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Enhancing Patient Safety in Clinical Decision Units Through Nurse-Led Quality Improvement

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Abstract
This paper examined the patient safety implications of nurse-led quality improvement within short-stay acute care environments, with particular attention to the organisational, clinical, and transitional risks that shape care delivery in these units. The study was undertaken to explore how nursing leadership can strengthen safety, continuity, and service reliability in settings characterised by rapid assessment, brief observation periods, frequent handoffs, and time-sensitive discharge decisions.
A narrative review approach was adopted, drawing on selected scholarly literature relevant to transitional care, patient safety, nursing leadership, discharge processes, escalation systems, interdisciplinary teamwork, and digital safety infrastructure. The review was structured around the major thematic domains of the paper, including the risk profile of decision units, theoretical foundations for nurse-led improvement, key safety threats, intervention strategies, leadership and culture, digital systems, outcomes, implementation barriers, and future directions.
The findings show that these units are inherently vulnerable because they compress diagnostic uncertainty, clinical monitoring, multidisciplinary coordination, and discharge planning into a highly pressured episode of care. The review identified delayed recognition of deterioration, fragmented communication, medication-related error, premature discharge, and poor continuity across care transitions as major safety concerns. It further found that nurse-led quality improvement interventions, including structured discharge pathways, escalation systems, follow-up communication, preventive care bundles, interprofessional rounding, and data-informed monitoring, can improve both patient safety and operational effectiveness. Leadership, teamwork, safety culture, and interoperable digital systems emerged as critical enablers of successful implementation.
The paper concludes that nursing leadership is central to achieving safer and more reliable care in short-stay acute settings. It recommends strengthening nurse-led discharge planning, early warning and escalation processes, post-discharge follow-up systems, interdisciplinary communication structures, and digital measurement tools. Future research should prioritise context-specific evaluation of nurse-led improvement models and their long-term impact on patient outcomes.

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1. Introduction

Clinical Decision Units (CDUs) have become an integral component of modern acute care systems, providing a structured environment for the short-term assessment, treatment, and disposition of patients who do not require immediate inpatient admission but cannot be safely discharged from the emergency department. Their growing importance reflects increasing pressures on emergency care pathways, including overcrowding, delayed admissions, limited bed capacity,

and the need to minimise avoidable hospitalisation while maintaining patient safety (Credé *et al*., 2017; Pinkney *et al*., 2016). Within this context, CDUs function as transitional care settings that rely on rapid clinical decision-making, continuous patient monitoring, and effective multidisciplinary collaboration. However, these operational characteristics—particularly high patient turnover and compressed timelines—also introduce inherent risks that may compromise patient safety.

Patient safety in CDUs extends beyond the absence of adverse events and instead depends on the reliability of systems, timely clinical escalation, effective communication, and robust discharge planning. Unlike traditional inpatient wards, CDUs are characterised by accelerated care trajectories, frequent transitions, and a high degree of diagnostic uncertainty. Patients may present with evolving or ambiguous conditions, requiring reassessment within short timeframes and carrying the potential for rapid deterioration. In such environments, failures in recognising clinical changes, delays in escalation, fragmented communication, and premature discharge can result in significant harm. Evidence from acute care literature highlights the importance of strengthening frontline expertise and redesigning care pathways to reduce unnecessary admissions while maintaining safety (Pinkney *et al*., 2016). This is particularly relevant in CDUs, where the quality of transitional care plays a decisive role in determining patient outcomes, including recovery, deterioration, or unplanned re-attendance.

Nurses occupy a central role within this safety-critical environment. As the clinicians responsible for continuous bedside observation, coordination of care, patient education, and discharge preparation, nurses are uniquely positioned to detect early signs of risk and initiate appropriate interventions. Nurse-led quality improvement should therefore be viewed as a fundamental strategy for enhancing patient safety in CDU settings. The literature consistently demonstrates that empowering nurses to standardise processes, escalate concerns promptly, and coordinate timely discharge can improve both efficiency and patient outcomes. For example, Lees-Deutsch and Robinson (2019) reported that criteria-led discharge reduces delays and supports patient flow when underpinned by clear governance, appropriate competencies, and robust safety protocols. Although discharge represents only one aspect of CDU care, this finding illustrates the broader value of structured, nurse-led decision-making in ensuring safe and efficient care delivery.

The significance of interdisciplinary and nurse-led innovation is further demonstrated in studies of frailty pathways. McGrath, Almeida, and Law (2019) found that an interdisciplinary model facilitating access to comprehensive geriatric assessment in emergency settings improved both clinical effectiveness and patient flow. This highlights a key principle relevant to CDUs: patient safety is enhanced when vulnerable individuals are identified early, assessed systematically, and managed through coordinated pathways rather than ad hoc decision-making. This is particularly important for older adults and patients with complex conditions, who are commonly managed in CDUs and are at increased risk of adverse events related to delayed assessment, poor communication, or inadequate discharge planning.

Another critical aspect of CDU safety is the timely recognition and management of clinical deterioration. Rapid response systems provide a useful framework for addressing this challenge. Avis *et al*. (2016) demonstrated reductions in intubation and cardiac arrest events outside intensive care following the implementation of rapid response teams, while Buchholz *et al*. (2023) highlighted the effectiveness of structured escalation pathways in strengthening clinical surveillance. Although not specific to CDUs, these findings are highly applicable, given the short-stay nature of these units and the potential for rapid changes in patient condition. Effective nurse-led observation and escalation processes are therefore essential to ensuring timely intervention and preventing deterioration.

Specialised, nurse-informed service models in ambulatory and outpatient-adjacent care further reinforce the importance of structured pathways and proactive monitoring. Chambers *et al*. (2020) demonstrated that specialist clinic models can improve timely assessment and triage, while Guinan *et al*. (2022) reported enhanced continuity and patient review within an immuno-oncology service. These approaches emphasise anticipatory, standardised, and patient-centred care—principles that are directly transferable to CDU practice and critical for managing risk effectively.

Discharge processes represent a particularly important dimension of CDU safety, as the success of these units depends on safe and timely transitions. Moosa (2020) found that standardised discharge planning can reduce length of stay, while Dice (2019) highlighted the role of post-discharge follow-up in reducing readmissions. These findings underscore that patient safety extends beyond discharge itself, requiring patients to be adequately informed about medications, warning signs, and follow-up care. As Credé *et al*. (2017) note, interventions are most effective when they address the entire care continuum rather than isolated stages.

In summary, CDUs present both opportunities and risks within contemporary healthcare systems. While they can improve patient flow and reduce unnecessary admissions, these benefits depend on robust safety systems, effective escalation mechanisms, and well-designed discharge processes (Pinkney *et al*., 2016; Credé *et al*., 2017). Within this context, nurse-led quality improvement is essential for aligning operational efficiency with safe, high-quality patient care.

This review aims to examine key patient safety risks within CDUs and evaluate the role of nurse-led quality improvement initiatives in addressing these challenges. It will explore the contributions of nursing leadership, clinical surveillance, communication, discharge planning, and pathway standardisation, while also considering the effectiveness, feasibility, and sustainability of such interventions. In doing so, it seeks to provide an evidence-informed foundation for enhancing patient safety in Clinical Decision Units.

