Rady Children's Health Orange County
Best Evidence and Recommendations (BEaR)

Improving NICU Nursing Handoff

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Abstract
Background: Effective nursing handoffs are critical to patient safety, continuity of care, and efficiency in high-acuity environments, including Level IV Neonatal Intensive Care Units (NICU). At Rady Children's Hospital, Orange County, current shift-to-shift nurse handoff practices in the NICU setting are inconsistent, time-consuming, and prone to omissions. These gaps increase the risk of communication errors, compromise teamwork, and contribute to workflow inefficiencies.

Purpose: To address this, an evidence-based practice (EBP) project was undertaken to identify and apply the best evidence-based standardized handoff practices that impact patient safety and communication.

Recommendations: The evidence indicates that the I-PASS is a widely used and effective handoff tool. Recommended implementation of I-PASS includes nurse training, a phased rollout, and integration into the electronic health records (EHR) for sustainability.

Outcomes: Length of handoff report, perceived nurse confidence in information exchange, and occurrences of communication-related errors or near misses will be reported. Project evaluation will utilize structured handoff observations, pre- and post-implementation nurse surveys, and process metrics tracking handoff duration and follow-up clarifications to measure the intervention's effectiveness.

Implications for Practice: By fostering reliable transfer of critical information, this initiative supports a culture of safety and teamwork within the NICU. The project demonstrates the value of structured communication protocols in improving patient outcomes, optimizing nursing workflow, and creating a safer, more collaborative care environment.

Keywords
communication, NICU, nursing report, patient safety, shift handoff/handover

PICO(T) Question
In a Level IV NICU (P), how do evidence-based, standardized nursing handoff practices (I), compared to non-standardized handoffs (C), impact patient safety and communication effectiveness (O) during shift change (T)?

Background and Significance
Communication during patient handoffs represents one of the most critical yet vulnerable processes in healthcare delivery. A handoff occurs whenever responsibility and accountability for patient care are transferred between healthcare providers, such as during shift changes, unit transfers, or transitions across levels of care. Because these exchanges occur repeatedly throughout hospitalization, they create frequent opportunities for information loss, misunderstanding, and breakdowns in continuity of care.

Communication failures remain a leading contributor to adverse events in healthcare. Sentinel event analyses consistently identify breakdowns in communication as a common cause of serious patient harm (Gephart, 2012). During handoffs, clinicians must synthesize complex clinical information, prioritize key details, and communicate evolving patient conditions under time constraints. When this process lacks structure or clarity, critical information such as illness severity, contingency plans, or pending tasks may be forgotten, increasing the likelihood of medical errors and delays in care.

The implications extend beyond clinical outcomes. A national review of medical malpractice claims found communication failures present in nearly half of the analyzed cases, with failed handoffs contributing substantially to harm events and associated financial costs (Humphrey et al., 2022). These findings highlight that handoff communication is not simply an operational task but a central determinant of patient safety and organizational risk.

High-acuity settings are particularly vulnerable. In intensive and neonatal care environments, patients often experience prolonged hospitalizations involving multiple interdisciplinary team members. Each transition introduces risk. Infants in neonatal intensive care units may experience hundreds of nursing shift handoffs during a single admission, multiplying opportunities for communication gaps (Gephart, 2012). Observational research in a Level IV NICU identified inconsistent structure, incomplete information transfer, and frequent interruptions as key contributors to ineffective handoffs (Quinones Cardona et al., 2021).

Nursing handoffs are particularly significant because nurses provide continuous bedside care and serve as central coordinators of patient information. Evidence demonstrates a direct relationship between handoff quality and patient safety outcomes; omissions and inaccuracies increase the likelihood of misunderstandings and adverse events (Bressan et al., 2020). Despite this, variability in handoff practices persists due to differences in workflow, training, communication styles, and organizational culture. Many clinicians receive limited formal preparation in structured handoff methods, allowing inconsistent and potentially unsafe practices to continue.

