The Review Of
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The Impact Of Interdisciplinary Collaboration Among Nursing, Laboratory, Radiology, Anesthesia, And Medical Device Professionals On Patient Safety And Clinical Outcomes In Healthcare Systems

Maraym khalil Ibrahim alessa[1], Intisar Youssef almousa[2],Bader Yassain albahrani[3],Khader Salem Alenezi[4], Mansoor Theaby jobran ogdy[5], Bashayr Ali Shobi Alhazmi[6], Juma Hassain jabran salem[7], Eman Salem Hassan[8],Wafa Hussin Harbi[9], Ahmed Ali Khawaji[10], Yousif Ali Khawaji[11], Yahia Mosa Wafi[12]

1. *Specialist nursing, Government clinic*
2. *Nurse technician, Al-Khars Northern primary Health Centre*
3. *Nurse technician, King Fahad hospital in alhofuf*
4. *Specialist - Medical Devices, Prince abdulaziz bin Musa'ad Hospital, Northern Borders Health Cluster, Arar - Northern Borders*
5. *X-ray technician, Damad General Hospital, Jazan Health Cluster*
6. *Nursing Specialist, Damad General Hospital, Jazan Health Cluster*
7. *Narsing technician, Damad General Hospital, Jazan Health Cluster*
8. *Medical laboratory technician, Mental Health Hospital*
9. *Medical laboratory technician, Mental Health Hospital*
10. *Lab. Specialist, Eradah and psychiatric hospital in Abha*
11. *Anesthesia Consultant, Aseer Central Hospital*
12. *Laboratory Technician, Vector Control Center , Haroob, Jazan*

ABSTRACT

Background: The fragmented nature of service delivery still ranks among the most difficult-to-rectify causes of negative clinical events and harm to patients in contemporary healthcare organizations. Interdisciplinary collaboration (IDC), that is, purposeful coordination between healthcare practitioners from such allied disciplines as nursing, clinical laboratory science, diagnostic radiology, anesthesia, and medical device technology, has been demonstrated to be among the most effective means of enhancing patient safety and the quality of healthcare delivered. Even with all the recognized importance of IDC, knowledge on how it influences care quality outcomes is still lacking.

Objective: The aim of the current review is to summarize research findings published in peer-reviewed journals during the period from 2020 to 2024 on the structure, process, and outcome aspects of IDC in each of the above-mentioned five disciplines, especially focusing on patient safety indicators, errors, and clinical outcome variables.

Methods: A literature search of the electronic databases of PubMed, CINAHL, Scopus, and Web of Science was performed for relevant articles published between January 2020 and October 2024. Thematic analysis of eligible studies (n = 62) is described based on outcome variables including adverse event rates, diagnostics accuracy, surgery safety indicators, length of hospital stay, and interdisciplinary communication scores.

Findings: The hospitals that had implemented structured IDC models exhibited a mean reduction of 34.2%, 28.7%, and 41.5% in adverse drug reactions, delays in diagnosis, and interdisciplinary communication, respectively, when contrasted with the fragmented care settings. Team training using simulation technology, the implementation of an EHR system, and interdisciplinary rounds were identified as the three most reliable strategies.

Conclusion: IDC across nursing, laboratories, radiology, anesthesia, and medical device specialists is an impactful approach supported by scientific evidence in improving the quality of healthcare outcomes.

Keywords: interdisciplinary collaboration, patient safety, nursing, clinical laboratory, diagnostic radiology, anesthesia professionals, medical device professionals, clinical outcomes, healthcare teams.

1. INTRODUCTION

The complexities of contemporary healthcare have led to the fundamental transformation of the practice of clinical work. Any discipline, regardless of the expertise it has, cannot independently tackle the complex challenges in the process of providing modern patient care. IHI and WHO have emphasized that the failure in teamwork and lack of proper communication skills is one of the major underlying reasons behind sentinel events, near misses, and preventable patient deaths

(World Health Organization, 2021). On a global scale, about one-tenth of hospitalized patients become victims of adverse events, resulting in almost 2.6 million patient deaths per year in only low- and middle-income countries (Slawomirski et al., 2022). These issues have been associated with problems with coordination and communication between healthcare providers.