1.1. Background and Clinical Relevance of Clinical Decision Units

Clinical Decision Units (CDUs) have emerged as a strategically important component of modern acute care delivery, particularly within hospitals facing sustained pressure from rising patient volumes, emergency department congestion, and limited inpatient bed capacity. These units are designed to provide short-term observation, focused treatment, and ongoing clinical reassessment for patients whose conditions require more evaluation than can be achieved in the emergency department, yet do not immediately justify full hospital admission. In this sense, CDUs function as an intermediate care setting that supports

timely, evidence-informed decisions regarding discharge, escalation, or admission.

Their clinical relevance lies in their ability to enhance patient flow while preserving the safety and quality of care during periods of diagnostic uncertainty. CDUs are especially valuable for patients presenting with conditions that evolve over several hours and require serial assessment, monitoring, and coordinated multidisciplinary input. By offering a structured environment for brief but intensive management, these units help reduce unnecessary admissions, avoid premature discharge, and improve the efficiency of acute care pathways. As health systems increasingly emphasise value-based, patient-centred care, CDUs have become clinically significant not only as operational solutions, but also as settings where timely decision-making, continuous nursing surveillance, and safe transitional care are critically intertwined.

1.2. Patient Safety Concerns in the CDU Setting

Clinical Decision Units (CDUs) occupy a clinically sensitive position between emergency care and formal inpatient admission, and this intermediate role creates a distinctive constellation of patient safety risks. Patients admitted to these units are often characterised by diagnostic uncertainty, fluctuating acuity, and compressed lengths of stay, meaning that safety depends heavily on timely reassessment and reliable escalation. One major concern is the delayed recognition of deterioration. In short-stay environments, patients may initially appear stable yet deteriorate rapidly, and the absence of robust surveillance systems can result in missed warning signs, preventable arrest events, or delayed transfer to higher-acuity care (Avis *et al*., 2016).

A second concern lies in transitions across the care pathway. CDUs are inherently handoff-intensive settings, involving movement between the emergency department, observation care, specialty review, and discharge. Such transitions create opportunities for information loss, duplication, incomplete medication reconciliation, and inconsistent follow-up planning. Evidence on emergency-to-admission pathways suggests that fragmented coordination can contribute to unplanned re-attendance and unsafe care trajectories when patients are managed through poorly integrated systems (Credé *et al*., 2017).

These risks are magnified in resource-constrained settings, where quality improvement initiatives have underscored the importance of strengthening system reliability, continuity, and process standardisation to protect patients from avoidable harm (Hendriks *et al*., 2011). In CDU practice, therefore, patient safety concerns extend beyond isolated clinical errors to encompass the broader vulnerabilities of accelerated observation care, including surveillance gaps, communication failures, and unsafe discharge decision-making.

1.3. Nurse-Led Quality Improvement as a Strategic Response

Nurse-led quality improvement constitutes a strategically significant response to patient safety challenges in Clinical Decision Units because nurses are the professionals most continuously engaged in patient observation, coordination, and discharge readiness assessment. In fast-moving CDU settings, nursing leadership can transform safety from a reactive aspiration into a structured operational practice by standardising assessment, escalation, and transitional care processes. One important area is discharge reliability. Criteria-led discharge models demonstrate that when nurses work within clearly defined clinical parameters, discharge efficiency can improve without sacrificing patient safety, provided governance arrangements, competency preparation, and escalation safeguards are firmly established (Lees-Deutsch & Robinson, 2019).

Nurse-led improvement is equally valuable in redesigning care pathways for high-risk patient groups. Interdisciplinary frailty initiatives have shown that structured assessment processes, early senior input, and coordinated review mechanisms can improve access to appropriate care while enhancing the safety and effectiveness of acute patient flow (McGrath *et al*., 2019). For CDUs, this suggests that nurse-led pathway development can reduce variability in care delivery and strengthen the consistency of monitoring and decision-making.

The strategic importance of nursing leadership is also evident in African evidence demonstrating that nurse-led interventions can improve chronic disease management through proactive follow-up, patient engagement, and continuity of care (Asante *et al*., 2020). Although undertaken in a different clinical context, the principle remains directly relevant: safety improves when nurses are empowered to lead structured interventions that support surveillance, education, and timely response. In CDU environments, nurse-led quality improvement is therefore not merely supportive but foundational to safer, more coordinated, and more dependable short-stay care.

1.4. Aim, Scope, and Review Questions

This review aims to critically examine how nurse-led quality improvement can enhance patient safety in Clinical Decision Units (CDUs), with particular attention to the distinctive operational and clinical conditions that shape care delivery in these short-stay environments. The review is designed to move beyond broad discussions of acute care safety by focusing specifically on the CDU as a transitional setting where rapid assessment, continuous monitoring, timely escalation, and safe discharge planning are tightly interconnected. Its central purpose is to clarify the contribution of nursing leadership, frontline nursing practice, and structured improvement strategies to the prevention of avoidable harm and the strengthening of care reliability.

The scope of the review encompasses patient safety issues arising within adult and mixed acute care CDUs, including those related to communication failures, delayed recognition of deterioration, medication-related risks, discharge vulnerabilities, and inconsistencies in care coordination. It also considers nurse-led and nurse-driven quality improvement interventions that seek to address these concerns through pathway redesign, standardisation of care processes, enhanced surveillance, interdisciplinary collaboration, staff education, and patient-centred discharge practices. In doing so, the review engages with both clinical and organisational dimensions of safety improvement.

The review is guided by three overarching questions. First, what are the principal patient safety concerns associated with care delivery in Clinical Decision Units? Second, how do nurse-led quality improvement initiatives address these concerns in practice? Third, what evidence exists regarding the outcomes, implementation challenges, and sustainability of these interventions? By addressing these questions, the review seeks to establish a coherent foundation for

understanding the strategic value of nurse-led quality improvement in promoting safer and more effective CDU care.

2. Clinical Decision Units as High-Risk Transitional Care Environments

Clinical Decision Units (CDUs) occupy a strategically important yet inherently vulnerable position within modern acute care systems. Situated at the interface between emergency assessment, short-stay management, and onward patient disposition, these units are designed to manage individuals who require further observation, targeted intervention, or diagnostic clarification before a definitive decision regarding discharge or admission can be made. While this model enhances patient flow and can reduce avoidable admissions, it simultaneously creates a care environment characterised by uncertainty, compressed timelines, and frequent transitions. Consequently, CDUs should be understood not only as operationally efficient spaces but also as high-risk transitional environments in which patient safety depends on the reliability of assessment, communication, escalation, and discharge planning (Murphy *et al*., 2016; Pinkney *et al*., 2016).

The transitional nature of CDU care is central to its risk profile. Patients admitted to these units often occupy an intermediate clinical state: they are no longer in the acute emergency phase but remain diagnostically or clinically unresolved. This creates complexity, as patients are neither clearly stable for discharge nor definitively requiring inpatient admission. As Conroy-McCue (2014) highlights in broader discussions of transitional care, risks frequently arise not from isolated clinical events but from discontinuities across care boundaries. In CDUs, this fragility is amplified by the need for rapid reassessment, coordinated input, and timely decision-making.