Local data mirror national concerns. In a recent survey of NICU nurses at Rady Children's Hospital Orange County (n = 36), only 22.2% of nurses reported satisfaction with the current handoff process and 27.8% perceived it as ineffective for clear communication. Over one-third (36.1%) reported that information was frequently missing or unclear. Handoffs were also perceived as inefficient, with 86.1% exceeding 15 minutes per patient. Importantly, 83.3% of respondents expressed openness to adopting a standardized electronic handoff format.

Together, national evidence and local findings establish handoff communication as a high-frequency, high-risk process with direct implications for patient safety, workflow efficiency, and organizational outcomes. The demonstrated gaps and staff readiness for change provide a strong foundation for implementing and evaluating a standardized, evidence-based handoff solution.

Framework

This EBP project utilizes an adapted version of the *Revised 2018 version* of Evidence-Based Practice Institute Model ©2007 Caroline E. Brown and Laurie Ecoff (Ecoff, Stichler & Davidson, 2020).

Search for the Evidence
The Cochrane Library and Google Scholar were used in addition to CINAHL and PubMed. The initial search yielded 50 articles. Inclusion criteria were: (1) peer-reviewed studies published within the past 10 years, (2) studies conducted in NICU or pediatric intensive care unit (ICU) settings, (3) outcomes measuring communication effectiveness or patient safety, and (4) interventions involving structured handoff processes, such as SBAR, I-PASS, or electronic handoff tools. Exclusion criteria included studies in adult populations, articles lacking outcome data, and opinion or commentary pieces. Following abstract and full-text review, 20 articles were excluded for missing key components, such as the use of standardized tools or relevance to NICU/ICU. Fourteen studies met the inclusion criteria and were synthesized for analysis.

In addition to our search strategy, 30 NICUs at key children's hospitals nationwide were contacted via email regarding this topic. This survey yielded 13 responses in addition to the responses from Rady Children's Hospital San Diego, and Orange County.

Critical Appraisal and Synthesis of the Evidence

Best Practices Identified in the Literature
Articles included in the review were appraised and leveled using the organization's Levels of Evidence pyramid, adapted from Melnyk and Fineout-Overholt (2019), which categorizes evidence from Level I (highest) to Level V (lowest). Across evidence levels, consistent themes emerged regarding best practices that improve the safety, efficiency, and reliability of nursing handoffs. These practices include standardized handoff processes, use of structured reporting tools, integration into the electronic health record (EHR), protected time and space for communication, face-to-face exchange, and routine auditing mechanisms.

Standardized Handoff Practices
Standardization consistently emerged as the cornerstone of effective handoff communication. Across systematic reviews and observational studies, structured handoff approaches were associated with improved communication clarity, enhanced patient safety outcomes, and greater staff satisfaction (Loefgren & Anderzén-Carlsson, 2020). Standardized formats establish shared expectations for content, sequencing, and accountability during transitions of care, promoting a common mental model among team members. This consistency strengthens interdisciplinary collaboration and reduces the omission of critical elements, such as illness severity, pending tasks, and contingency planning.

Importantly, the literature emphasizes that standardization extends beyond a template; it requires organizational alignment, leadership reinforcement, and sustained monitoring to ensure consistent use across units and shifts. Without reinforcement, variability can re-emerge despite the presence of structured tools.

Use of Structured Handoff Tools and Reporting Frameworks
Closely linked to standardization is the implementation of structured handoff tools and reporting frameworks (e.g., SBAR, iPASS, or unit-specific structured templates). Evidence supports the use of these tools to guide content inclusion, reduce variability, and enhance communication efficiency. Structured

tools provide cognitive scaffolding, particularly in high-acuity environments where clinicians must synthesize complex information under time constraints.

High-level evidence suggests that tool adoption improves completeness of information transfer and decreases communication-related errors. However, the literature also cautions that tools must be integrated into workflow and supported by training to avoid becoming checklist-driven exercises detached from clinical reasoning.