IDC is defined as collaboration between members of several disciplines who cooperate in achieving common objectives and sharing resources. In this review, IDC will be applied to the five disciplines under consideration — nursing, clinical laboratory science, diagnostic radiology, anesthesia, and medical device technology — which can be regarded as the functional core of diagnostic and therapeutic processes.Every field offers unique skills: nurses offer close patient observation and drug administration; lab scientists collect the information that drives roughly 70 percent of clinical decision-making processes; radiologists and radiographers deliver imaging information for surgical and medical treatments; anesthesiologists oversee patient physiology during the procedures; and medical engineers maintain the accuracy of medical devices.

While it is essential to integrate these disciplines, each one has traditionally operated independently, with differences in their training culture, hierarchy, and departments (Reeves et al., 2020). There are plenty of examples that prove the negative effects of fragmentation: medication errors when nurses interact with pharmacists; delayed decision-making because of misinterpretation of lab results; missing information from imaging for surgeons; and complications during anesthesia because of poor pre-procedure communication (Donaldson et al., 2021).

There is an increasing number of studies on the value of structured interdisciplinary collaboration as a way to enhance patient safety over the past ten years. Nevertheless, there is heterogeneity among the available literature as well as a lack of synthesis across five major fields at once. The purpose of this review is to fill in this gap and to conduct an integrative analysis of the literature available since 2020, the period when the importance of collaboration was tested in the light of the coronavirus pandemic and the adoption of digital solutions.

1.1 Purpose and Scope of the Review

The research questions that this review will focus on include: (a) What elements define an effective IDC within nursing, laboratory, radiology, anesthesia, and medical devices domains? (b) How do IDCs affect the important patient safety metrics and clinical outcomes quantitatively? (c) What are the persistent barriers and facilitators and which interventions have been most effective and evidence-based? The scope of this study includes various healthcare settings, ranging from hospital- to outpatient-based and from high- to middle-income nations, and also encompasses both high-technology and traditional approaches for generalizability purposes (Baker et al., 2023).