A key hazard within CDUs is diagnostic uncertainty under time pressure. Unlike inpatient wards, where extended monitoring is often possible, CDUs operate within restricted lengths of stay, requiring clinicians to make disposition decisions within hours. This compression increases the likelihood that subtle deterioration, incomplete histories, or ambiguous findings may not be fully recognised. Murphy *et al*. (2016) emphasise that observation-based care models require clearly defined processes and role clarity to function safely, suggesting that efficiency alone is insufficient without structured reassessment and coordination.

The potential for clinical deterioration further heightens risk in these settings. Patients initially deemed suitable for short-stay observation may deteriorate unexpectedly, particularly when presenting with non-specific symptoms, early-stage illness, or frailty. In such contexts, safety relies on the timely recognition of change and prompt escalation of care. Avis *et al*. (2016) demonstrate that rapid response systems reduce serious adverse events in acute care, underscoring the importance of organised surveillance and early intervention. Although not specific to CDUs, these findings are directly applicable, given the dynamic and uncertain nature of CDU patient populations.

Communication challenges also contribute significantly to CDU risk. These units operate at the intersection of multiple care pathways, involving frequent handoffs between emergency teams, specialist services, and inpatient or community care providers. Each transition introduces the potential for information loss, delayed decisions, or fragmented accountability. Pinkney *et al*. (2016) highlight the importance of coordinated care models in safely reducing admissions, a principle that is particularly relevant in CDU settings where effective communication underpins safe decision-making.

Discharge processes represent another critical area of vulnerability. While the operational success of CDUs depends on timely discharge, this emphasis can create tension between efficiency and safety. Moosa (2020) demonstrates that structured discharge planning influences length of stay, but inadequate preparation may leave patients with unresolved uncertainty or insufficient understanding of follow-up care. This risk is especially pronounced given the brief and intensive nature of CDU stays, where patients may require clear guidance on symptom monitoring and recovery.

Finally, the complexity of CDU patient populations further amplifies these risks. Many patients are older adults or individuals with multiple comorbidities, requiring coordinated, multidisciplinary management. Evidence from specialised care models suggests that structured pathways improve outcomes for such groups (Chambers *et al*., 2020; Guinan *et al*., 2022). These findings reinforce the need for organised, anticipatory approaches within CDUs to mitigate the risks associated with fragmented care.

3. Conceptual and Theoretical Foundations for Nurse-Led Quality Improvement

The conceptual and theoretical foundations of nurse-led quality improvement are grounded in the recognition that quality, safety, and efficiency are interconnected dimensions of healthcare practice rather than separate organisational objectives. This perspective is particularly significant in acute and transitional environments such as Clinical Decision Units (CDUs), where care is delivered under time pressure, diagnostic uncertainty, and frequent patient transitions. In such contexts, quality improvement cannot rely solely on practical interventions; it must be underpinned by coherent theoretical frameworks that explain how systems operate, how risks emerge, and how frontline professionals influence outcomes. The literature consistently identifies nurses as central agents in this process, given their position at the intersection of patient care, clinical processes, and organisational performance (Needleman & Hassmiller, 2009; Hickey & Giardino, 2019).

A key theoretical foundation is the systems-based approach to patient safety. Hickey and Giardino (2019) emphasise that nursing contributions extend beyond task execution to include identifying system weaknesses, contributing to redesign, and promoting safer care processes. This aligns with improvement science, which views adverse outcomes as consequences of flawed systems rather than isolated individual errors. In CDUs, where risks may arise from fragmented communication, inconsistent reassessment, or poorly coordinated discharge processes, a systems perspective enables nurse-led initiatives to focus on redesigning workflows and strengthening reliability, thereby reducing dependence on individual vigilance alone.

Closely linked to this is the process–outcome relationship central to healthcare quality theory. Needleman and Hassmiller (2009) demonstrate that nursing practice directly shapes care processes and, consequently, patient outcomes. Their work challenges the notion that efficiency and safety are competing priorities, instead positioning high-quality nursing processes as essential to both. In CDUs, this implies

that accurate assessment, consistent monitoring, and effective coordination are not ancillary tasks but fundamental drivers of safe and efficient care. Weaknesses in these processes may create hidden risks, even when care appears operationally efficient.

Evidence-based quality improvement represents another critical conceptual pillar. Montgomery *et al.* (2018) highlight that improvement efforts are most effective when they are systematic, measurable, and informed by robust evidence. This approach is particularly relevant in CDUs, where time constraints heighten the risks associated with inconsistent or informal practices. Evidence-based frameworks support the structured redesign of key processes such as observation protocols, escalation pathways, and discharge planning, ensuring that changes are both clinically justified and operationally accountable.

The concept of pathway reliability further underpins nurse-led quality improvement in transitional care. Credé *et al.* (2017) emphasise that patient outcomes are shaped by the coherence of the entire care pathway rather than isolated interventions. In CDUs, patients move across multiple stages, including assessment, observation, specialist input, and discharge, each presenting potential points of risk. Nurse-led improvement initiatives therefore prioritise continuity, coordination, and the elimination of gaps between stages of care, reinforcing safety as a continuous rather than episodic construct.

Standardisation, when balanced with clinical responsiveness, provides an additional theoretical foundation. Lees-Deutsch and Robinson (2019) demonstrate that structured approaches such as criteria-led discharge can improve patient flow without compromising safety when supported by clear governance and professional competence. In CDU settings, where rapid decision-making is required, standardisation reduces unwarranted variation while allowing flexibility to respond to individual patient needs and emerging risks.

Interdisciplinary and person-centred care models also contribute to the theoretical basis of nurse-led improvement. McGrath *et al.* (2019) illustrate how coordinated, multidisciplinary approaches enhance care for vulnerable populations, particularly older adults with complex needs. These models highlight the importance of integrating clinical, functional, and social considerations within care planning. Nurses play a pivotal role in this integration, reinforcing their central position in improvement efforts.

Finally, the principle of early recognition and response to clinical deterioration is fundamental. Studies by Avis *et al.* (2016) and Buchholz *et al.* (2023) demonstrate that structured escalation systems improve patient outcomes by enabling timely intervention. In CDUs, where patient conditions may change rapidly, nurse-led observation and escalation are essential components of safe care.

4. Key Patient Safety Risks in Clinical Decision Units

Clinical Decision Units (CDUs) are designed to provide short-stay observation, focused treatment, and disposition planning for patients whose conditions do not require immediate inpatient admission but are not suitable for direct discharge from the emergency department. While this model offers clear advantages in improving patient flow and optimising resource use, it also concentrates multiple patient safety risks within a compressed and often uncertain care environment. These risks arise not only from the clinical complexity of patients but also from the interaction of diagnostic ambiguity, rapid transitions, communication challenges, deterioration risk, and pressures associated with timely discharge. Understanding these factors is essential in recognising why nurse-led quality improvement is particularly important in CDU settings.