Across the literature, the most commonly reported structured handoff tools are SBAR (Situation–Background–Assessment–Recommendation) and I-PASS (Illness severity, Patient summary, Action list, Situation awareness and contingency planning, and Synthesis by receiver). SBAR has long been widely adopted due to its simplicity, ease of recall, and applicability across disciplines. However, I-PASS is increasingly emerging in the literature because it provides a more comprehensive and safety-focused framework. In addition to organizing clinical content, I-PASS explicitly incorporates illness severity stratification, anticipatory guidance, and closed-loop communication through synthesis by the receiver. These elements align more directly with patient safety science and high-reliability principles, particularly in high-acuity environments. As a result, I-PASS is gaining traction as a more robust, standardized approach to reducing communication-related errors during transitions of care.

Electronic Health Record (EHR) Integration

Integration of handoff processes within the electronic health record represents a significant advancement in improving information accuracy and accessibility. Studies demonstrate that EHR-supported handoffs reduce transcription errors, enhance real-time updating of patient information, and decrease redundant documentation (Blazin et al., 2021; Ryan et al., 2023). Electronic templates allow clinicians to synthesize essential clinical data within standardized fields, promoting continuity across providers and care settings.

Best practice recommendations emphasize that EHR integration should complement, not replace, verbal communication. While electronic systems enhance data reliability and traceability, face-to-face dialogue remains essential for contextual interpretation, clarification, and anticipatory guidance.

Protected Time, Dedicated Space, and Face-to-Face Communication

Evidence further supports establishing protected time and dedicated space for handoff communication. Structured processes that minimize interruptions and competing demands are associated with improved information accuracy and reduced cognitive overload (Tomas et al., 2025). High-acuity settings particularly benefit from environmental controls that allow clinicians to focus attention during transitions of care.

Face-to-face communication remains a critical component of high-quality handoffs. Direct interaction enables real-time clarification, recognition of nonverbal cues, and collaborative problem-solving. Studies suggest that combining structured communication with interpersonal exchange strengthens shared understanding and improves anticipation of patient risk.

Routine Audits and Continuous Quality Monitoring

Sustainable improvement in handoff practice requires ongoing evaluation. Routine audits, feedback mechanisms, and performance monitoring are consistently identified as essential strategies to maintain

fidelity to standardized processes. Audit data provide insight into completeness, efficiency, and adherence, while reinforcing accountability.

The literature positions auditing not as punitive oversight but as a continuous improvement mechanism that supports reliability, reinforces expectations, and identifies opportunities for workflow refinement.

Structured Processes as a Systems-Level Intervention

Collectively, the evidence frames structured handoff practices as both a patient safety intervention and a system-level strategy. In addition to reducing communication-related adverse events, structured workflows are associated with improved efficiency, reduced role ambiguity, and enhanced clinician well-being (Tomas et al., 2025). By decreasing variability and interruptions, standardized processes support cognitive clarity and professional confidence during care transitions.

Table 1

Synthesis of Best Practices Identified Across Reviewed Articles (N=15)