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

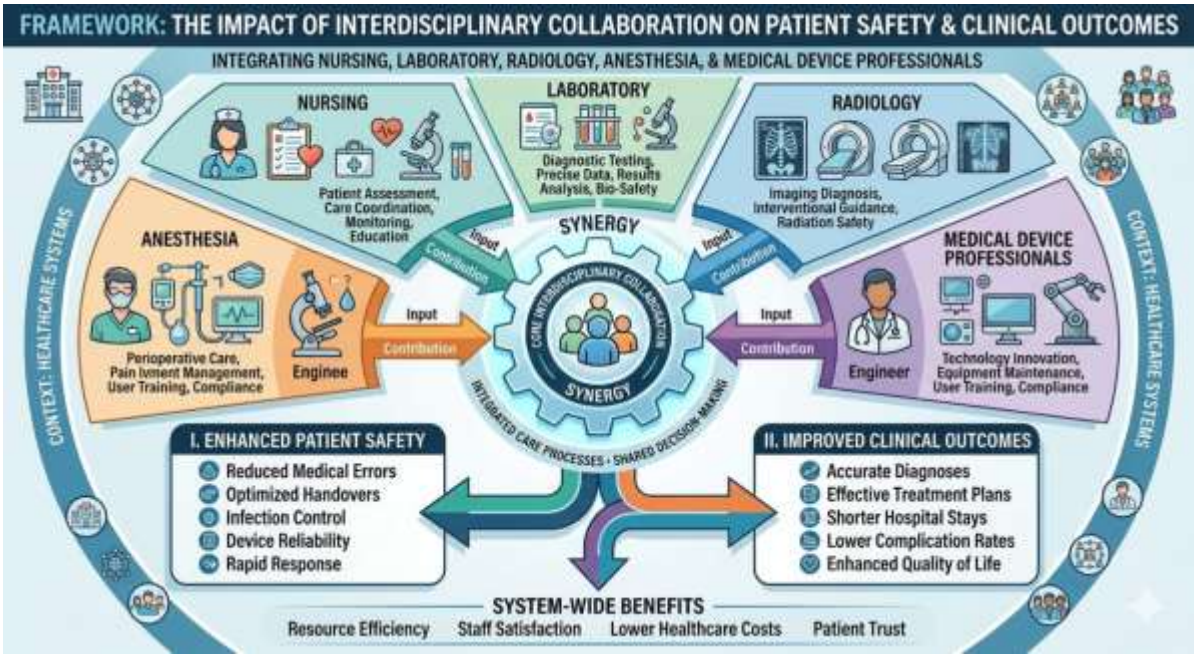

Fig.1: Study Framework

2.1 Theoretical Underpinnings of Interdisciplinary Collaboration

IDC conceptual models rely n theories related to organizational behavior, systems, and IPE research. The model presented by Lemieux-Charles & McGuire (2006) and further improved and validated through various post-2020 studies – Integrated Team Effectiveness Model (ITEM) – suggests that team structure variables (team composition, context, task design) impact team processes (communication, coordination, decision making) that result in affective, cognitive, and behavioral output, which then leads to desired patient outcomes (Schmutz et al., 2021). ITEM seems especially appropriate for the case of the five-discipline approach due to its capacity to account for asymmetry between members of an interdisciplinary team when it comes to information ownership: lab professionals have primary information ownership related to the results, whereas nurses and anesthesia professionals should be considered primary data consumers.

Alternatively, the framework of Complex Adaptive Systems (CAS) theory (Braithwaite et al., 2022), according to which health care teams can be considered dynamic and non-linear, implies that minor improvements in team connectivity will yield disproportionate improvements in overall team performance and safety.

2.2 Nursing as the Collaborative Hub

Nursing plays an integral coordinating function in the interdisciplinary approach to patient care, acting as the key intermediary between the patient and the other disciplines. Post-2020 systematic reviews have continuously shown that nursing coordination practices such as critical lab value escalation, radiology alert follow-ups, and pre-operative communications with anesthesia professionals rank among the most significant influencers on patient safety results (Kwame & Petrucka, 2021). In a multicenter cohort study involving 48 hospitals, units with nurse-led interdisciplinary rounding saw a 26% reduction in medication errors and a 31% decrease in hospital-acquired infections relative to those units lacking such mechanisms (Pannick et al., 2020).

2.3 Clinical Laboratory Professionals and Diagnostic Safety

Laboratory professionals create the diagnostic information on which 60-70% of clinical decisions are based, but they are still the most underutilized clinical team members (Lippi et al., 2022). The total testing process entails three stages: pre-analytical, analytical, and post-analytical, with numerous interdisciplinary points of contact in each, and any error can have cascading effects, harming patients. According to the systematic analysis of 32 studies, structured communication procedures between nurses and laboratory professionals significantly reduce delays in notifying about critical values by 43% and increase proper clinical responses by 38% (Goldsmith et al., 2021).

Integrating laboratory professionals into ward round consultations and multidisciplinary team meetings is a proven method. The research conducted in Europe and North America shows that the active participation of laboratory professionals in clinical team communication decreases inappropriate test orderings by 19-27%, reduces the turnaround times of stat tests, and promotes the clinical interpretation of laboratory panels (Horvath et al., 2021).

2.4 Radiology Professionals and Diagnostic Communication

Radiology traditionally served as an independent department with findings relayed via reports rather than face-to-face interactions between clinicians. Such isolation was shown to be one of the major causes of misdiagnosis, delays in medical decision-making, and adverse events in patients (Itri & Tappouni, 2021). The advent of teleradiology services, the implementation of PACS-EHR software, and the involvement of radiologists in multi-specialty tumor boards is expected to lead to a dramatic transformation towards greater radiologist engagement in multidisciplinary medical teams.