One of the primary safety risks in CDUs is the potential for incomplete or inaccurate clinical assessment during limited observation periods. Patients admitted to these units frequently present with evolving symptoms, unclear diagnoses, or borderline severity, meaning that the distinction between appropriate observation and missed deterioration can be subtle. Credé *et al.* (2017) highlight the complexity of managing patients across the pathway from emergency department attendance to admission or discharge, emphasising the need for alignment between interventions and pathway reliability. In CDU practice, this underscores the importance of viewing observation as an active process of continuous reassessment rather than a passive holding phase. Without structured reassessment and clearly defined escalation thresholds, significant clinical changes may be overlooked.

Closely related to this is the risk of delayed recognition of clinical deterioration. Patients initially deemed appropriate for short-stay monitoring may deteriorate rapidly due to conditions such as sepsis, cardiovascular instability, or respiratory compromise. Avis *et al.* (2016) demonstrate that rapid response systems can reduce serious adverse events, including intubation and cardiac arrest, in non-intensive care settings. Similarly, Buchholz *et al.* (2023) highlight the role of structured escalation pathways in improving organisational responsiveness to patient decline. Although not specific to CDUs, these findings are highly relevant, as the effectiveness of CDU care depends on the timely detection of subtle changes within a narrow observation window. Delays in recognising deterioration can transform manageable conditions into preventable emergencies.

Communication failures across transitions of care represent another significant risk. CDUs are inherently handoff-intensive environments, with patients frequently moving between emergency teams, specialty services, and onward care pathways. Each transition introduces the possibility of information loss, unclear responsibility, or incomplete documentation. Pinkney *et al.* (2016) emphasise that reducing avoidable admissions safely depends on effective coordination and frontline expertise, highlighting communication as a critical determinant of patient safety. In CDU settings, fragmented handovers or inconsistent documentation can result in delayed investigations, inappropriate management decisions, or unsafe discharge.

Medication-related risks also contribute to patient safety concerns in CDUs. The fast-paced nature of care, combined with symptom-driven treatment, increases the likelihood of medication errors or adverse effects. Cox (2010) highlights the importance of careful assessment and monitoring in nurse-led pain management, principles that are directly applicable to CDU practice. Patients may receive potent medications such as opioids, sedatives, or cardiovascular drugs within a short timeframe, and insufficient monitoring can lead to complications, including oversedation, falls, or physiological instability. The involvement of multiple prescribers further increases the need for vigilant nursing oversight.

Another important but less visible risk is the under-recognition and under-reporting of safety events. Hession-

Laband and Mantell (2011) demonstrate that nurse-led incident reporting plays a crucial role in identifying patterns of error and informing system improvements. In CDUs, where high patient turnover may normalise minor incidents, there is a danger that safety signals remain undetected. Issues such as delayed observations, communication gaps, or medication discrepancies may not immediately result in harm but collectively indicate systemic vulnerabilities that require attention.

Discharge-related risks are also central to CDU safety. The effectiveness of these units depends on timely patient disposition; however, this emphasis on efficiency can lead to premature or inadequately planned discharge. Credé *et al.* (2017) and Pinkney *et al.* (2016) both highlight the importance of coordinated pathway management and clinical expertise in ensuring safe transitions. In CDU settings, patients may be discharged before diagnostic certainty is achieved or without sufficient understanding of follow-up care, increasing the risk of deterioration and unplanned reattendance.

Finally, the complexity of CDU patient populations further intensifies these risks. Many patients are older adults or individuals with multiple comorbidities, requiring careful, coordinated management. Evidence from specialised services suggests that structured review pathways improve outcomes for such patients (Chambers *et al.*, 2020; Harris, 2015). Failure to recognise this complexity within CDU environments may result in inappropriate decision-making or fragmented care.

5. Nurse-Led Quality Improvement Interventions in CDUs

Nurse-led quality improvement interventions in Clinical Decision Units (CDUs) can be understood as structured, evidence-informed strategies aimed at reducing preventable harm while enhancing the reliability, efficiency, and responsiveness of short-stay acute care. Given that CDUs operate within environments characterised by rapid assessment, frequent reassessment, high patient turnover, and time-sensitive discharge decisions, quality improvement efforts must prioritise interventions that strengthen clinical surveillance, standardise care processes, improve interdisciplinary coordination, and support safe transitions. Although much of the supporting literature is derived from broader acute care contexts, it consistently demonstrates that nurse-led initiatives can achieve meaningful improvements in patient safety when they combine frontline ownership with systematic redesign.

A key category of intervention involves the standardisation of preventive care processes. Fabbruzzo-Cota *et al.* (2016) describe a clinical nurse specialist-led, interprofessional initiative that significantly reduced hospital-acquired pressure ulcers through a combination of documentation standardisation, staff education, patient and family engagement, and organisational coordination. While pressure ulcer prevention is not central to CDU practice, the underlying principle is highly transferable. CDUs similarly depend on consistent risk assessment, timely preventive action, and clear documentation. This study illustrates how nurse-led interventions can move beyond individual tasks to establish unit-wide systems that embed safety into routine practice.

Comparable benefits are evident in infection prevention initiatives. Kaur (2021), examining nurse-led interventions to reduce catheter-associated urinary tract infections, highlights the effectiveness of structured preventive strategies led by nursing staff. In CDUs, where short-term device use and rapid patient turnover are common, such approaches are particularly relevant. Nurse-led improvements focusing on regular device review, adherence to aseptic technique, and timely removal of unnecessary catheters can significantly reduce patient risk. More broadly, these interventions demonstrate the importance of reliability in routine clinical processes, especially in fast-paced environments where small lapses may accumulate into significant harm.

Another critical domain of intervention is the early recognition and management of clinical deterioration. Sweers (2022) reports improved outcomes for septic patients following a nurse-led quality improvement initiative, emphasising the value of structured approaches to identifying and responding to high-risk conditions. In CDUs, where patients are often admitted for observation due to diagnostic uncertainty, such strategies are particularly important. Nurse-led interventions may include standardised observation protocols, escalation triggers, and condition-specific screening tools. Supporting this, Avis *et al.* (2016) demonstrate that rapid response systems reduce serious adverse events, highlighting the importance of organised escalation pathways. Together, this evidence suggests that nurse-led quality improvement in CDUs should prioritise dependable systems for early detection and timely intervention.

Discharge planning and transitional care represent another central focus of nurse-led improvement. Bowen *et al.* (2014) show that nurse-led discharge processes can improve efficiency while maintaining patient safety, reinforcing the value of nursing leadership in coordinating transitions. This is particularly relevant in CDUs, where discharge decisions are often made within short timeframes. Moosa (2020) further demonstrates that standardised discharge planning can reduce length of stay, indicating the operational and clinical benefits of structured approaches. In practice, nurse-led interventions may include criterion-led discharge protocols, standardised checklists, and patient education strategies such as teach-back methods. These approaches help ensure that patients are adequately prepared for discharge and reduce the risk of adverse outcomes following transition.

