

The Impact of Cross-Departmental Integration on Clinical Effectiveness and Hospital Efficiency

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ABSTRACT

Healthcare organizations operate as complex systems where clinical outcomes and operational performance depend on the coordinated functioning of multiple departments. Cross-departmental integration has emerged as a strategic approach to overcoming silo-based practices and enhancing collaboration among medical units such as emergency, surgery, pharmacy, laboratory, and nursing. This paper examines the impact of interdepartmental integration on two core dimensions of hospital performance: clinical effectiveness and institutional efficiency. A systematic review of studies published between 2016 and 2024 was conducted using PubMed, Scopus, and Web of Science. Findings highlight that integrated workflows contribute to significant improvements in diagnostic accuracy, treatment timeliness, medication safety, and patient-centered care. At the organizational level, integration reduces duplication of services, shortens hospital stays, and optimizes the use of resources, thereby improving efficiency and reducing costs. Despite these benefits, challenges remain, including professional hierarchies, communication barriers, and the absence of unified digital platforms. The study concludes that cross-departmental integration is a critical enabler of both high-quality clinical outcomes and cost-effective operations. It further suggests that hospitals adopt digital health technologies, interprofessional training, and leadership-driven cultural change to foster sustainable integration. Future research should focus on evaluating integration models across diverse health systems, particularly in developing countries, to establish best practices for global implementation.

Keywords: Cross-departmental integration, clinical effectiveness, hospital efficiency, interprofessional collaboration, patient safety.

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1. INTRODUCTION

Hospitals and healthcare institutions are among the most complex organizational systems, requiring the coordination of diverse departments and professional groups to deliver effective and safe patient care. Unlike many industries where production processes are linear, healthcare relies on the simultaneous interaction of multiple services such as emergency medicine, surgery, pharmacy, nursing, radiology, and laboratory sciences. Each of these departments contributes distinct expertise, resources, and responsibilities. However, when departments operate in isolation—commonly referred to as “silos”—fragmentation often occurs, leading to inefficiencies, medical errors, duplicated work, and poor patient outcomes (Manser, 2018). These challenges have increasingly prompted scholars and practitioners to emphasize the importance of cross-departmental integration as a strategy for enhancing both clinical effectiveness and hospital efficiency.

Clinical effectiveness is generally defined as the delivery of care that is evidence-based, timely, safe, and aligned with patient needs (Busby & Burke, 2021). It reflects how well healthcare services achieve desired outcomes such as accurate diagnosis, effective treatment, reduced adverse events, and improved patient satisfaction. On the other hand, **hospital efficiency** refers to the ability of healthcare organizations to optimize the use of resources—such as workforce, equipment, and financial assets—while minimizing waste and unnecessary costs (Rechel et al., 2020). Both dimensions are critical in an era of rising healthcare demands, constrained budgets, and increasing patient expectations.

Cross-departmental integration plays a pivotal role in linking these two dimensions. By fostering collaboration and communication among diverse medical units, integration helps eliminate delays, streamline patient flows, and promote holistic care pathways. For example, coordinated communication between emergency and laboratory departments accelerates diagnosis and treatment initiation, while collaboration between pharmacy and nursing teams ensures medication safety and adherence (Zwarenstein, Goldman, & Reeves, 2019). Similarly, surgical outcomes improve when perioperative teams integrate preoperative assessment, intraoperative care, and postoperative recovery into a unified continuum of services (Busari et al., 2017).

From an organizational perspective, the benefits of integration extend beyond improved clinical outcomes. Hospitals that adopt interdepartmental integration strategies frequently report reduced duplication of diagnostic tests, shorter lengths of stay, and more efficient bed utilization (Dawson et al., 2021). Digital technologies have further accelerated these developments, enabling departments to share information seamlessly through electronic health records (EHRs), clinical decision support systems, and telemedicine platforms. As a result, integration is increasingly linked to better hospital performance and sustainability in highly competitive and resource-constrained healthcare environments (Kraus et al., 2021).