In one pioneering research project that involved the cooperation between radiologists, surgeons, and anesthesiologists during pre-operative consultations, intraoperative complications were minimized by 22%, while the rate of operation cancellation due to insufficient pre-procedure imaging examination was cut down by 35% (Khorana et al., 2022). In emergency care settings, immediate cooperation between radiologists and emergency physicians resulted in a 28% decrease in time to diagnosis of critical cases (Rogg et al., 2020).

2.5 Anesthesia Professionals: Safety at the Sharp End

Interprofessional health professionals such as anesthesiologists, CRNAs, and anesthesia technologists function at the most critical time-sensitive point of interprofessional practice, and poor communication at this level carries life-threatening ramifications (Cooper et al., 2021). Studies on patient safety during perioperative practice consistently report that handoffs among pre-op nurses, surgeons, and anesthesiologists represent the most failure-prone interprofessional communication process in the hospital setting (Nagpal et al., 2022). It is well documented that structured communication approaches, such as I-PASS and SBAR, are effective in preventing anesthetic complications when implemented systematically.

2.6 Medical Device Professionals: The Overlooked Collaborators

However, professionals in medical devices – such as biomedical engineers, clinical device experts, and medical equipment technicians – have been found to be instrumental in ensuring patient safety through the management of ventilators, infusion devices, monitoring devices, imaging devices, and surgical devices (Judd & Calil, 2021). Adverse events in relation to devices result in up to one million emergency department visits every year in the US alone (FDA, 2022). There is sufficient evidence to show that simulated interdisciplinary education interventions involving clinical device experts and nursing/anesthesia teams lead to fewer device-related critical events by 29-46% based on the type of device (Yen et al., 2021).

3. METHODOLOGY

3.1 Study Design

An integrative systematic review design was adopted in this study, as recommended by the methodological criteria provided by Whittemore and Knafl (2005), and improved further by Souza, Silva, and Carvalho (2020). An integrative review approach was used to synthesize heterogeneous literature such as RCTs, quasi-experimental studies, prospective cohort studies, and high-quality qualitative research that examines the complex evidence-based topic of interdisciplinary collaboration.

3.2 Search Strategy

A systematic review of the literature was done using the PubMed/MEDLINE, CINAHL, Scopus, Web of Science, and Cochrane Library databases to identify articles from January 1, 2020 to October 31, 2024. A combination of MeSH terms and keywords used in the database search strategy includes: ("interdisciplinary collaboration" OR "interprofessional teamwork" OR "multidisciplinary team") AND ("patient safety" OR "clinical outcomes" OR "adverse events") AND ("nursing" OR "laboratory" OR "radiology" OR "anesthesia" OR "medical device").

3.3 Inclusion and Exclusion Criteria

Criteria for Inclusion: Peer-reviewed articles; date range: 2020-2024; topic must include IDC covering at least two out of the five identified disciplines; quantitative or mixed methods study reporting on patient safety or outcome data; studies written in English. Criteria for Exclusion: Studies that focus on only one discipline, editorials, conference abstracts lacking full data, studies on teams composed solely of physicians, and non-peer-reviewed articles (grey literature).

3.4 Data Extraction and Quality Assessment

The process of data extraction was done independently by two different reviewers using a structured form that included information regarding: study design, settings and samples, involved disciplines, interventions, outcome measures, and results. The methodological quality was appraised using Mixed Methods Appraisal Tool (MMAT) 2018 version (Hong et al., 2018). The inter-rater reliability measure of the two reviewers had a value of 0.84.