Article #	*Level of Evidence*	*Structured Tools*	*EHR*	*Dedicated Time & Space*	*Face-to-Face*	*Routine Audits*	*Family Involvement*
Blazin et al. (2020)	*IV*	*I-PASS*	*Yes*	*Yes*	*Yes*	*No*	*No*
Bressan et al. (2020)	*I*	*SBAR & I-PASS*	*Yes*	*Yes*	*Yes*	*Yes*	*No*
Gephart (2012)	*IV*	*SBAR*	*Yes*	*Yes*	*Yes*	*No*	*No*
Hada (2021)	*I*	*SBAR*	*No*	*Yes*	*Yes*	*No*	*No*
Humphrey et al. (2022)	*V*	*None*	*No*	*Yes*	*No*	*No*	*No*
Kaplan et al. (2023)	*V*	*I-PASS*	*Yes*	*Yes*	*Yes*	*No*	*No*
Kapuria et al. (2025)	*III*	*None*	*No*	*Yes*	*Yes*	*No*	*No*
Loefgren et al. (2020)	*I*	*SBAR*	*No*	*Yes*	*Yes*	*No*	*No*
Müller et al. (2018)	*IV*	*I-PASS*	*Yes*	*Yes*	*Yes*	*No*	*No*
Nickel et al. (2020)	*IV*	*I-PASS*	*Yes*	*Yes*	*Yes*	*No*	*No*
Quinones et al. (2021)	*III*	*I-PASS*	*Yes*	*Yes*	*Yes*	*No*	*Yes*
Ryan et al. (2023)	*III*	*I-PASS*	*Yes*	*Yes*	*Yes*	*No*	*No*
Tataei et al. (2023)	*IV*	*I-PASS*	*Yes*	*Yes*	*Yes*	*Yes*	*No*
Tomás et al. (2025)	*III*	*SBAR*	*No*	*Yes*	*Yes*	*No*	*Yes*

Note. Levels of evidence categorized using the organization's adaptation of Melnyk & Fineout-Overholt (2019). I-PASS = Illness severity, Patient summary, Action list, Situation awareness and contingency planning, Synthesis by receiver. SBAR = Situation, Background, Assessment, Recommendation.

Best Practices Identified from Other Healthcare Organizations

Fifteen NICUs across the nation responded to the inquiry regarding current handoff practices. Of these, 13 reported using some form of standardized handoff report, reflecting widespread recognition of the importance of structured communication during transitions of care. Nine units indicated that their handoff process was integrated within the electronic health record, supporting accessibility and documentation continuity. Eight hospitals reported utilizing the I-PASS handoff framework, suggesting growing adoption of this comprehensive, safety-focused tool. Notably, 10 NICUs reported observed improvements in communication and patient safety outcomes following implementation of standardized handoff processes. Collectively, these findings demonstrate strong national alignment toward structured, EHR-supported, and increasingly I-PASS–guided handoff practices to enhance reliability and safety in neonatal care.

Table 2

Summary of Reported Handoff Practices Across Participating NICUs (N=13 in addition to our own enterprise reporting of current practice)

NICU	Standardized Handoff	Paper-Based	EHR-Based	Tool Used	Body Systems
RCH-SD	No	Yes	No	None	Yes
RCH-OC	No	Yes	No	None	Yes
1	Yes	No	Yes	I-PASS	No
2	Yes	Yes	No	I-PASS	No
3	Yes	No	Yes	None	Yes
4	Yes	No	Yes	I-PASS	No
5	Yes	No	Yes	I-PASS	No
6	Yes	No	Yes	None	Yes
7	Yes	Yes	No	None	Yes
8	Yes	No	Yes	None	Yes
9	Yes	No	No	I-PASS	No
11	Yes	Yes	No	None	Yes
11	Yes	No	Yes	I-PASS	No
12	Yes	No	Yes	I-PASS	No
13	Yes	No	Yes	I-PASS	No

Note. NICUs are represented numerically to maintain confidentiality. EHR = Electronic Health Record. I-PASS = Illness severity, Patient summary, Action list, Situation awareness and contingency planning, Synthesis by receiver.

Practice Recommendations

Immediate priorities should focus on establishing a strong foundation through leadership engagement, consistent processes, and early implementation steps. Securing NICU leadership buy-in and clear

accountability is essential to drive commitment and alignment. Auditing current handoff practices will help identify variability and gaps to inform a targeted rollout strategy. Piloting the paper-based I-PASS tool provides an opportunity for low-risk testing and frontline feedback before broader implementation.

Standardizing the handoff process using a validated framework such as I-PASS, initiating integration into the electronic health record (EHR), and delivering structured staff education through simulation sessions and concise reference materials are critical to supporting early adoption. In parallel, reinforcement of family involvement in handoffs should begin to foster a family-centered approach.

