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Using I-PASS to improve nursing handoffs across the continuum of care at a tertiary oncology hospital

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ABSTRACT

Background Communication failures can cause medical errors that harm patients. Handoffs occur frequently every day—every time a patient is transferred from one nurse to another (eg, shift change, hospital location). At our comprehensive cancer centre, handoffs became a priority focus area in our institution.

Purpose We implemented the evidence-based handoff tool I-PASS (Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver) for all nurses at our comprehensive cancer centre and assessed the uptake of the new framework and subsequent compliance and safety outcomes.

Methods Our team comprised representatives from nursing education, operations and informatics; a healthcare systems engineer; and electronic health record (EHR) analysts. Based on our observations of handoffs in different settings and feedback from focus group sessions, we developed an I-PASS handoff workflow in our EHR with the engagement of frontline staff and unit leaders. Various education modalities were implemented, and compliance was monitored through an EHR dashboard. Handoff audits were conducted for over a year after I-PASS was implemented to observe compliance with I-PASS reports for verbal handoffs. The institution's regularly administered safety culture survey results were assessed in the category of handoffs and information exchange.

Results Our process measures**,** all nurses were trained to use I-PASS by 28 November 2022. Compliance in documenting I-PASS handoffs varied between 86% and 88% of all handoffs between December 2022 and April 2024. I-PASS elements were present in above 95% of verbal handoffs between April 2023 and April 2024. The percentage of clinical nurses who reported favourable handoffs in our institutional safety culture survey improved from 64% in 2022 to 72% in 2024. For our outcome measure, a rate of zero high-harm events was maintained during the same period.

Conclusion The dissemination method led to the full implementation of I-PASS across all nursing areas and improved handoff quality.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Standardising nursing handoffs is essential for healthcare organisations to meet accrediting body requirements and ensure consistent, high-quality care. The I-PASS (Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver) methodology is a validated, evidence-based approach that reduces communication errors and enhances patient safety during these critical transitions.

WHAT THIS STUDY ADDS

⇒ Implementing diverse training materials, mandatory education, integration with the electronic health record and direct observation of handoffs led to measurable improvements in both handoff processes and patient outcomes.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Implementing these interventions can help other healthcare organisations enhance regulatory compliance and improve satisfaction survey results.

INTRODUCTION

Problem description

Variations in communication styles, time constraints and frequent interruptions make patient handoffs challenging in nursing. These handoff-related challenges can lead to information gaps, misunderstandings and errors that compromise patient safety. Studies have found that ineffective handoffs contributed to patient harm, as critical information about patient status, care plans and medication needs may have been overlooked.[1] Standardised handoff tools like I-PASS (Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver) aim to improve handoffs by clearly structuring the reporting of essential information, thus reducing the risks associated with miscommunication during handoffs in clinical settings.[2]

Our institutional quality assessment performance improvement board is committed to improving care quality and patient safety. In 2020, the board identified handoffs as an area of improvement after our institution's safety culture survey revealed it had one of the lowest scores among all measured domains.

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Thus, handoffs became a primary focus area at our institution. We adhered to the Joint Commission's requirements for handoffs; the Joint Commission is an accrediting body that certifies healthcare organisations in the USA to ensure they follow standards for quality and patient safety.[3] We decided to implement I-PASS as a validated handoff tool across the continuum of care for all nurses at our institution.[4] At the time, I-PASS had already been implemented in most clinical departments for physicians, advanced practice providers and trainees. However, the nursing handoff structure varied from one department to another, with the dominant handoff framework being the situation, background, assessment, recommendation framework.

Available knowledge

Communication breakdowns during handoffs often occur owing to time pressures, inadequate training, inconsistent handoff procedures and interruptions.[5] Failures in the nursing handoff process, such as not reviewing patient records, create issues that negatively impact patient care and the nursing workflow.[6] These findings emphasise the need for structured handoff tools such as I-PASS, which seamlessly organises handoff information and closes the communication loop in the final step to achieve shared understanding.[7]

