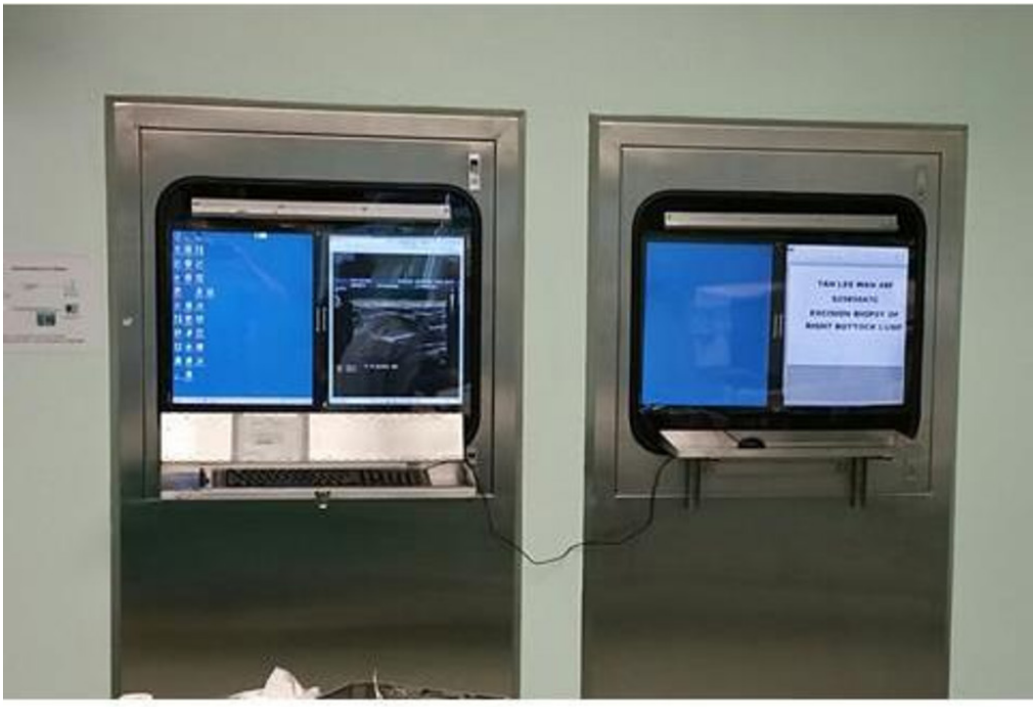

Figure 2 Power point display

We evaluated the strategy and collected feedback from the nursing staff using a survey form. There were only 24% of nurses and 7% of the surgeons who preferred using the whiteboard as a means for display. The other points related to the whiteboard are listed below:

- high risk of errors with transcribing
- the nurses did not want the responsibilities of updating the board after every patient; there were occasions where the board was not updated, leaving the wrong patient's information on display
- legibility of handwriting
- visibility of handwritten words and numbers from the operating table where the surgeons work; this was author-dependent and inconsistent; the makeshift whiteboard is about 3 m from the operating table.

Strategy 2

The team then brainstormed and proposed using a PowerPoint display of patient's name, IC number and nature of operation on one of the computer screens, near the operating table. The details were manually keyed in by the surgical team (figure 2).

After a month of pilot, the team sent out a survey form to collect feedback from the departments of general surgery and ear nose and throat (ENT). The result of the survey showed that 72% of nurses and 50% of surgeons preferred an electronic means of displaying the patient's information, rather than handwritten form. The other points related to electronic display were the following:

- Visibility was not a major concern with PowerPoint display, from the operating table or the wall telephone.
- Time-consuming and risk of errors while typing in the patient's details.
- Needs regular updating with every changeover of patient.

There was a team of staff who did random survey for a total of two consecutive months in selected OTs to observe the frequency of surgeons putting up a display either on the makeshift whiteboard near the wall phone and/or PowerPoint display on the computer screen near the operating table. They noted that in the first month of the pilot, only 54% of the surgeons bothered to have the patient's name and IC number on display on either the whiteboard and/or PowerPoint on computer screen. The compliance rate improved to 64% at the second month of pilot project. It was noted that the majority of display was on both the computer screen and the whiteboard. Only one case was displayed on whiteboard alone.