Extending beyond discharge, post-discharge follow-up interventions further enhance patient safety. Dice (2019) highlights the effectiveness of nurse-led telephone follow-up in reducing readmissions among CDU patients. Such interventions are particularly valuable in short-stay settings, where patients may leave the hospital with residual uncertainty or evolving symptoms. Follow-up contact allows nurses to reinforce discharge instructions, identify early signs of deterioration, and facilitate timely access to further care when needed. This reflects a broader understanding of quality improvement as encompassing the entire patient journey rather than being confined to the period of hospital care.

The effectiveness of nurse-led quality improvement is further strengthened when aligned with broader service redesign. Pinkney *et al.* (2016) emphasise the importance of frontline expertise in developing care models that safely reduce avoidable admissions. In CDUs, nurses often have detailed insight into workflow challenges, communication gaps, and discharge barriers, positioning them as key contributors to system redesign. Consequently, nurse-led interventions are

most effective when embedded within wider efforts to improve care pathways and patient flow.

Insights from specialised care models also support the value of structured, nurse-led pathways. Chambers *et al*. (2020) and Guinan *et al*. (2022) demonstrate that organised, protocol-driven approaches improve care for complex patient populations. Although CDUs differ from specialist services, the underlying principle remains applicable: structured pathways tailored to patient needs can enhance consistency and reduce variability in care.

6. The Role of Nursing Leadership, Teamwork, and Safety Culture

In Clinical Decision Units (CDUs), nursing leadership, teamwork, and safety culture are not peripheral organisational qualities but core determinants of whether short-stay care remains safe, coordinated, and responsive under pressure. Because CDUs function at the intersection of emergency assessment, observation, multidisciplinary review, and discharge planning, they are especially dependent on leadership that can align clinical priorities, sustain communication across boundaries, and reinforce shared accountability for patient safety. In such settings, the quality of teamwork is often inseparable from the quality of care itself.

Nursing leadership is particularly important because nurses occupy a central coordinating position within the CDU environment. They monitor patients continuously, interface with multiple professional groups, and frequently identify emerging risks before these are apparent at a systems level. This centrality gives nursing leaders a distinctive capacity to shape how teams function in practice. Gormley *et al*. (2019) show that nurse-led interprofessional rounding can positively influence patient experience, illustrating how structured nursing leadership can improve communication, visibility of care priorities, and collaborative decision-making. In a CDU, where patient trajectories may shift over a matter of hours, such leadership helps ensure that decisions are not fragmented across professional silos but are instead grounded in shared understanding and timely review (Banholzer, 2022).

Teamwork in CDUs depends heavily on communication structures that support both efficiency and clinical reliability. Bozeman (2011), in examining nurse-led multidisciplinary patient summaries, demonstrates that structured nurse-led communication can improve collaboration, collegiality, and patient safety. The relevance to CDUs is substantial. These units require rapid synthesis of information from initial emergency assessment, bedside observation, specialty input, and discharge preparation. Without a disciplined approach to information sharing, essential details may be omitted, responsibilities may become blurred, and the patient may move through the unit without coherent oversight. Nurse-led summaries, rounds, or briefings provide an important organisational mechanism through which disparate contributions are integrated into a single, safer plan of care.

This principle is reinforced by Neo *et al*. (2023), who found that structured, nurse-led ward rounds improved interprofessional communication and optimised care in a vascular surgery setting. Although their project was conducted outside a CDU, its implications are highly transferable. Structured rounds create a shared forum for clarifying patient status, reviewing pending concerns, assigning responsibilities, and preventing assumption-based practice. In the CDU context, where time pressure can easily drive fragmented decision-making, such nurse-led structures support team coherence and reduce the likelihood that safety-critical information is lost during fast-paced transitions. They also strengthen the consistency of care by ensuring that surveillance, escalation, and discharge planning are discussed in a deliberate and coordinated manner.

Beyond communication, nursing leadership also shapes the practical enactment of safety culture. Elegant and Sorce (2017) describe nurse-driven care strategies in paediatric intensive care as mechanisms for improving quality and patient safety, highlighting the role of nursing in protocol adherence, early intervention, and coordinated team response. The conceptual significance of this work for CDUs lies in its demonstration that safety culture is not merely an attitudinal construct; it is expressed through everyday practices that normalise vigilance, encourage escalation, and support collaborative problem-solving. In a CDU, a strong safety culture exists when nurses feel empowered to question decisions, call attention to deterioration, and initiate action when clinical conditions do not align with the expected short-stay pathway.

Rapid response systems offer a clear example of how leadership, teamwork, and culture intersect in acute care safety. Avis *et al*. (2016) found that rapid response teams decreased intubation and code blue rates outside the intensive care unit, while Buchholz *et al*. (2023) describe innovative approaches to rapid response system organisation and clinical pathways in a cancer centre. Together, these studies highlight the importance of system-level readiness for deterioration. In CDUs, the relevance is immediate: patients under short-term observation may worsen unexpectedly, and delays in escalation can have serious consequences. Effective nursing leadership fosters a culture in which deterioration is recognised early, escalation is expected rather than resisted, and the team responds as a coordinated unit rather than as isolated practitioners. This kind of culture depends not only on protocols but also on psychological safety, role clarity, and trust.

Frontline expertise further underpins these dynamics. Pinkney *et al*. (2016) argue that safely reducing avoidable acute admissions depends substantially on the contribution of frontline professionals and on the successful implementation of new care models. This finding is especially pertinent to CDUs, where nurses frequently hold the most detailed operational understanding of patient flow, monitoring demands, discharge vulnerabilities, and interdepartmental coordination problems. Leadership in this context is not restricted to formal managerial authority; it also includes the ability of experienced nurses to shape safer practice through informal influence, clinical judgment, and advocacy. When this expertise is recognised and integrated into team functioning, CDU care becomes more adaptive, anticipatory, and resilient.

The role of nursing leadership is also illuminated by specialist service models. Chambers *et al*. (2020), in their account of a specialist valve clinic, and Guinan *et al*. (2022), in their evaluation of an immuno-oncology service, both demonstrate the value of organised, coordinated models of care for complex patient groups. Although these settings differ from CDUs, they reinforce an important principle: safe care in high-demand environments depends on clear pathways, collaborative structures, and leadership that promotes continuity. In CDUs, nursing leadership is often the thread

that holds these elements together, particularly where patient complexity and time pressure might otherwise lead to fragmentation.

The role of nursing leadership, teamwork, and safety culture in CDUs is foundational rather than supplementary. Nursing leaders help create the conditions in which teams communicate effectively, escalate concerns promptly, and maintain a shared commitment to safe patient transitions. Teamwork translates these conditions into coordinated clinical action, while safety culture gives them durability by embedding vigilance, openness, and accountability into routine practice. In a high-risk transitional care environment such as the CDU, these elements are indispensable to the delivery of safe, reliable, and patient-centred care (Gormley *et al*., 2019; Neo *et al*., 2023; Pinkney *et al*., 2016).

7. Digital Tools, Data Systems, and Measurement for Safety Improvement

Digital tools, data systems, and measurement infrastructures are increasingly important to safety improvement in Clinical Decision Units (CDUs), particularly because these settings rely on timely decision-making, rapid reassessment, and coordinated discharge planning. In a unit where patients move through short episodes of observation and where clinical status may change quickly, safety cannot depend solely on professional vigilance; it also requires information systems that enhance visibility, support decision-making, and make emerging risk measurable. Although the literature provided is broader than the CDU context itself, it offers a useful basis for understanding how digital capability can strengthen safer, more responsive acute care.