Additionally, a systematic review reported the importance of conducting handoff reports at the bedside.[8] Although nurses generally had positive feelings about involving patients in handoffs and viewed it as an opportunity to enhance participation, they also expressed concerns about maintaining patient privacy while conducting bedside communication in the presence of both patients and visitors.[9] Although one study has suggested that patient involvement in the handoff process does not affect patient satisfaction, more research is needed.[10] Furthermore, other research has developed scales to assess nursing handoff competencies, identifying clear communication and the ability to prioritise patient needs effectively as essential handoff-related skills.[11] These findings point to the need for continuous education and structured handoff protocols to minimise communication failures and optimise care transitions.[12 13]

Rationale

The I-PASS handoff tool was developed to address the communication gaps significantly contributing to medical errors during patient handoffs. Its structured format promotes consistent transfer of critical information, which helps reduce omissions and misunderstandings. The tool has five key components: illness severity, patient summary, action list, situation awareness and contingency planning, and synthesis by receiver. These elements are designed to ensure the receiving healthcare provider comprehensively understands the patient's current condition and the necessary medical actions, thus improving the quality of handoff communication. Studies have reported that the adoption of I-PASS significantly reduced errors and enhanced patient safety by standardising handoff communication, thus minimising the risks associated with verbal miscommunication.[2 14]

The rationale for implementing I-PASS among the nurses at our institution was rooted in the need for a systematic approach to communication, particularly in high-stakes environments like our hospital, where patients often transition between care teams. Research has indicated that standardised handoffs improve patient outcomes by ensuring that critical details—such as the severity of illness and contingency plans—are conveyed consistently between healthcare providers. Additionally, the tool supports collaborative care by promoting shared mental models and situational awareness, thus improving teamwork and decision-making among healthcare providers.[11 12] The success of I-PASS in reducing preventable errors makes it a tool worth implementing across our institution to enhance the quality of care and support patient safety initiatives.[2 15]

Specific aims

First aim: To roll out an I-PASS handoff tool in our electronic health record (EHR), educate all nurses on using I-PASS in all nursing areas by November 2022 and maintain zero high-harm events during transitions in care.

Second aim: To achieve a compliance rate above 90% in documenting handoffs in the EHR using I-PASS in all handoff settings and during observations of verbal handoffs.

METHODS

Context

Our institution is an 816-bed academic medical centre that sees more than 27 000 admissions yearly. We currently have 3177 clinical nurses and train more than 900 nurses yearly. We have been Magnet recognised five times from 2001 to 2021. Magnet designation is a recognition awarded by the American Nurses Credentialing Center to healthcare organisations that demonstrate excellence in nursing practice and quality care.[16]

To address variations in handoff structure among nurses at our institution, we developed a project to standardise the nursing handoff framework. This project was led by the director of clinical nursing, director of nursing education and programme director, who all served as the administrative and quality improvement triad. The project was sponsored by the chief nursing officer, the chief education and training officer, and the vice president of inpatient medical practice.

Development of I-PASS intervention

In September 2021, we formed a nursing handoff leadership team consisting of members from nursing informatics, nursing education and healthcare systems engineering and EHR application analysts. This team met every 2 weeks to develop a business plan to implement I-PASS across the continuum of care for all nurses. Our first steps were conducting two onsite handoff

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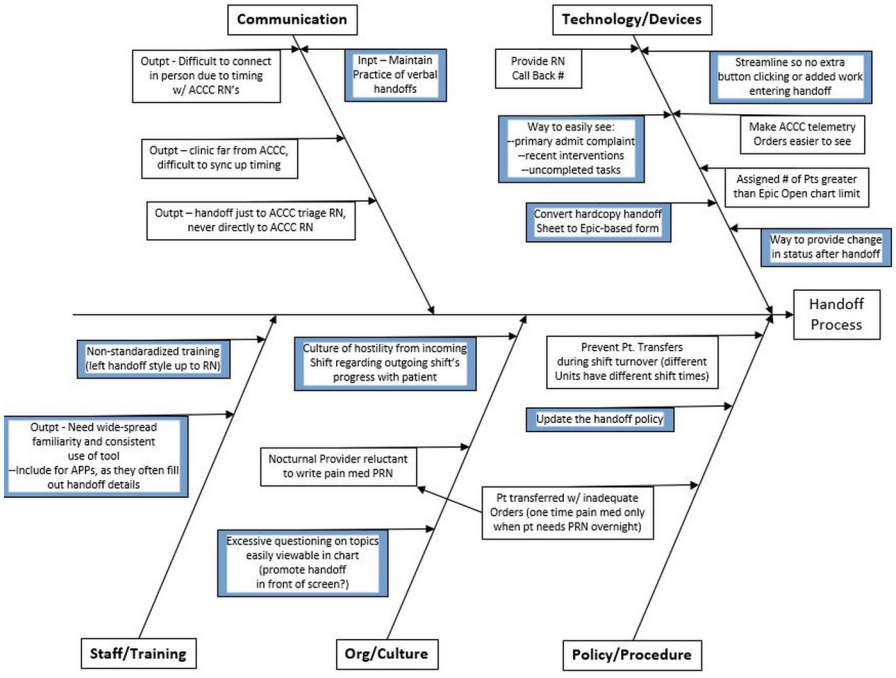