Strategy 3

The team then met and brainstormed to finally come out with the possibility of an automated electronic display where the OT staffs will scan the bar code on the patient's wrist tag to pull up the required information for display. The usual patient's bar code registers the patient's IC number when the bar code is scanned. The team worked with the IT department to create a button on the hospital's electronic medical records, in the operating theatre management system (OTMS), to flash out the patient's name, IC number, consultant-in-charge, nature of operation and the patient's drug allergy history to display on the electronic display board.

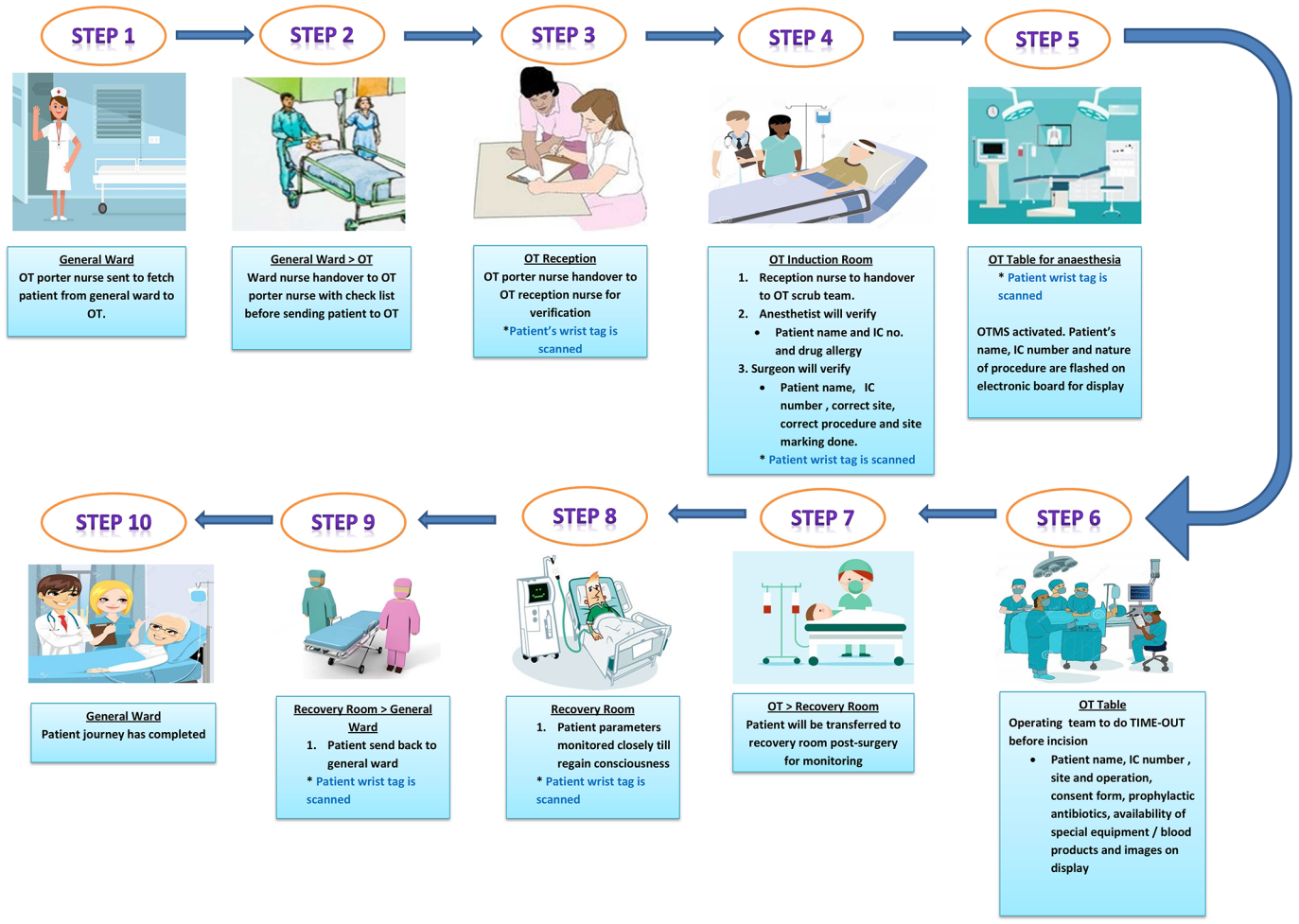

Figure 3 Patient's journey through the operating theatre (OT)