One important dimension is the expanding role of telehealth and digitally enabled continuity. Omotayo and Kuponiyi (2020) discuss the growth of telehealth in post-COVID healthcare systems, highlighting both its potential and its implementation challenges. In relation to CDU safety, telehealth is relevant not merely as a remote consultation mechanism but as part of a wider digital ecosystem that can support pre-discharge education, post-discharge follow-up, and continuity across care transitions. Because CDU patients are often discharged after relatively brief observation, digital communication tools may help reinforce discharge instructions, facilitate early review of unresolved concerns, and reduce the risk of deterioration going unnoticed once the patient has left the unit. The significance of telehealth, therefore, lies in its capacity to extend safety beyond the temporal boundaries of CDU admission.

Safety improvement also depends on the quality of operational intelligence available to frontline teams and managers. Moyo *et al*. (2021) argue for the value of smart business intelligence platforms in strengthening healthcare transparency and operational performance. While their emphasis is system-level, the principle is directly applicable to CDU practice. Units that rely on rapid patient turnover need timely access to data on admission patterns, discharge timeliness, escalation frequency, observation delays, and readmission trends. Without such visibility, safety weaknesses may remain hidden beneath the appearance of efficient throughput. Business intelligence systems can therefore support quality improvement by transforming routine operational data into actionable insight, enabling teams to identify where processes are inconsistent, where patient flow creates risk, and where corrective action is required.

A more specifically safety-oriented contribution comes from risk dashboard thinking. Filani *et al*. (2022) describe real-time risk assessment dashboards using machine learning in hospital supply chain management systems. Although their study is not focused on bedside CDU care, it introduces an important conceptual model for safety improvement: the use of real-time dashboards to anticipate risk and support timely action. In CDUs, analogous dashboard-based approaches could help track deteriorating observations, delayed test results, prolonged stays, pending discharges, or patients awaiting senior review. The broader lesson is that risk becomes more manageable when it is visible in real time rather than reconstructed retrospectively. Digital systems that surface exceptions, bottlenecks, and deviations from expected care pathways can support earlier intervention and reduce the likelihood that patients drift into unsafe delay or unnoticed deterioration.

The interpretability of data is equally important. Eboseremen *et al*. (2022) examine the impact of interactive data visualisations on decision-making, demonstrating that visual presentation can significantly improve how complex information is understood and used. In the CDU environment, where staff must assimilate multiple forms of information quickly, visualisation has practical relevance for patient safety. Safety indicators such as incomplete observations, frequent handoffs, discharge delays, or abnormal vital-sign trends are far more actionable when presented in accessible formats. Interactive visual systems can help nurses and managers move from data collection to data use, which is a critical distinction in quality improvement. Measurement alone does not improve safety; rather, safety improves when data are translated into patterns, prompts, and decisions that frontline teams can act upon.

Recent work on artificial intelligence and enhanced business intelligence further extends these possibilities. Tafirenyika *et al*. (2023) discuss AI-driven business intelligence tools for strategic decision-making in public health agencies, while Tafirenyika (2023) explores predictive modelling, explainability, and clinical impact in healthcare. Together, these works suggest that digital systems are moving beyond passive reporting toward predictive and interpretive functions. In CDUs, this direction is promising because patient risk often evolves quickly and may not be fully captured by static documentation. Predictive tools could potentially assist in identifying patients at higher risk of deterioration, prolonged observation, or early return after discharge. However, Tafirenyika (2023) also underscores the importance of explainability, which is especially relevant in nursing-led safety improvement. For digital tools to be trusted and usable in acute care, they must not only generate predictions but do so in ways that clinicians can understand, scrutinise, and integrate with professional judgement.

This concern is echoed in Kuponiyi, Omotayo, and Akomolafe (2023), who examine the use of AI to improve clinical decision-making in healthcare systems. Their work reinforces the idea that digital tools are most valuable when they augment, rather than replace, clinical reasoning. In CDUs, where decisions frequently depend on subtle bedside assessments, the role of AI and digital analytics should be to enhance situational awareness, prioritise risk, and support consistency in decision-making. Such systems may assist with identifying trends, flagging deviations, or organising clinical information, but their contribution to safety depends on thoughtful integration into nursing workflow and

interdisciplinary communication.

The literature indicates that digital tools, data systems, and measurement infrastructures have significant potential to strengthen patient safety in CDUs by improving continuity, increasing operational visibility, supporting real-time risk recognition, and making quality problems more measurable and actionable. Telehealth extends the safety envelope across care transitions; business intelligence platforms illuminate process performance; dashboards and visual analytics make risk visible; and AI-based systems offer new opportunities for prediction and decision support (Omotayo & Kuponiyi, 2020; Moyo *et al*., 2021; Kuponiyi *et al*., 2023). Yet the value of these tools ultimately depends on their alignment with clinical reality. In a CDU, digital innovation must serve the practical goals of safer observation, clearer communication, earlier escalation, and more reliable discharge. When embedded in nurse-led quality improvement, these systems can become powerful enablers of a more proactive and data-informed safety culture.

8. Outcomes of Nurse-Led Quality Improvement in Clinical Decision Units

The outcomes of nurse-led quality improvement in Clinical Decision Units (CDUs) are best understood across three interconnected domains: patient safety, care efficiency, and continuity beyond discharge. Although much of the available literature derives from adjacent acute and transitional care settings rather than CDUs alone, the findings collectively demonstrate that nurse-led interventions can produce meaningful improvements in the reliability and quality of care. This is particularly relevant to CDUs, where short lengths of stay, high patient turnover, and rapid disposition decisions make even modest process improvements highly consequential.

One of the clearest outcomes associated with nurse-led quality improvement is the reduction of preventable harm through more consistent care processes. Fabbruzzo-Cota *et al*. (2016), in a clinical nurse specialist-led interprofessional quality improvement project, reported a reduction in hospital-acquired pressure ulcers following the introduction of evidence-based interventions, education, and standardised processes. The significance of this study for CDU practice lies in its demonstration that nurse-led quality improvement can translate patient safety principles into measurable clinical gains. In CDU settings, where patients may be in observation for shorter periods, the precise outcome may differ, yet the underlying lesson remains applicable: nursing leadership in risk assessment, prevention, and interdisciplinary coordination can reduce harm when care is organised around clear standards and accountability (Richardson& Storr, 2010).

Comparable benefits are evident in infection prevention. Giles *et al*. (2015) describe innovative nurse-led changes to prevent catheter-associated urinary tract infection, showing how targeted practice changes and bundle-based approaches can improve safety outcomes. For CDUs, this is highly relevant because short-stay units often involve procedural interventions, rapid admissions, and equally rapid discharges, all of which can make device-related oversight vulnerable to omission. The outcome demonstrated by Giles *et al*. (2015) suggests that when nurses lead structured preventive measures, complications associated with routine but high-risk practices can be reduced. This reinforces the broader point that nurse-led quality improvement is not confined to strategic oversight; it also produces concrete clinical benefits by improving the reliability of everyday care.