Figure 1 Fishbone diagram illustrating the problems affecting a seamless handoff that were identified during observations of our prior handoff procedures. Problems highlighted in blue were selected as areas of concentration in our project. ACCC, acute cancer care centre; APP, advanced practice provider; inpt, inpatient; med, medication; org, organisation; outpt, outpatient; pt, patient; RN, registered nurse.

observations with frontline staff in inpatient, outpatient, procedural and acute cancer care centre settings and interviewing nurses to identify the barriers hindering effective handoffs through five virtual meeting sessions. Common themes identified during these observations were a lack of standardised content being shared during handoffs, handoff tasks not being completed, handoff notes being written on paper and a lack of standardised handoff training. Additionally, there were challenges in contacting the receiving nurse to perform the handoff before the patient was transferred. The results of these observations according to specific settings are illustrated in figure 1.

After observing the current handoff procedures in frontline staff, we conducted focus group sessions, including meetings with nursing leaders from various departments, to decide on the content of the new handoff procedures. We determined what variables could be discussed during a handoff and created two types of I-PASS handoff reports: a permanent handoff report that would be used only during a shift change or when patients were permanently transferred and a temporary handoff report that would be used when patients were temporarily transferred to a procedural area and later returned to their home unit. Table 1 illustrates the data elements included in the permanent handoff report. This handoff report includes more information than the temporary one. To create the handoff reports, our EHR analysts chose data variables by pulling all the information from different handoff flowsheets in the EHR and placing that information into an I-PASS format. A sticky note item was added under the Action List section to record any other information not listed elsewhere in the report that needed to be conveyed to the receiving nurse during handoffs.

After the I-PASS handoff reports were built in the EHR, we selected seven frontline nurses to test the tool and provide feedback from different settings (intensive care unit, medical, surgical and paediatric floors, post anaesthesia care unit, and acute cancer care centre). The I-PASS report was deemed comprehensive (ie, it included everything that needed to be discussed during the handoff and could be reviewed by the sending and receiving nurses in the EHR during the handoff).

Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver (I-PASS) training

Before I-PASS was implemented across all nursing departments, the nursing education team developed I-PASS training presentations and conducted 25 one-on-one train-the-trainer sessions (45 min each) for all nurse leaders. An institution-wide communication was sent to all nurses to inform them about the transition to the new handoff report. All nurses were then required to take an I-PASS education module. Through our online education centre, we monitored who took the training, and we sent reminders to all nursing leaders to achieve 100% compliance with I-PASS training in their respective departments. All nurses were trained on conducting handoffs using the I-PASS report in the EHR by 28 November 2022.

While I-PASS education was underway, we worked with our EHR analysts to build a dashboard to monitor

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Table 1 I-PASS permanent handoff

Illness severity	Admin diagnosis
	Expected discharge date
	Workload score
Patient summary	Surgical/procedural cases on this admission
	Active treatments
	Active treatment team
	Medical history
	Surgical history
Action list	IP labs (due next 12 hours)
	Nursing sticky note
Situation awareness and contingency planning	Patient isolation status
	Fall risk level
	Active cardiac monitoring
	Diet orders
	Weights (last 3 days)
	Patient LDAs
	Restraints (last 24 hours)
	Selected labs
	Documented intake/output
	Last BM/last urine output
	Nursing activities and treatment
	Blood administration
	Glucose management
	Pain summary
	Vitals (past 12 hours)
	RT skin integrity assessment/ intervention (last day)
	Continuous and past due meds
	WDL assessments
	Mobility status
	Orders
Synthesis by receiver	Handoff flowsheet documentation