Scanning the patient's bar code on the wrist tag is a routine procedure in a patient's journey through OT, as shown in figure 3. The patient's whereabouts in the OT are displayed on a dashboard at various points in the OT and the OTMS on the electronic medical records so the hospital personnel can track the patient's movement in OT. At step 5, when the patient is transferred to the operating table fully awake before anaesthesia, scanning the patient's bar code will show the patient's details for display, as shown on figure 4.

At the end of the surgery, the patient is not scanned out of OT. When the patient is transferred out of the OT to the recovery room, he/she will be scanned in the recovery room (figure 3), so an account is created in the OTMS and this is the only way in which nurses can enter the patient's parameters into the system and this record cannot be activated any other way. Once the patient is in the recovery area and his/her location is confirmed, the display board in the OT goes blank. When the patient is ready to be discharged from the OT to step-down care area, the recovery room is required to print out a discharge summary and close the whole journey across the OT. In the event that a new patient arrives in the OT before the previous patient is scanned in the recovery area, the new patient's details will appear on the electronic display board.

In the event that the patient's wrist tag was not scanned when he/she was transferred onto the operating table and details are not shown on the display board, time out will be stopped until the patient is verified and scanned before time out can recommence and surgery can start.

DISCUSSION

The aim of this project was to improve patient safety during their journey through the OT, ensuring that patients are identified correctly, and to reduce risk of WSS. The use of patient's ward and bed number as identifiers is discouraged since patients' wards and beds change as care needs change. Misidentification of patients is identified as a root cause of many errors, and the Joint Commission listed correct patient identification in 2003 as its first international patient safety goal and is a requirement for accreditation. There are currently various methods used in healthcare to assist with correct patient identification. The classic is the wrist tag that patients wear, which has the disadvantages of being dislodged, lost, wrong patient's details on the tags, wrist tags with missing or illegible information, and presence of more than one wristbands with conflicting information.[1 8] Other technologies that have been tried in healthcare include radiofrequency tagging,