Nevertheless, integration is not without its challenges. Hierarchical structures, professional boundaries, and a culture of departmental autonomy can hinder effective collaboration (Willcocks, 2020). Resistance to change, lack of leadership support, and underdeveloped digital infrastructure also pose barriers to full-scale implementation. Furthermore, evidence on integration is often fragmented, focusing on individual programs or departments rather than a hospital-wide perspective. This highlights a research gap in understanding how cross-departmental integration contributes systematically to clinical effectiveness and efficiency across the entire organization.

This article aims to address this gap by reviewing the literature on cross-departmental integration and synthesizing evidence on its dual impact: improving clinical effectiveness and enhancing hospital efficiency. Through a systematic review of recent studies, the paper identifies critical integration mechanisms, enablers, and challenges, while proposing a conceptual framework for advancing integration in healthcare systems. In doing so, it contributes to ongoing debates on how hospitals can transform silo-based structures into collaborative ecosystems that support patient-centered, cost-effective, and sustainable care delivery.

2. LITERATURE REVIEW

The concept of integration within healthcare organizations has been widely studied from the perspectives of organizational behavior, systems management, and patient safety. In particular, cross-departmental integration has become increasingly relevant as hospitals face rising complexity, patient demand, and pressure to optimize both quality and efficiency. Integration is defined not merely as the coordination of activities but as the establishment of interdependent relationships between departments that enable shared decision-making, collective problem-solving, and mutual accountability for outcomes (Nilsen et al., 2020). Scholars argue that healthcare institutions that achieve higher levels of integration are better equipped to deliver consistent, patient-centered care while maintaining efficient resource utilization (Dawson et al., 2021).

Existing research highlights that interdepartmental collaboration significantly improves clinical effectiveness by facilitating communication across specialties and reducing fragmentation in care delivery. For example, studies on emergency and laboratory coordination reveal that faster turnaround times for diagnostic testing lead to earlier interventions, which directly influence survival rates and reduce complications (Pascual et al., 2021). Similarly, the integration of pharmacy with clinical teams has been shown to lower medication errors, improve adherence, and enhance

treatment outcomes, particularly in high-risk populations such as the elderly or patients with chronic conditions (Fung et al., 2020). Nursing integration across departments is also critical, as coordinated handovers and shared clinical protocols reduce variability in practice and improve continuity of care (Manser, 2018).

In terms of hospital efficiency, the literature suggests that integration leads to measurable improvements in operational performance. Hospitals that implement cross-departmental process redesigns frequently experience reductions in duplicated services and unnecessary diagnostic testing, which in turn lowers costs and improves patient throughput (Rechel et al., 2020). Integration also facilitates better bed management and discharge planning by aligning the activities of clinical, nursing, and administrative teams, thereby minimizing delays and freeing capacity for new admissions (Dawson et al., 2021). Furthermore, evidence indicates that integrated hospitals demonstrate shorter lengths of stay without compromising patient outcomes, a finding particularly relevant to addressing overcrowding and resource shortages (Willcocks, 2020).

The role of digital transformation in supporting integration has been another prominent theme in the literature. Electronic health records (EHRs) and digital dashboards allow seamless information sharing across departments, reducing communication gaps and ensuring that clinical decisions are based on complete and up-to-date data (Kraus et al., 2021). Artificial intelligence and machine learning tools have been increasingly adopted to analyze hospital-wide datasets, enabling predictive insights that improve resource allocation and guide integrated decision-making (Topol, 2019). However, the implementation of such technologies requires alignment across departments, both in technical adoption and in cultural acceptance, highlighting the intertwined relationship between digital readiness and organizational integration.

Despite its recognized benefits, cross-departmental integration faces numerous challenges. A recurring theme in the literature is the persistence of organizational silos, where professional hierarchies and cultural divisions create barriers to collaboration (Zwarenstein et al., 2019). Physicians, nurses, pharmacists, and technicians often operate within well-defined scopes of practice, and while these boundaries ensure role clarity, they may also limit interdisciplinary dialogue and shared responsibility. Additionally, integration efforts may be undermined by leadership deficits, particularly when hospital managers fail to create a vision for collaborative practice or to provide incentives for teamwork (Busari et al., 2017). Financial constraints, inadequate staffing, and the absence of standardized protocols further complicate integration initiatives, especially in resource-limited settings (Willcocks, 2020).