BM, bowel movement; IP, Inpatient; I-PASS, Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver; LDAs, Lines, Drains, and Airways; RT, Resporatpry Therapy; WDL, within defined limits.

compliance with I-PASS in each setting. Nurses were required to document in the EHR that the handoff occurred using a flowsheet embedded within the I-PASS report. This flowsheet included the type of handoff conducted, the sending nurse, the receiving nurse and the isolation status. This dashboard allowed us to monitor compliance by department and identify departments where handoffs were not appropriately documented. The flowsheet did not force a selection; if a nurse forgot to select the handoff type, for example, that data were recorded as incomplete or missing.

I-PASS 'went live' on 28 November 2022. For approximately 2 weeks after the implementation, nurse educators rounded in their assigned areas to provide any additional training support.

To sustain I-PASS implementation, nurse leaders in inpatient units and in the acute cancer care centre were required to conduct handoff observations two times a week using the Joint Commission's AMP (Analytics, Management and Performance) tool. It is a web-based application that helps healthcare organisations to monitor and track progress on quality and safety standards.[17] Nurse leaders' goals were to ensure that nurses used the I-PASS structure during verbal handoffs and to provide real-time feedback as necessary.

Evaluation of the Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver (I-PASS) intervention

The effectiveness of the I-PASS implementation was evaluated in terms of the completion of the I-PASS handoff training, the rate of compliance with documenting of the I-PASS handoff in the EHR, the harm scores of handoff-related safety events, the handoff favourability score in our institution's regularly administered safety culture survey and the results of observations of verbal handoffs using I-PASS after its implementation.

We evaluated these measures using the dashboards in our EHR and the Power BI platform. I-PASS compliance data were obtained from the data records stored in the backend of the EHR when nurses completed the I-PASS handoff report. Handoff-related safety event data were captured through our safety event reporting system, and the team reviewed and classified handoff-related safety events each month. The Joint Commission's AMP tool was our data source for analysing I-PASS verbal handoff observations.

Analysis

The compliance rate was calculated by dividing the number of handoffs completed by the required handoffs. We also used the Joint Commission AMP tool to capture compliance data for individual I-PASS elements after implementation; these data also tracked where the handoff was conducted and the quality and accuracy of the handoff information. The auditors used the AMP platform to determine whether each of the five I-PASS elements was present and correctly conveyed. Each element was scored yes (present and met criteria) or no (absent or incomplete). Overall handoff compliance was calculated as the number of elements scored Yes divided by five. Element-specific compliance was calculated across all audited handoffs (eg, illness severity compliance=-number of handoffs scored yes for illness severity ÷ total handoffs). A handoff was classified as complete if all five elements were scored Yes.

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Ethical considerations

The Quality Improvement Assessment Board approved this institution-wide quality improvement project.

Patients or the public were not involved in the design, conduct, reporting or dissemination plans of our research.

RESULTS

By 28 November 2022, all nurses had been trained to use I-PASS, and the I-PASS handoff report was implemented in our EHR. A rate of zero instances of high harm during a transition in care was maintained. Between December 2022 and April 2024, compliance in documenting I-PASS handoffs varied between 86% and 88%.

Between April 2023 and April 2024, the compliance rate for each I-PASS element observed during verbal handoffs was above 95% (figure 2). Regarding the timing of our observations, 62.14% of handoffs occurred during the morning shift, 32.17% occurred during the evening shift and 5.35% occurred during a unit transfer. A total of 74.68% of handoffs were conducted at the bedside, and 22.35% were conducted at the nursing pod. Regarding pacing, 90.52% of handoffs were optimally paced, and 5.2% were slow-paced or inefficient. Regarding the accuracy and quality of verbal handoffs, most were considered 'Good' or better.

In 2020, when handoffs became a priority focus area for quality assessment and performance improvement, the handoffs and information exchange category of survey questions on our institutional safety survey had a favourable response from 42% of all employees. In 2022, this favourability score improved to 59% In 2024, the favourability score again improved to 63%. For the subset of responses from clinical nurses, the 2024 favourability score in the handoffs and information exchange category improved to 72% from 64% in 2022.