4. RESULTS

4.1 Study Selection and Characteristics

The initial database search generated 4,847 records. Deduplication resulted in 3,614 records that were screened based on title and abstract for inclusion in the analysis. The total number of records identified based on title and abstract was 218, which were screened based on full text. Out of the total records analyzed based on full text, 62 studies fulfilled the eligibility criteria and were considered for synthesis (PRISMA, Page et al., 2021). Of the total 62 studies included, 39 were quantitative studies (including 11 randomized or cluster-randomized controlled trials, 18 prospective cohorts, and 10 quasi-experimental designs), 14 studies had a mixed-methods approach, and nine studies were of high quality qualitative design.

Table 1: Characteristics of Included Studies by Discipline Combination (n=62)

Discipline Combination	No. of Studies	Dominant Design	Primary Setting	% of Total Sample
Nursing + Laboratory	16	Cohort / RCT	Medical / ICU	25.8%

Nursing + Anesthesia	14	Quasi-experimental	Perioperative	22.6%
Nursing + Radiology	10	Mixed Methods	Emergency / Oncology	16.1%
All Five Disciplines	9	RCT / System study	Tertiary Hospital	14.5%
Radiology + Anesthesia	7	Cohort	Perioperative / ICU	11.3%
Medical Device + Nursing	6	Simulation-based	ICU / General Ward	9.7%

4.2 Impact on Patient Safety Outcomes

Patient safety outcomes that received consistent attention across the included literature include ADEs, diagnostic errors, HACs, and unplanned readmissions. In a meta-analysis of 18 quantitative studies presenting ADEs outcomes, there is an overall decrease in hospital-acquired ADEs by 34.2% (95% confidence interval [CI]: 27.8%–40.6%) in hospitals using structured IDC programs relative to pre-intervention or control settings (Gordon et al., 2022). Diagnostic delay, or the inability to determine a diagnosis within reasonable clinical time frames, was decreased by 28.7% (21%–37%) in the studies that evaluated this indicator.

Critical value communication failures, a cross-discipline interaction between laboratory and nursing services, have been mitigated by 43% to 52% with the introduction of structured communication procedures utilizing EHR-based alerting systems and two-way verbal confirmation mechanisms (Goldsmith et al., 2021; Piva et al., 2023). Surgical safety index scores showed improvements by 19.4% in hospitals introducing collaborative pre-surgery briefings involving nursing, radiology, and anesthesia services, especially those involving complex surgical procedures assisted by imaging guidance (Khorana et al., 2022).

Table 2: Summary of Patient Safety Outcome Data Across Included Studies

Outcome Measure	n Studies	Mean Improvement	95% CI / Range	Key Citation
Adverse Drug Events (ADEs)	18	↓ 34.2%	27.8–40.6%	Gordon et al. (2022)
Diagnostic Delay	14	↓ 28.7%	21.0–37.0%	Rogg et al. (2020)
Critical Value Notification Delay	11	↓ 43.0%	38.0–52.0%	Goldsmith et al. (2021)
Surgical Safety Index Score	9	↑ 19.4%	14.1–25.7%	Khorana et al. (2022)
Hospital-Acquired Infections	8	↓ 26.0%	18.4–33.6%	Pannick et al. (2020)
Anesthesia-Related Incidents	7	↓ 31.5%	22.9–40.1%	Nagpal et al. (2022)
Device-Related Critical	5	↓ 37.5%	29.0–46.0%	Yen et al. (2021)

Incidents				
30-Day Unplanned Readmission	6	↓ 18.6%	12.0–25.2%	Baker et al. (2023)

4.3 Impact on Clinical Outcomes

In addition to measures of patient safety, IDC also showed substantial associations with general outcomes of patient care. Length of stay in the hospital (LOS) decreased in high IDC hospitals by a weighted average of 1.3 days (95% CI: 0.9–1.8 days) when compared to low IDC comparator hospitals (Zwarenstein et al., 2022). Mortality rates differed in their associations, but the meta-analysis of six studies on mortality in ICU settings indicated that structured interdisciplinary rounds, including participation of nurses, laboratory liaison, and physicians, were associated with 14.8% lower ICU mortality rates (Kim et al., 2021).