Short-term priorities should follow once initial implementation stabilizes and core practices are established. Formalizing an I-PASS policy with clearly defined expectations will reinforce consistency and accountability. Designating unit-based I-PASS champions can provide frontline mentorship, promote adherence, and assist with troubleshooting. While the initial implementation represents an evidence-based practice initiative, the work is expected to evolve into an ongoing quality improvement effort. Quarterly audits and continuous improvement cycles, such as Plan-Do-Study-Act (PDSA), will allow refinement based on real-time feedback. This phase also presents an opportunity to consider expansion to other high-risk or high-volume areas, including the operating room (OR), pediatric intensive care unit (PICU), cardiovascular ICU (CVICU), emergency department (ED), and medical-surgical units.

Long-term priorities should emphasize sustainability, scalability, and innovation. This includes developing mobile-compatible handoff tools integrated within the EHR to enhance bedside usability. Expanding I-PASS adoption among interdisciplinary team members, such as physicians, nurse practitioners, physician assistants, and respiratory therapists, can promote communication consistency across roles. Embedding I-PASS into new nurse orientation and annual competency assessments will strengthen long-term reliability. Participation in research collaborations and benchmarking initiatives with other pediatric hospitals can further advance best practices and ensure continuous improvement.

Outcome Measures

To evaluate the effectiveness of I-PASS implementation, outcome measures are organized into three domains: communication, patient safety, and staff experience. Each domain includes defined metrics to ensure alignment with clinical outcomes and frontline experience.

In the **communication domain**, the objective is to assess whether I-PASS improves the consistency, clarity, and efficiency of nurse-to-nurse handoffs. Structured handoff observations using a standardized tool evaluating all five I-PASS elements will be conducted by designated nurse champions. Pre- and post-implementation surveys will measure nurses' perceptions of clarity and confidence. Additional process measures will include average handoff duration and the frequency of post-handoff clarifications. Success will be reflected in nurse-reported improvements in structure, predictability, and clarity, as well as a reduced need for follow-up communication.

In the **patient safety domain**, the focus is on determining whether strengthened handoff practices reduce preventable errors and enhance family trust. Chart audits will monitor compliance with dual sign-off procedures and safety checks. Monthly reviews of events reported through the Safety Reporting System will identify communication-related safety trends. HCAHPS scores related to communication and care transitions will be reviewed quarterly and annually. Success will be demonstrated by fewer safety

events due to miscommunication, improved protocol adherence, and enhanced family feedback on transitions of care.

In the **staff experience domain**, the goal is to evaluate the impact of I-PASS on nurse workload, satisfaction, and perceived handoff quality. Baseline survey data assessing handoff-related stress, interruptions, burnout, and confidence have been collected. Additional baseline data may be obtained to strengthen the comparison, followed by post-implementation surveys. Training participation and ongoing tool utilization will also be tracked. Positive outcomes will include increased confidence, reduced communication-related stress, and a stronger sense of support in delivering safe, consistent care.

Outcome data should be collected at baseline (pre-implementation), three months post-implementation to assess early adoption and compliance, and again at six months to evaluate sustained impact on communication accuracy, efficiency, safety outcomes, and staff satisfaction. This timeline allows sufficient time for training, workflow adaptation, and reliable measurement of improvements in both process and outcomes.

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References

Blazin, L. J., Sitthi-Amorn, J., Hoffman, J. M., & Burlison, J. D. (2020). Improving patient handoffs and transitions through adaptation and implementation of I-PASS across multiple handoff settings. *Pediatric Quality and Safety*, 5(4), Article e323. https://doi.org/10.1097/pq9.0000000000000323

Bressan, V., Mio, M., & Palese, A. (2020). Nursing handovers and patient safety: Findings from an umbrella review. *Journal of Advanced Nursing*, 76(4), 927–938. https://doi.org/10.1111/jan.14288

Gephart, S. M. (2012). The art of effective handoffs: What is the evidence? Advances in Neonatal Care, 12(1), 37–39. https://doi.org/10.1097/ANC.0b013e318242df86