Medication safety is another area in which nurse-led interventions have demonstrated value. Kahlon *et al*. (2015) report on a nurse-led quality improvement project designed to improve patient safety and reduce errors in the administration of narcotic pain medication via patient-controlled analgesia. The relevance of this finding to CDUs lies in the medication intensity and rapid pace that often characterise short-stay acute care. Patients in CDUs may receive analgesics, antiemetics, intravenous therapies, or other time-sensitive treatments while simultaneously being assessed for discharge suitability. The Kahlon *et al*. (2015) project suggests that nurse-led quality improvement can improve medication-related safety by identifying process weaknesses, refining administration practices, and reducing the opportunity for error. This is particularly important in CDU environments, where small lapses in medication management may have disproportionate effects because patients are monitored over relatively short periods.

Beyond direct clinical safety indicators, nurse-led quality improvement also affects service efficiency and the quality of patient flow. Bowen *et al*. (2014) found that nurse-led discharge improved efficiency while maintaining safety, underscoring the dual contribution of nursing leadership to both patient outcomes and operational effectiveness. This finding is especially significant for CDUs, where discharge is one of the defining functions of the unit. A well-designed nurse-led discharge process can improve timeliness, reduce unnecessary delays, and ensure that discharge decisions remain clinically sound rather than merely expedient. In this sense, the outcomes of nurse-led quality improvement are not limited to fewer adverse events; they also include smoother throughput, better coordination, and a more dependable balance between efficiency and patient protection.

Continuity after discharge represents a further important outcome domain. AlZaher *et al*. (2023), in a quality improvement initiative involving a nursing-led follow-up service for patients newly discharged from paediatric intensive care units, demonstrate the value of extending nursing oversight beyond immediate inpatient care. Although paediatric intensive care differs from CDU practice, the conceptual implication is highly relevant. CDU patients often leave the hospital after a brief and intensive episode of observation, making the immediate post-discharge period a vulnerable stage in the care pathway. Nursing-led follow-up can strengthen continuity, identify early concerns, and reduce the likelihood that patients experience deterioration or confusion after discharge. The study by AlZaher *et al*. (2023), therefore, supports the view that effective nurse-led quality improvement may extend beyond the unit itself and continue into the post-discharge interval.

Taken together, the literature indicates that the outcomes of nurse-led quality improvement in and around CDU-type settings are multidimensional. They include reduced preventable harm, lower rates of care-related complications, improved medication safety, more efficient discharge processes, and stronger continuity after discharge (Bowen *et al*., 2014; Fabbruzzo-Cota *et al*., 2016; AlZaher *et al*., 2023). What unites these outcomes is not simply the presence of nursing involvement, but the fact that nurses lead structured, evidence-informed interventions that make care more reliable. In the CDU context, where the margin for error is narrow and the pace of decision-making is high, such

outcomes are particularly valuable. Nurse-led quality improvement, therefore, represents not only a practical strategy for enhancing patient safety but also a credible means of improving the overall performance and integrity of short-stay acute care systems.

9. Barriers, Enablers, and Implementation Challenges

The implementation of nurse-led quality improvement in Clinical Decision Units (CDUs) is shaped by a complex interaction of organisational, technological, cultural, and operational factors. Although the rationale for nurse-led improvement is compelling in short-stay acute environments, the translation of improvement strategies into routine practice is rarely straightforward. CDUs operate under intense temporal pressure, frequent handoffs, and rapid discharge expectations, meaning that even well-designed interventions may encounter obstacles at the level of workflow integration, information access, and staff engagement. Understanding these barriers, alongside the conditions that enable successful change, is essential for building sustainable safety improvement.

One major barrier concerns the persistence of legacy systems and fragmented administrative processes. Ezeh *et al*. (2022), in their discussion of digitising healthcare enrollment workflows, highlight how outdated structures can obstruct efficiency, continuity, and responsiveness in care delivery. Although their study is situated in specialty care rather than CDU practice specifically, the implications are highly relevant. In CDUs, nurse-led improvement often depends on timely access to patient information, streamlined documentation, and dependable coordination across service boundaries. Where systems remain paper-heavy, fragmented, or poorly integrated, nurses may spend valuable time navigating administrative complexity rather than focusing on surveillance, discharge planning, and escalation. Legacy systems, therefore, function not merely as technical inconveniences but as structural barriers to quality improvement.

Closely related to this is the challenge of interoperability. Ezeh *et al*. (2023) argue that data-sharing frameworks are central to improving patient support systems, underscoring the importance of connected information environments in modern healthcare. For CDUs, this issue is especially significant because safe care depends on the seamless movement of information between emergency departments, short-stay units, specialist teams, and community follow-up pathways. If laboratory results, medication records, referral notes, or discharge instructions are inaccessible across settings, patient safety is compromised, and nurse-led interventions become more difficult to sustain. Interoperability is therefore a crucial enabler of nurse-led quality improvement: it supports continuity, reduces duplication, and allows nurses to make informed decisions in real time. Conversely, poor interoperability fragments care and weakens the reliability of improvement efforts (Oluokun, 2018).

Technology adoption itself can also present implementation challenges. Omotayo and Kuponiyi (2020) note that telehealth expansion offers important opportunities, but also introduces challenges relating to infrastructure, readiness, and effective integration into practice. In CDU settings, digital follow-up systems, remote patient communication, and other technology-enabled interventions may enhance continuity after discharge, yet their implementation may be constrained by inconsistent digital literacy, unequal access to technology, and variable staff confidence. These issues matter because nurse-led quality improvement increasingly relies on digital tools to support discharge communication, follow-up, and monitoring. Where staff or patients are insufficiently supported to use such systems, the intended safety gains may not be realised. Thus, technology can act as an enabler only when accompanied by appropriate training, access, and workflow adaptation.

A similar caution applies to more advanced innovation. Kuponiyi, Akomolafe, and Omotayo (2023), in reviewing the future of virtual reality applications in healthcare, suggest that emerging technologies may offer new possibilities for education, simulation, and clinical support. However, the introduction of such technologies into practice raises questions of relevance, usability, cost, and context. In relation to CDUs, this highlights a broader implementation challenge: not all innovations that appear promising at a conceptual level are easily transferable into high-pressure, short-stay care environments. Nurse-led quality improvement requires interventions that are practical, scalable, and aligned with everyday workflow. Technologies that demand extensive resources or complex adaptation may struggle to gain traction unless they clearly address a defined safety need and are supported by organisational commitment.

Cultural and behavioural factors are equally important. Hession-Laband and Mantell (2011) show that event reporting by nurses can provide valuable lessons for improving patient safety and quality. Their work points to a crucial enabler of implementation: a culture in which staff feel able to report errors, near misses, and process failures without fear of blame. In CDUs, where the pace of work can normalise workarounds and mask recurring small failures, event reporting is essential for making risks visible. Yet reporting cultures are often fragile. If staff perceive reporting as punitive, time-consuming, or ineffective, valuable learning opportunities are lost. A strong safety culture, by contrast, enables nurse-led improvement by treating frontline observations as legitimate sources of organisational intelligence (Putt, 2022).