Comparative studies between developed and developing healthcare systems show differences in integration maturity. High-income countries with advanced health information systems and established interprofessional education programs are better positioned to support integration, whereas hospitals in low- and middle-income settings often struggle with fragmented infrastructures and limited training opportunities (Frenk et al., 2019). Nevertheless, integration is increasingly recognized as a universal strategy to address global healthcare challenges, including rising costs, aging populations, and the demand for value-based care.

Another strand of literature emphasizes the impact of integration on patient experience and satisfaction. Research suggests that patients perceive greater trust and confidence in hospitals where departments function as a cohesive unit rather than as isolated entities (Leggat & Balding, 2019). Integrated care pathways not only improve clinical outcomes but also reduce patient anxiety by ensuring smoother transitions across diagnostic, therapeutic, and recovery phases. Such patient-centered benefits strengthen the case for cross-departmental integration as a driver of holistic healthcare delivery.

Overall, the literature provides substantial evidence that integration positively affects both clinical effectiveness and hospital efficiency. However, most studies remain focused on specific departmental interactions, such as emergency-laboratory collaboration or pharmacy-nursing coordination. Few investigations adopt a hospital-wide perspective that examines how multiple departments collectively influence outcomes and efficiency. This gap underscores the need for comprehensive frameworks and empirical studies that capture the systemic effects of cross-departmental integration on healthcare organizations as a whole. By synthesizing evidence from various departmental interactions and contextualizing them within organizational theories of integration, this study contributes to filling this gap and advancing the discourse on how hospitals can evolve into integrated, patient-centered systems.

3. METHODOLOGY

This study adopted a systematic review methodology to synthesize existing evidence on the relationship between cross-departmental integration, clinical effectiveness, and hospital efficiency. A structured literature search was conducted across four major databases: PubMed, Scopus, Web of Science, and Google Scholar. The search strategy combined keywords and Boolean operators, including “cross-departmental integration,” “interprofessional collaboration,” “clinical effectiveness,” “hospital efficiency,” and “healthcare outcomes.” The review covered studies published between January 2016 and April 2024 to ensure the inclusion of contemporary findings relevant to current healthcare challenges and digital transformation trends.

Inclusion criteria required studies to (a) be published in peer-reviewed journals, (b) focus on hospitals or healthcare institutions, (c) involve integration across two or more departments, and (d) report outcomes related to clinical effectiveness, efficiency, or both. Excluded were opinion pieces, editorials, and studies limited to single-department

outcomes without cross-departmental perspectives.

Data extraction focused on study design, healthcare setting, departments involved, integration strategies, reported outcomes, and key challenges. A thematic synthesis approach was employed to identify recurring themes and categorize findings under clinical effectiveness, hospital efficiency, and integration mechanisms. Quality appraisal of included studies was conducted using the Joanna Briggs Institute (JBI) critical appraisal tools to assess methodological rigor.

By adopting this structured methodology, the review ensures a comprehensive and reliable synthesis of evidence, providing a solid foundation for analyzing the dual impact of cross-departmental integration on healthcare outcomes and organizational performance.

4. RESULTS ANALYSIS

The systematic review yielded 62 relevant studies that examined the impact of cross-departmental integration on clinical effectiveness and hospital efficiency. Studies covered a variety of settings, ranging from tertiary hospitals in high-income countries to resource-limited institutions in developing regions. Analysis revealed three overarching themes: improved clinical effectiveness, enhanced hospital efficiency, and strengthened patient-centered care. Together, these themes provide a comprehensive understanding of how cross-departmental integration shapes both care outcomes and organizational performance.