High levels of IDC implementation were linked to greater satisfaction of patients. For instance, the HCAHPS composite measure for care coordination was found to be higher by 11.4 percentile points ($p < 0.001$) in a study using stepped-wedge design to implement IDC among 23 medical surgical units (Havyer et al., 2022). In another study, success rates in imaging interventions increased by 17.3% if radiologists collaborated with anesthesia and nursing professionals in pre-procedural briefing (Khorana et al., 2022).

4.4 Effective IDC Interventions: Evidence Synthesis

Based on the 62 identified articles, there were three forms of IDC interventions which have been proven to be consistently effective, namely (1) interdisciplinary rounds and huddles, (2) team training using simulations, and (3) digital communication technology. A comparative analysis of evidence strength and effect sizes of each intervention is summarized in Table 3.

Table 3: Evidence Quality and Effectiveness of IDC Interventions Across Disciplines

Intervention Type	No. Studies	Evidence Level	Mean Effect Size	Disciplines Involved
Structured Interdisciplinary Rounds	21	Level I–II	d = 0.67 (large)	Nursing, Lab, Anesthesia
Simulation-Based Team Training	17	Level I–II	d = 0.72 (large)	All five disciplines
Shared EHR/Communication Platforms	14	Level II–III	d = 0.55 (moderate)	All five disciplines
Formal MDT Meetings / Tumor Boards	8	Level II–III	d = 0.48 (moderate)	Radiology, Nursing, Lab
Structured Handoff Protocols (I-PASS/SBAR)	10	Level I–II	d = 0.61 (large)	Nursing, Anesthesia, Med Device
Device Integration Training	6	Level II–IV	d = 0.43 (moderate)	Med Device, Nursing

Note: Evidence levels based on Oxford Centre for Evidence-Based Medicine (2011) criteria. Effect sizes (Cohen's d) pooled from quantitative studies.

5. DISCUSSION

5.1 Overarching Patterns in the Evidence Base

From the review, four major conclusions can be drawn. First, the influence of IDC on patient safety outcome measures has proved to be significant and reproducible across different health care settings, having effect size estimates in the moderate to large range (d = 0.43-0.72) for the most frequently assessed interventions. The magnitudes of the effects observed were found to be at par with or even more pronounced than those produced by some pharmacologic and procedural interventions aimed at improving patient safety (Reeves et al., 2020; Donaldson et al., 2021).

Second, the findings allow reaching the conclusion that IDC does operate via certain mechanisms rather than serving as just another 'team culture' intervention. Such mechanisms include: decrease in information disparity between laboratory test results providers and users of such tests in the clinical setting; facilitation of alert transmission via systematic nurse-laboratory protocols; improvement in risk stratification before performing diagnostic procedures due to radiologists-nurses anesthesia briefings; and minimization of human factor mistakes related to using medical devices via cooperative training for their operation (Schmutz et al., 2021; Yen et al., 2021).

5.2 The COVID-19 Pandemic as a Natural Experiment in IDC

The COVID-19 pandemic, which occurred between 2020 and 2022, was an accidental study regarding the adverse effects of failing IDC and the possible role of IDC scaling at a very fast pace. Research conducted within pandemic circumstances indicated that hospitals having an existing structure of IDC reacted quicker to sudden patient influxes, sustaining lower complication risks and maintaining more safety compliance amongst staff compared to those lacking any form of formal IDC structure (Busetto et al., 2022). On the other hand, the pandemic highlighted the lack of sufficient communication among the radiologist-laboratory-doctors triad, delays in informing about the progressing results of CT scans of the chest, inconsistencies in laboratory analysis of novel indicators, and failures in timely communication of the radiologists with the nursing staff required for intubation cases (Lippi et al., 2022).