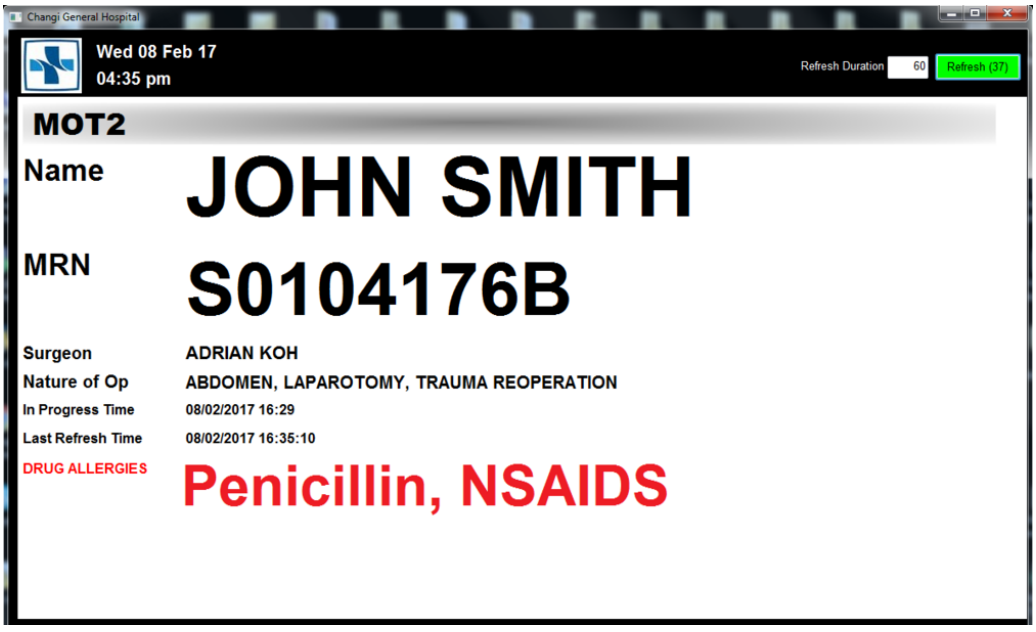

Figure 4 Automated display of patient's identifiers

which is expensive, and personal biometrics like thumbprint, which is unique to each individual. Bar-coding is currently the best technology; it is cheap and readily available for labelling drugs and specimens.[9] For the study environment, the patients wear a wrist tag with their individual name and IC number printed with a bar code. Some of the patients also wear a radio tagging device allowing healthcare workers to track their whereabouts in the hospital compound during their stay. Scanning the bar codes is also used for other purposes. During medication rounds to reduce medication errors, phlebotomists scan bar codes on patients' wrist tags to ensure specimen collected and request matches and OT scans bar codes to locate the patients circulating through the OT. Scanning the bar codes leads to the hospital's medical records system. Using bar codes eliminates possible errors associated with misidentification, especially when we have uncommunicative patients or patients who have cognitive impairment who are unaccompanied and unable to tell us their name or IC numbers.

The risk of human errors, poor communication and lack of teamwork is present in all healthcare settings. Misidentification of patients and WSS occur due to lapses in human performance, and to reduce errors improving the system where healthcare workers do their work is more reliable than perfecting human performance.[10] In this project, verification of patients' identifiers occurs when the patient is seen, when the surgery is scheduled, on admission to the ward, prior to any procedures that include phlebotomy, during patient transfer to another caregiver, at the induction room prior to site marking and prior to sedation, and at time out before the surgery. Some of these checks involve scanning the bar codes on their wrist tags and verbal verification. The patients are also asked to verify the surgical procedures and site against the consent form which they are scheduled for. For patients who are uncommunicative or unconscious, verification of identifiers and surgery with a next of kin checking against the patient's wrist tag and consent form is required.

Preoperative verification using checklists allows discrepancies to surface. Reviewing the medical records and verification with the patients are useful steps to resolve these discrepancies.[11] Adoption of the Universal Protocol adheres to the three elements: patient identification, site mark and time out. The Universal Protocol must be strictly adhered to, and any team members must speak up if they feel patient safety is compromised.[12] Time out serves as the final verification before the procedure and is an important step that allows the team of surgeons, nurses and anaesthetist to have a quick briefing, and has been shown to prevent WSS, with improvements in the communication on the correct site and correct operation.[13]

Critical results from the laboratory and the radiology departments are often called through to the OTs as these results may influence the extent of surgery. Individual hospitals have their set criteria to define critical results. Miscommunications of critical results may result in delayed treatment and result in serious harm. The Joint Commission requires that the hospital has a guideline on reporting and receipt of critical results, to whom and by whom critical results are reported, and that compliance is monitored. The receiver should routinely do a 'read back' to ensure that the results communicated are accurately received. In the OT and emergency situations, read back is often not possible. The information communicated must be documented.[14] In the OT setting, time is critical. The results called through may affect the extent of surgery, or interventions for abnormal results can be instituted as early as possible. In the OT, where the patient's identifiers are not clearly displayed, it is possible to miscommunicate the wrong patient's results, especially if patients'

names sound similar and the staff receiving the abnormal results has to recall patients' identifiers from memory for verification. In healthcare setting, relying on human memory is prone to errors, especially if there is inexperienced staff, pressure for time, inadequate checking and inadequate information. At an individual level, the human memory has a finite capacity that can be further affected by fatigue, sleep deprivation, stress, hunger and illness. In addition, language barriers may be another factor for miscommunication.[15] In the study setting, the critical results are reported to the OT staff, and the date and time of communication are documented for future verification. The staff may be asked to do a read back and the instruction is to check the electronic medical record system to view the actual report, since documentation and read back are often not feasible.

CONCLUSION

Healthcare facilities are a high-risk environment for our patients. Human errors can cause serious threat to patient safety particularly in highly stressful environment like the OTs. Improving the system creates an extra layer of protection against human errors; for example, identifying the right patient for the right surgery reduces the risk of WSS.

Contributors The paper submitted is an original QI project and has not been published elsewhere. It was exhibited at the last BMJ Healthcare Safety and Quality Conference in Singapore in September 2016.

Competing interests None declared.

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