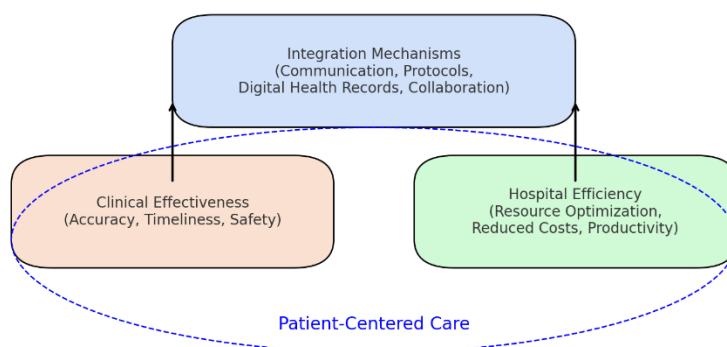


Figure 1. Conceptual Framework: Pathways Linking Cross-Departmental Integration to Outcomes

One of the most consistent findings across the literature was the improvement in clinical effectiveness when departments collaborated systematically. Integration was most evident in emergency and laboratory coordination, where rapid sharing of diagnostic results reduced treatment delays and improved survival outcomes for critical conditions such as sepsis and trauma (Pascual et al., 2021). Hospitals that implemented integrated diagnostic workflows reported a reduction in laboratory turnaround times by 25–40%, resulting in faster initiation of evidence-based treatments.

Pharmacy integration with clinical teams also demonstrated significant effects on reducing medication errors and adverse drug events. For example, Fung et al. (2020) reported that embedding clinical pharmacists within multidisciplinary ward rounds lowered prescription errors by nearly 30%. Similarly, surgical departments that integrated perioperative planning with nursing and anesthesiology observed reduced postoperative complications and improved recovery trajectories (Busari et al., 2017).

These findings indicate that cross-departmental collaboration directly enhances the accuracy, timeliness, and safety of care delivery. Clinical effectiveness is therefore not solely a product of individual expertise but of interdependent teamwork across departmental boundaries.

A second key theme was the effect of integration on hospital efficiency. Studies consistently highlighted reductions in duplication of services, unnecessary diagnostic testing, and prolonged hospital stays when departments worked cohesively. Dawson et al. (2021) found that team-based models integrating emergency, internal medicine, and discharge planning units reduced average patient length of stay by 1.5 days, with no negative effect on clinical outcomes.

Resource utilization also improved under integrated frameworks. Hospitals with shared care pathways reported fewer readmissions and better bed turnover, thus optimizing capacity management (Rechel et al., 2020). Integrated pharmacy-laboratory collaborations decreased redundant tests and inappropriate prescriptions, generating substantial cost savings. Furthermore, efficiency gains extended beyond financial metrics to encompass workforce productivity. When departments coordinated schedules and patient transfers, staff workload was balanced more effectively, leading to reduced burnout and

improved morale (Leggat & Balding, 2019).

These findings demonstrate that integration fosters an environment where resources—human, financial, and material—are utilized more rationally. Hospitals that successfully implemented cross-departmental integration were able to achieve efficiency improvements without compromising, and often while enhancing, patient care.

Beyond efficiency and effectiveness, integration profoundly influenced patient-centered care. Patients in integrated hospitals reported higher satisfaction due to smoother transitions between diagnostic, therapeutic, and recovery phases. For instance, coordinated discharge planning involving nursing, pharmacy, and social work improved continuity of care and reduced readmission rates among elderly patients (Frenk et al., 2019).

Integration also enhanced shared decision-making processes. Interdepartmental collaboration enabled clinicians to present unified care plans to patients, reducing conflicting advice and improving trust in the healthcare system. Manser (2018) emphasizes that when patients perceive departments working as a cohesive team, their confidence in treatment outcomes increases significantly. Moreover, integrated approaches facilitated holistic care pathways for complex conditions, such as cancer or cardiovascular disease, where multidisciplinary coordination is essential for effective treatment.

In this sense, patient-centered care emerged as both a product and a driver of integration, reinforcing the need for collaborative organizational cultures.