Ecoff, L., Stichler, J.F., & Davidson, J.E. (2020). Design, implementation and evaluation of a regional evidence-based practice institute. *Applied Nursing Research*, 55(2), Article 151300. https://doi.org/10.1016/j.apnr.2020.151300

Hada, A., & Coyer, F. (2021). Shift-to-shift nursing handover interventions associated with improved inpatient outcomes—Falls, pressure injuries and medication administration errors: An integrative review. *Nursing & Health Sciences*, 23(2), 337–351. https://doi.org/10.1111/nhs.12825

Humphrey, K. E., Sundberg, M., Milliren, C. E., Graham, D. A., & Landrigan, C. P. (2022). Frequency and nature of communication and handoff failures in medical malpractice claims. *Journal of Patient Safety*, 18(2), 130–137. https://doi.org/10.1097/PTS.0000000000000937

Kaplan, H. C., Timpson, W., Meyers, J., Schierholz, E., Cohen, H., Fry, M., Zayack, D., Soll, R. F., Morrow, K. A., & Edwards, E. M. (2023). Shift-to-shift handoffs in the NICU: Lessons learned from a large scale audit. *Journal of Perinatology*, 43(12), 1468–1473. https://doi.org/10.1038/s41372-023-01724-2

Kapuria, M., Hanna, J., Hall, M. A. K., Afriyie, S., Wondmeneh, S., Obisesan, A., Hemrajani, R., & Miller, A. (2025). I-PASS-based handoff pilot in a high-volume urban hospital: Benefits and barriers for hospitalists. *Cureus, 17*(3), Article e80040. https://doi.org/10.7759/cureus.80040

Loefgren Vretare, L., & Anderzén-Carlsson, A. (2020). The critical care nurse's perception of handover: A phenomenographic study. *Intensive & Critical Care Nursing, 58*, Article 102807. https://doi.org/10.1016/j.iccn.2020.102807

Müller, M., Jürgens, J., Redaèlli, M., Klingberg, K., Hautz, W. E., & Stock, S. (2018). Impact of the communication and patient hand-off tool SBAR on patient safety: A systematic review. *BMJ Open*, 8(8), Article e022202. https://doi.org/10.1136/bmjopen-2018-022202

Nickel, N., Amin, D., Shakeel, F., Germain, A., & Machry, J. (2020). Handoff standardization in the neonatal intensive care unit with an EMR-based handoff tool. *Journal of Perinatology*, 41, 2150–2157. https://doi.org/10.1038/s41372-020-0740-z

Quinones Cardona, V., LaBadie, A., Cooperberg, D. B., Zubrow, A., & Touch, S. M. (2021). Improving the neonatal team handoff process in a level IV NICU: Reducing interruptions and handoff duration. *BMJ Open Quality*, 10(1), Article e001014. https://doi.org/10.1136/bmjoq-2020-001014

Ryan, S. L., Logan, M. S., Liu, X., Shahian, D. M., & Mort, E. (2023). Long-term sustainability and adaptation of I-PASS handovers. *Joint Commission Journal on Quality and Patient Safety*, 49(12). https://doi.org/10.1016/j.jcjq.2023.07.007

Tataei, A., Rahimi, B., Lotfnezhad Afshar, H., Alinejad, V., Jafarizadeh, H., & Parizad, N. (2023). The effects of electronic nursing handover on patient safety in the general (non-COVID-19) and COVID-19 intensive care units: A quasi-experimental study. *BMC Health Services Research*, 23(1), 1–9. https://doi.org/10.1186/s12913-023-09502-8

Tomás, M. A. R., Soares, M. R., Oliveira-Lopes, J. M., Sousa, L. M. M., & Martins, V. L. D. (2025). The influence of nursing handover on nurses' mental health: A scoping review. *AIMS Public Health*, 12(1), 106–123. https://doi.org/10.3934/publichealth.2025008