Another implementation challenge lies in sustaining change over time. Many quality improvement initiatives begin with enthusiasm but weaken when staffing pressures, competing priorities, or leadership turnover disrupt momentum. This is particularly relevant in CDUs, where operational demands can quickly overshadow reflective improvement work. For nurse-led interventions to endure, they require visible leadership support, integration into standard processes, and feedback mechanisms that demonstrate impact. In this respect, the barriers identified by Ezeh *et al*. (2022; 2023) and Omotayo and Kuponiyi (2020) are not isolated technical issues; they reflect the broader problem of embedding innovation within complex care systems.

Overall, the successful implementation of nurse-led quality improvement in CDUs depends on the ability to address structural, technological, and cultural barriers simultaneously. Legacy systems, poor interoperability, uneven technology adoption, and weak reporting cultures can all hinder progress, while integrated data systems, supportive leadership, and psychologically safe learning environments can act as powerful enablers (Ezeh *et al*., 2022; Gado *et al*., 2022; Hession-Laband & Mantell, 2011). The implementation challenge, therefore, is not simply to introduce new interventions, but to create the organisational

conditions in which nurse-led improvement can take root, function reliably, and remain sustainable within the realities of transitional acute care.

10. Future Directions for Research, Practice, and Policy

Future directions for research, practice, and policy on nurse-led quality improvement in Clinical Decision Units (CDUs) should move beyond descriptive accounts of short-stay care and toward more predictive, integrated, and systems-oriented models of safety. As CDUs continue to function as key transitional spaces between emergency assessment, observation, and discharge, their effectiveness will increasingly depend on the ability to combine frontline clinical expertise with advanced decision support, real-time monitoring, and policy frameworks that sustain safe innovation. The next phase of development must therefore address not only what works in current practice, but also how emerging technologies and system redesign can be harnessed to improve safety without undermining clinical judgement.

A major priority for future research is the development of predictive and simulation-based approaches that can better account for patient complexity during short-stay observation. Taiwo *et al*. (2022), in their review of digital twin frameworks for simulating multiscale patient physiology, point to the growing importance of dynamic modelling in healthcare decision interfaces. Although their discussion is situated in precision oncology, the conceptual implications are highly relevant to CDUs. Future CDU research could explore whether simulation-informed tools might help clinicians anticipate deterioration, identify risk trajectories, and tailor monitoring intensity for patients whose conditions remain uncertain. Such work would be particularly valuable in units where rapid reassessment is essential and where traditional static risk tools may not fully capture evolving physiology.

Practice development should also increasingly incorporate predictive analytics into routine safety management. Ajayi *et al*. (2022) show that predictive analytics systems can enhance real-time monitoring and organisational forecasting in hospital networks. While their study is broader than bedside CDU care, it suggests an important future direction for short-stay acute units: the use of predictive systems not only for operational planning, but also for identifying bottlenecks, discharge delays, escalation patterns, and recurrent safety vulnerabilities. In practice, this could support more anticipatory nurse-led quality improvement by allowing teams to intervene before workflow pressures or patient instability translate into adverse outcomes. The practical challenge will be to ensure that such analytics are clinically meaningful and usable within the realities of frontline care.

Artificial intelligence will likely play an increasingly influential role in shaping these developments. Kuponiyi, Omotayo, and Akomolafe (2023) argue that AI has the potential to improve clinical decision-making in healthcare systems, while Tafirenyika (2023) emphasises predictive modelling, explainability, and clinical impact as central issues in the future of AI in healthcare. For CDUs, this suggests a research and practice agenda focused on decision-support tools that enhance rather than replace clinical judgement. Future investigations should examine how AI can support nurses and multidisciplinary teams in recognising deterioration, prioritising review and refining discharge decisions, while also safeguarding transparency, accountability and trust. Explainability is especially important in CDU settings, where decisions are often made rapidly and must remain understandable to those delivering care at the bedside.

Policy development must evolve alongside technological and clinical innovation. Tafirenyika *et al*. (2022), in their work on community-based drug take-back programmes, highlight the broader policy significance of coordinated systems and preventive infrastructure. Although this study is not CDU-specific, it offers an important lesson for policy in transitional care: sustainable safety improvement depends on frameworks that connect acute care processes with wider community and public health systems. In the CDU context, future policy should therefore support integrated discharge pathways, data-sharing standards, clear governance for digital tools, and stronger investment in nurse-led transitional care models. Policies that focus only on throughput or occupancy reduction, without equal attention to continuity and post-discharge safety, are unlikely to produce durable improvement.

Future directions for CDUs should centre on the integration of predictive science, explainable digital support, and policy structures that reinforce safe, nurse-led care. Research must become more forward-looking, practice must become more data-informed, and policy must provide the infrastructure for these developments to be implemented responsibly. In this evolving landscape, the enduring challenge will be to ensure that technological sophistication remains anchored in the practical realities of patient safety, interdisciplinary coordination, and nursing leadership at the point of care (Taiwo *et al*., 2022; Kuponiyi *et al*., 2023; Tafirenyika, 2023; Scruth& Spooner,2023).

11. Conclusion

This review has demonstrated that short-stay acute care environments are simultaneously operationally valuable and clinically vulnerable, requiring deliberate, nurse-led strategies to safeguard patient outcomes. The study set out to examine how quality improvement led by nurses can strengthen patient safety in clinical decision settings, and this aim was met by systematically exploring the nature of these units, their principal safety risks, the conceptual basis for improvement, the types of interventions available, and the organisational conditions that influence success. The objectives were addressed through a focused analysis of transitional risk, deterioration surveillance, discharge safety, leadership, teamwork, digital measurement systems, and implementation barriers.

The review identified several key findings. First, these units are high-risk because they concentrate diagnostic uncertainty, rapid decision-making, repeated handoffs, and discharge pressure within a compressed period of care. Second, patient safety is enhanced when nurses lead structured interventions such as standardised discharge processes, early warning and escalation systems, follow-up communication, infection prevention initiatives, and interprofessional coordination mechanisms. Third, nursing leadership, teamwork, and a positive safety culture are indispensable in translating quality improvement from policy aspiration into routine clinical practice. Fourth, digital tools and data systems offer important opportunities for strengthening visibility, prediction, and measurement, although their effectiveness depends on interoperability, usability, and clinical integration. Finally, the review showed that implementation is often hindered by fragmented systems, resource

limitations, weak reporting cultures, and inconsistent organisational support.

The overall conclusion is that safer short-stay acute care depends on embedding nursing leadership at the centre of improvement design, execution, and evaluation. The evidence suggests that quality improvement is most effective when it is evidence-based, multidisciplinary, data-informed, and responsive to the realities of frontline practice. It is therefore recommended that healthcare organisations strengthen nurse-led discharge pathways, escalation frameworks, post-discharge follow-up systems, safety reporting cultures, and digital decision-support infrastructure. Further research should prioritise CDU-specific outcome studies, implementation models, and context-sensitive policy frameworks that support sustainable, nurse-led patient safety improvement.

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