DISCUSSION

Summary and interpretation

Implementing I-PASS for all nurses throughout the continuum of care improved handoff communication and patient safety at our institution. By training all nurses on the same procedures for delivering handoffs for every patient every day, we have shown that process improvement methodologies can be effectively scaled for large organisations.

Our approach demonstrated that our thorough planning and choice of training modalities such as one-on-one train-the-trainer sessions, an educational module and rounds to provide support after I-PASS implementation were highly effective. Engaging frontline staff and unit leaders throughout the planning and execution process ensured that our EHR analysts and nursing informatics team received the necessary information to create the appropriate handoff reports in the EHR.

Unlike other projects focusing only on unit-level implementation of handoff systems, our implementation project aimed to transition all handoff procedures to I-PASS across all nursing areas with minimal area-level customization. We created two reports: a version with extensive details for shift-to-shift or permanent transfers and a simplified version for temporary transfers. We believe this approach is more cost-effective and time-efficient than creating reports customised to each department. During our planning process, we discovered that the perioperative nursing team had been using a checklist for handoffs that incorporated a few elements of I-PASS. This transition had taken place when the provider team streamlined their handoff processes years before our initiative.[18]

Synthesis by receiver is one of the challenging elements of I-PASS. Although synthesis is an essential component in other industries, it is sometimes overlooked in healthcare.[19] In our I-PASS implementation, we emphasised the importance of synthesis by the receiver, which led to the high compliance that we observed during the handoff audits, particularly during shift handoffs. However, synthesis is occasionally missed during phone-call handoffs.[3]

Lessons learned

Our experience reinforces several key principles for large-scale I-PASS adoption. Consistent with recent studies, targeted auditing and feedback help identify underused I-PASS elements and guide focused retraining.[20] Evidence

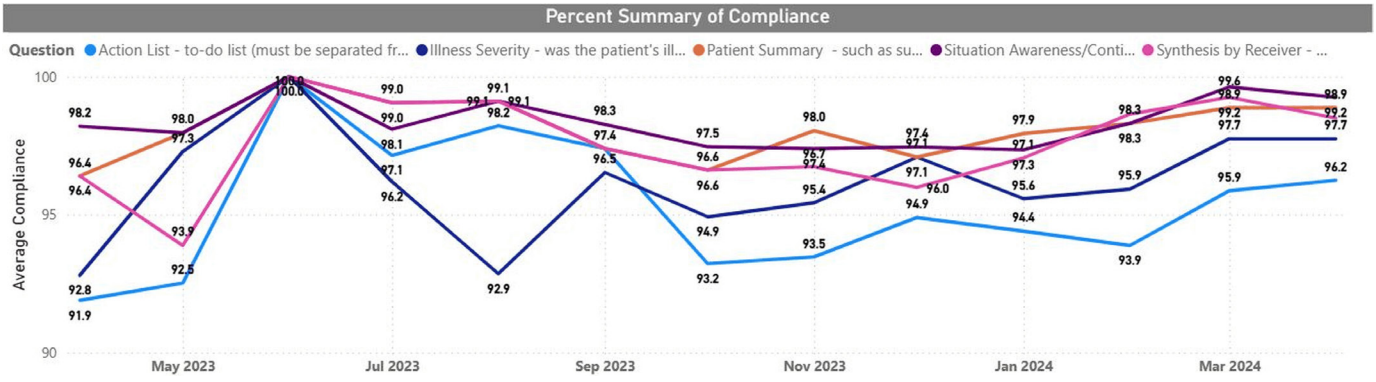


Figure 2 Compliance rate for each I-PASS element during observations between April 2023 and April 2024. I-PASS, Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver.

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from a rapid review highlights the importance of integrating standardised handoff tools into existing workflows to maximise impact, a strategy mirrored in our EHR integration approach.[15] Work in other international settings has shown that successful I-PASS adoption often requires tailoring the rollout to fit local workflows, culture and resources.[21] In our implementation, we maintained fidelity to the five core I-PASS elements while making practical adjustments such as creating two EHR handoff report formats, integrating existing perioperative checklists where appropriate, and adapting training delivery methods to ensure smooth adoption and long-term sustainability (online supplemental figure).