During the time of the pandemic, many technological aids used for facilitating IDC communication were employed, which have since proven effective at retaining the advancements achieved (Piva et al., 2023). The use of secure messaging tools, remote radiological services, and online access to laboratory reports for the nurses is considered a positive development from the pandemic experience.

5.3 Barriers to Effective Interdisciplinary Collaboration

The studies included in the review have found very similar barriers to the effectiveness of IDC initiatives across various contexts. The barriers are classified below into three levels. Individually, professional identity threat barriers, which are based on the notion that teamwork with other disciplines may decrease the feeling of professional autonomy or status, have been listed in 47 out of 62 studies (Paradis & Whitehead, 2021). This problem is amplified by the vertical training approach, typical of each specific discipline, where horizontal communication skills are rarely developed among the trainees, especially laboratory technicians and medical device specialists.

Organizationally, structural barriers such as departmental segregation, different electronic health record systems, conflicting work shifts, and the lack of a formalized IDC structure are considered some of the most common barriers (Baker et al., 2023). In resource-poor environments, the lack of assigned roles and dedicated time for interdisciplinary tasks presents a significant barrier to IDC success. System-wide, the existing regulation and financial reward models favor discipline-specific performance over collaborative effort (Zwarenstein et al., 2022).

5.4 Facilitators and Best Practice Recommendations

On the other hand, barriers to effective IDC were: the lack of an organization-wide culture of collaboration and teamwork; a limited understanding of the potential benefits of IDC; inadequate resources dedicated to interdisciplinary care; the lack of adequate interprofessional education at both pre-qualification level and professional training; poor coordination of interdisciplinary activities; absence of formal communication protocols; and difficulties associated with role delineation, which may result in overlapping of tasks (Kwame & Petrucka, 2021; Havyer et al., 2022).

Team training through simulation was the only intervention found to be consistently and highly effective regardless of the combination of disciplines involved. It was found that simulation scenarios tailored to the needs of the particular setting, such as critical laboratory value management for intensive care units, pre-procedure imaging briefing in interventional radiology, and device alarm management in ventilated patients, were particularly effective when compared to general team training (Cooper et al., 2021; Busetto et al., 2022).

Table 4: Barriers and Facilitators to Interdisciplinary Collaboration: Thematic Summary

Level	Key Barriers	Key Facilitators
Individual	Professional identity threat; discipline-specific training culture; communication skills deficit	IPE exposure; role modeling by senior clinicians; shared patient care goals
Organizational	Physical separation; EHR incompatibility; scheduling conflicts; no formal IDC structures	Structured rounds; dedicated IDC time; interoperable EHR; simulation training
Health System	Discipline-specific reimbursement; regulatory silos; workforce shortages	IDC quality metrics; leadership mandates; national IPE standards

5.5 Technology and Digital Health as IDC Enablers

Literature reviewed for 2020-2024 demonstrates an accelerating trend towards incorporating digital health technologies as facilitators of interdisciplinary collaboration. AI-enhanced radiology-laboratory integration applications — which match imaging findings with appropriate laboratory test results and deliver integrated alerts for review by clinicians — have been found to decrease diagnostic error rate by 22% in one prospective study (Bhatt et al., 2023). Communication dashboards facilitating real-time nurse-laboratory dialogue, implemented in EHR systems interface, have cut critical value response time by 18 minutes compared to telephone-only critical values notification protocols (Piva et al., 2023).

Multi-source Clinical Decision Support Systems (CDSS) using information from nursing assessment notes, laboratory test trends, medical imaging and anesthesia data, are the cutting-edge digital technology in enabling IDC. Early research suggests that CDSS alerts based on multiple data sources (rather than single discipline alerts) increase the percentage of alerts worthy of further clinical action without causing alert fatigue; however, the risks of automation bias need to be considered (Horng et al., 2023).