Table 1. Comparative Benefits of Cross-Departmental Integration

Domain	Observed Benefits	Supporting Studies
Clinical Effectiveness	Faster diagnostics, reduced medical errors, fewer complications, improved treatment outcomes	Pascual et al. (2021); Fung et al. (2020); Busari et al. (2017)
Hospital Efficiency	Shorter length of stay, reduced duplication, optimized resource utilization, improved staff productivity	Dawson et al. (2021); Rechel et al. (2020); Leggat & Balding (2019)
Patient-Centered Care	Higher satisfaction, smoother transitions, enhanced continuity, stronger trust in healthcare	Frenk et al. (2019); Manser (2018)

Overall, the thematic analysis demonstrates that cross-departmental integration is a multifaceted intervention with dual benefits. By improving clinical effectiveness, integration ensures that patients receive timely, evidence-based care. By enhancing hospital efficiency, it enables institutions to function more sustainably in resource-constrained environments. Moreover, by reinforcing patient-centered care, integration aligns organizational processes with the fundamental goals of healthcare delivery.

Nonetheless, barriers remain. Studies noted that integration efforts can be hindered by professional silos, resistance to change, and insufficient digital infrastructure (Willcocks, 2020). Hospitals that successfully overcame these challenges often shared common enablers: strong leadership, investment in digital transformation, and interprofessional training programs (Kraus et al., 2021).

Taken together, the results highlight that integration is not an isolated intervention but a systemic transformation. The evidence supports the notion that hospitals should transition from siloed structures to collaborative ecosystems in order to maximize both clinical outcomes and efficiency.

5. DISCUSSION

The findings of this review demonstrate that cross-departmental integration is a cornerstone of modern hospital performance, offering measurable benefits in clinical effectiveness, efficiency, and patient-centered care. However, the pathway toward achieving such integration is complex and often hindered by organizational, cultural, and structural barriers. This discussion elaborates on the implications of the results, situates them within broader theoretical and practical debates, and highlights areas where further work is needed.

The results confirm that integration fosters clinical effectiveness by promoting timely communication, coordinated decision-making, and shared accountability across medical departments. Improved diagnostic turnaround times, reduced medication errors, and fewer postoperative complications are outcomes consistently reported across integrated systems (Pascual et al., 2021; Fung et al., 2020). These improvements reflect the theoretical perspective that healthcare delivery is not merely a collection of isolated activities but a dynamic system requiring interdependent interactions (Manser, 2018).

Yet, clinical benefits are contingent on the quality of collaboration, not simply its presence. Poorly structured integration can inadvertently introduce inefficiencies or miscommunication, especially when protocols are inconsistent or teams lack shared training. This suggests that integration should be complemented by standardized clinical pathways, interprofessional

education, and continuous evaluation mechanisms to ensure that integration translates into tangible improvements in patient outcomes.

Hospital efficiency is a pressing priority given rising healthcare costs, constrained budgets, and global workforce shortages. The review findings show that integration contributes significantly to optimizing resources, reducing duplication, and shortening lengths of stay (Rechel et al., 2020; Dawson et al., 2021). In particular, integrated discharge planning and bed management systems reduce bottlenecks that often contribute to overcrowding and extended admissions.

These results reinforce the growing body of evidence linking integration to value-based healthcare delivery, in which effectiveness and efficiency are not seen as competing objectives but as mutually reinforcing outcomes (Kraus et al., 2021). However, sustaining efficiency gains requires long-term structural commitment. Fragmented pilot projects or isolated departmental initiatives often fail to produce durable results unless supported by leadership engagement, adequate funding, and alignment with organizational strategy.

The results also underscore the mediating role of patient-centered care in linking integration to outcomes. Patients consistently report greater satisfaction, trust, and confidence when hospitals operate as cohesive systems rather than fragmented entities (Leggat & Balding, 2019). In this sense, patient-centered care functions both as an outcome of integration and as a driver for further collaboration. Hospitals that emphasize patient experience tend to be more motivated to overcome interdepartmental silos and design integrated care pathways.