Implementing I-PASS required a significant culture shift, which was essential to its success. Designating this project as a priority focus area in our institution established a vital amount of institutional support, enabling its effective implementation and long-term sustainability. This designation not only supported the project's initial adoption but also ensured its integration into the fabric of the institution. For our I-PASS system to achieve enduring success, it must remain seamlessly aligned with the institution's culture. Embedding the system into daily practices reinforces its value, fosters its consistent use and sustains its impact over time. This cultural integration will ensure I-PASS continues to enhance patient safety and care quality.[22–24]

Limitations

Observational data and challenges in implementing Illness Severity, Patient Summary, Action List, Situation Awareness and Contingency Planning, and Synthesis by Receiver (I-PASS)

Observational data collection for the I-PASS project was conducted exclusively in inpatient units and the acute cancer care centre. Audits of handoffs from outpatient clinics to the acute cancer care centre proved challenging owing to the unpredictability of patient transfers. Additionally, variability in handoff audits across units contributed to differences in compliance rates, as some units did not consistently conduct weekly audits.

Perspectives on the usefulness of the I-PASS report differed between units. Whereas some units found the report comprehensive, others considered it overly lengthy. In response, our team plans to retain the current format but enhance usability by incorporating features such as expandable and collapsible sections and hyperlinks that will reduce excessive scrolling and improve navigation.

Documentation and compliance challenges

Misdocumentation of handoff types remains an ongoing challenge, particularly in ensuring nurses consistently document the correct handoff type. Calculating compliance for temporary and permanent transfers adds complexity, as these scenarios require precise data extraction and logical validation. The team is collaborating with the EHR reporting team to refine data-pulling processes and establish accurate calculation logic. Despite these challenges, the team feels confident in tracking shift-to-shift compliance. However, occasional issues arise when nurses mis-select or omit the correct handoff type, impacting overall compliance metrics.

Handoff-related safety events

Monitoring handoff-related safety events presented another significant challenge due to the time-intensive nature of reviewing each reported safety event. While our institution rigorously tracks these incidents internally, we are restricted by our institutional review board and patient safety committee policies from publishing incident-level data in this manuscript. This limits our ability to present a detailed analysis of the linkage between handoff compliance and patient safety outcomes at this stage. As part of the next phase of this project, our team will analyse these events in depth to identify their root causes and design targeted interventions to reduce their frequency. This effort is critical to improving compliance with these new handoff processes and addressing broader system-level factors affecting patient safety.

Knowledge assessment

While our evaluation demonstrates improvements in standardised handoff behaviours and broader organisational outcomes, we did not directly measure changes in learners' knowledge, skills or competencies. The project was primarily designed as a systems-level quality improvement initiative focused on embedding I-PASS into clinical workflows and assessing adherence through process measures. Future phases will incorporate formal educational assessment such as pre/post knowledge tests, structured skills observations and competency checklists to better quantify the intervention's impact on individual learning and clinical decision-making.

CONCLUSIONS

From October 2021 to November 2022, we successfully implemented I-PASS for all nurses across the continuum of care at a major cancer centre, resulting in excellent compliance outcomes post-implementation. Every nurse received training on conducting handoffs using the I-PASS methodology, and unit nurse leaders conducted observations to ensure and sustain the implementation of the I-PASS structure. Our recent safety culture survey showed significant improvements in handoff processes. In the next phase of this project, we plan to study handoff-related safety events and implement corrective actions to minimise the frequency of such events.

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Contributors MA,DV and CB designed the study. MA, JB and SC performed data collection and data management. MFV, MG, CP and DB provided guidance throughout execution of the project. All authors (MA, DV. CB. MFV, SC, JB, MG, CP and DB) contributed to program planning, data interpretation and manuscript writing for this project. MA is the guarantor.

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Patient and public involvement Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involved human participants and was approved by the Quality Improvement Assessment Board at UT MD Anderson Cancer Center (ID # 771). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer-reviewed.

Data availability statement Data are available upon reasonable request. All data relevant to the study are included in the article or uploaded as supplementary information.

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