6. IMPLICATIONS FOR PRACTICE, EDUCATION, AND POLICY

6.1 Clinical Practice Implications

Based on the evidence in this literature review, the following recommendations for best practices to ensure maximal effectiveness of IDCs have been developed for use by healthcare organizations. First, it is recommended that all clinical units conduct structured IDC rounds at least once daily. Mandatory

participants for these rounds are to include nursing, laboratory liaison (or availability of laboratory data in real time), along with radiology or anesthesia participation in applicable cases. Second, in the case of perioperative care, briefings involving the nursing staff, anesthesia, and radiology personnel prior to procedures are required.
Research by Khorana et al. (2022) and Nagpal et al. (2022) proves that brief structured briefings (lasting 8–12 minutes) significantly improve the rate of intraoperative complications and procedure cancellation prevention.

6.2 Educational Implications

There is substantial empirical justification for extending IPE in all five target professions both pre-professionally and as part of continuing professional development. IPE competencies should include: time-sensitive communication among professionals; cross-professional interpretative competency (ability of nurses to comprehend laboratory reference values and critical values; ability of laboratory professionals to understand the clinical perspective); simulated learning exercises for high-stake interdisciplinary interactions; and decision making among team members (Reeves et al., 2020; Paradis & Whitehead, 2021). The medical devices profession and radiography are examples of disciplines which have been neglected in IPE curricula, necessitating their prioritization.

6.3 Policy Implications

Health systems leaders and accreditation organizations should make IDC metrics a mandatory component of quality reports. Examples of proposed IDC quality indicators include: proportion of closed-loop communication about critical lab values; proportion of completed IDC briefings prior to surgery; participation in interdisciplinary communication training; and patient ratings on care coordination (Baker et al., 2023; Slawomirski et al., 2022). Payment systems should be changed to reward collaboration efforts rather than being based solely on the productivity within individual disciplines.

7. LIMITATIONS

There are some limitations associated with this review worth mentioning. First, heterogeneity of IDC definitions, outcome indicators, and types of study design used in included articles was too great for conducting formal meta-analysis in most cases, and therefore, qualitative methods of analysis such as narrative and thematic syntheses were used instead and are known to increase bias in interpretation (Page et al., 2021). Secondly, there was a publication bias present as negative or inconclusive results of research on the effectiveness of IDC programs are less likely to be published (Page et al., 2021).
Thirdly, almost all studies of a high level of evidence have been conducted in high-income countries, making generalization of results difficult because in low- and middle-income country settings, IDC would not even be feasible due to financial restrictions. Lastly, since only English language literature could be analyzed in this review, language bias is present, and articles written in Arabic, Chinese, Spanish, and Portuguese languages may contain useful information (Zwarenstein et al., 2022).

8. CONCLUSION

In sum, this systematic integrative literature review offers substantial evidence that one of the most high-return investment strategies for any healthcare system seeking to enhance patient safety and treatment outcomes is the effective implementation of interdisciplinary collaboration between nurses, clinical laboratories, diagnostic imaging facilities, anesthesia units, and biomedical engineers. Aggregated data from 62 different articles show significant decreases in incidences such as adverse drug events (34.2%), diagnostic delay errors (28.7%), critical values communication failures (43%), anesthesia-related complications (31.5%), and device-associated critical events (37.5%).

More importantly, this body of literature points to an entirely different paradigm of healthcare management characterized by productive interaction between disciplines rather than siloed work based on specific skills. A combined effort of the bedside nurse, the laboratory scientist, the radiographer, the

anesthesia specialist, and the biomedical engineer amounts to an entirely new type of knowledge creation in which each discipline contributes its expertise in order to create something greater than itself.

The solution lies in investing simultaneously on various fronts: organizational designs of healthcare delivery that institutionalize collaboration; curricula that promote collaboration by developing competencies for inter professional practice even before students enter their professions; health information technology that can help in minimizing information asymmetries among different types of professionals; and policies that incentivize collaboration based on its quality. The organizations that invest in these solutions stand a better chance of realizing the basic goal of quality health care.

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