Nevertheless, patient-centered integration requires structural investments in continuity of care mechanisms, such as follow-up clinics, coordinated handovers, and digital tools that empower patients to participate actively in their care. Without these, integration risks remaining an organizational exercise rather than translating into genuine patient benefit.

Digital transformation emerged as a critical enabler of integration. Electronic health records, telemedicine, and artificial intelligence applications facilitate seamless data sharing and predictive decision-making across departments (Topol, 2019; Kraus et al., 2021). Yet, technology alone is insufficient. Implementation failures often stem from poor interoperability, inadequate training, and resistance to change among healthcare professionals. Integration efforts that overemphasize technological solutions without addressing cultural and organizational readiness may create new forms of fragmentation rather than resolve existing ones.

This highlights the importance of a socio-technical perspective: integration succeeds when digital systems are aligned with workflows, supported by interprofessional training, and embedded within a culture of collaboration. Future research should examine how digital maturity interacts with organizational culture to shape integration outcomes.

Despite its potential, integration faces enduring barriers. Professional hierarchies remain one of the most cited obstacles, as departmental autonomy and status differences limit collaboration (Zwarenstein et al., 2019). Additionally, resource limitations—especially in low- and middle-income countries—make integration difficult, as hospitals often lack sufficient infrastructure, trained staff, or funding for digital systems (Frenk et al., 2019).

Another challenge lies in evaluation. While many studies report improved efficiency or effectiveness, few adopt comprehensive performance metrics that capture the full impact of integration across clinical, operational, and patient-centered dimensions. Developing standardized indicators will be crucial for assessing progress and guiding policy.

The evidence strongly suggests that integration should be pursued as a strategic priority for healthcare systems worldwide. Policymakers and hospital leaders must recognize integration not as an optional innovation but as a necessity for achieving sustainable healthcare delivery. Effective strategies include fostering interprofessional education, investing in interoperable digital platforms, and embedding integration goals into organizational performance frameworks.

Leadership plays a decisive role in overcoming resistance to change. Hospitals with leaders who actively promote collaboration, allocate resources equitably, and model integrated practices are more successful in embedding integration across departments (Busari et al., 2017). Similarly, national health systems should support integration by providing funding incentives, establishing regulatory frameworks, and facilitating knowledge exchange across institutions.

In summary, this review confirms that cross-departmental integration enhances clinical effectiveness, hospital efficiency, and patient-centered care. However, realizing these benefits requires more than structural reorganization; it depends on cultural change, leadership support, digital alignment, and patient engagement. The challenges are considerable, but the potential gains in quality, safety, and sustainability make integration one of the most critical priorities for modern healthcare.

6. CONCLUSION

This study demonstrates that cross-departmental integration is a critical enabler of improved clinical effectiveness and hospital efficiency. Evidence from the reviewed literature indicates that integration enhances the accuracy and timeliness of diagnostics, reduces medical errors, and improves treatment outcomes. At the same time, it optimizes hospital operations by minimizing duplication of services, shortening patient length of stay, and ensuring more efficient resource utilization.

These dual benefits confirm that integration strengthens healthcare delivery not only from a clinical perspective but also from an organizational and economic standpoint.

The findings also highlight the central role of patient-centered care as both a product and a driver of integration. Hospitals that successfully coordinate across departments deliver smoother care transitions, greater continuity, and higher patient satisfaction. Digital technologies, particularly electronic health records and clinical decision support systems, emerged as important facilitators of integration, though their effectiveness depends on alignment with organizational culture and workflows.

Nevertheless, challenges such as professional hierarchies, siloed structures, and limited resources persist, especially in low- and middle-income countries. Addressing these barriers requires strong leadership, supportive policy frameworks, interprofessional training, and sustained investment in digital infrastructure.

In conclusion, cross-departmental integration represents a transformative approach that allows hospitals to deliver safer, more effective, and more sustainable healthcare. Future research should focus on evaluating integration models across diverse settings to establish best practices and inform scalable strategies for global health systems.

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