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The Role of Multidisciplinary Healthcare Teams in Improving Patient Outcomes Integrating Medicine, Nursing Care, Health Administration, Pharmacy, and Radiology

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ABSTRACT: Modern health care is too complex for any single profession to deliver alone. A hospitalised patient today may be diagnosed by a physician with the help of a radiologist, receive a medication regimen optimised by a clinical pharmacist, be monitored around the clock by nurses, and move through a system whose staffing, information flows, and resources are organised by health administrators. The quality and safety of that patient's care depend not only on the competence of each professional, but on how effectively they work together. Failures of communication and coordination between professions are among the most frequent root causes of preventable harm.

This paper reviews the role of multidisciplinary healthcare teams in improving patient outcomes, with a focus on the integration of five core disciplines: medicine, nursing, health administration, pharmacy, and radiology. Drawing on Donabedian's structure–process–outcome model, Reason's Swiss cheese model, the Systems Engineering Initiative for Patient Safety (SEIPS) model, TeamSTEPPS, and the Interprofessional Education Collaborative (IPEC) competencies, it examines the distinctive contribution of each discipline, the mechanisms through which they integrate, and the evidence linking teamwork to patient safety, clinical effectiveness, efficiency, and patient experience.

The paper analyses the Saudi context — including the Model of Care, health clusters, national digital platforms, and the accreditation and professional standards of CBAHI and SCFHS — and identifies the main barriers to effective team-based care. It proposes the UNITE Framework: Unified patient-centred goals, Navigated structured communication, Integrated and clarified roles, Technology-enabled coordination, and Evaluation of shared outcomes. The paper concludes that multidisciplinary teamwork is not an organisational

preference but a determinant of patient outcomes, and that it must be deliberately designed, led, and measured.

1. INTRODUCTION

Health care has changed more in the past half-century than in the preceding millennia. Diagnostic imaging can visualise the body in exquisite detail; pharmacotherapy offers thousands of agents with complex interactions; patients are older and more often live with several chronic conditions at once; and hospitals have become intricate organisations coordinating hundreds of professionals, processes, and technologies around the clock. This complexity has brought extraordinary benefits, but it has also multiplied the points at which care can fail.

The landmark report *To Err Is Human* drew global attention to the scale of preventable harm in hospitals and argued that most errors arise not from individual incompetence but from faulty systems, processes, and conditions that lead people to make mistakes or fail to prevent them (Kohn et al., 2000). Among these system failures, breakdowns in communication and coordination between professionals stand out. Observational studies in operating rooms, for example, have found that communication failures are frequent and that a substantial proportion have visible effects on the team, such as inefficiency, tension, and procedural error (Lingard et al., 2004).

Patients are not cared for by individual professionals in sequence; they are cared for by teams. The quality of the team, not merely of its members, determines the outcome.

The response has been a sustained shift toward team-based care. A multidisciplinary team brings together professionals from different disciplines, each contributing specialised knowledge, to plan and deliver care around a shared patient. When such teams function well, they combine diagnostic, therapeutic, nursing, pharmaceutical, and organisational expertise in ways that no single profession can match. When they function poorly — through unclear roles, hierarchy, poor communication, or fragmented information — the patient bears the consequences.

This paper focuses on five disciplines whose integration is central to hospital and specialist care: **medicine**, which leads diagnosis and treatment; **nursing**, which provides continuous care and surveillance; **health administration**, which designs and resources the system in which care takes place; **pharmacy**, which ensures safe and effective medication use; and **radiology**, which provides the imaging on which a large share of diagnoses depend. While many other professions — laboratory scientists, physiotherapists, dietitians, social workers, and others — are equally essential, these five illustrate the full span of clinical, diagnostic, and organisational contributions to patient outcomes.

1.1 Aim and Objectives

The aim of this paper is to examine how multidisciplinary teams integrating medicine, nursing, health administration, pharmacy, and radiology improve patient outcomes, and to propose a framework for strengthening such integration in the Saudi health system. Its objectives are to:

- ◆ define multidisciplinary, interdisciplinary, and interprofessional teamwork;
- ◆ review the theoretical models that explain how teamwork influences outcomes;
- ◆ describe the distinctive contribution of each of the five disciplines;
- ◆ examine the mechanisms through which these disciplines integrate their work;
- ◆ synthesise evidence on the impact of team-based care on patient outcomes;
- ◆ analyse the Saudi context and the barriers to effective teamwork;
- ◆ propose an integrated framework and practical recommendations.

1.2 Methodological Approach

The paper adopts a narrative, integrative review design, synthesising foundational theory, systematic reviews and primary studies on teamwork and patient outcomes, international guidance from the World Health Organization and accreditation bodies, and

Saudi health policy sources. It aims at conceptual and practical synthesis for health-care leaders and practitioners rather than quantitative pooling of results.

2. CONCEPTUAL FOUNDATIONS OF HEALTHCARE TEAMWORK

2.1 Defining the Team

The terms used to describe collaborative practice are often used interchangeably, but they describe different degrees of integration. In a **multidisciplinary** model, professionals from different disciplines work alongside one another, each contributing their own assessment and intervention, often coordinated by a lead clinician. In an **interdisciplinary** model, team members share information, jointly set goals, and integrate their contributions into a single plan. **Interprofessional collaboration**, the term preferred by the World Health Organization (2010), describes multiple health workers from different professional backgrounds working together with patients, families, and communities to deliver the highest quality of care. In practice, effective hospital teams move along this continuum from parallel work toward genuine integration.

Table 1. Levels of Team Integration

Model	Characteristics	Strengths	Limitations
Multidisciplinary	Disciplines work in parallel; separate assessments; coordinated by a lead	Clear expertise; familiar structure	Risk of fragmentation and duplicated effort
Interdisciplinary	Shared information and joint goal-setting; integrated care plan	Coherent plan; better coordination	Requires time, trust, and communication
Interprofessional	Collaborative practice with patients and families; shared responsibility	Patient-centred; highest integration	Demands cultural change and supportive systems

2.2 Characteristics of Effective Teams

Research from organisational psychology identifies several core components of effective teamwork. Salas et al. (2005) proposed a "Big Five" model comprising team leadership, mutual performance monitoring, backup behaviour, adaptability, and team orientation, supported by coordinating mechanisms of shared mental models, closed-loop communication, and mutual trust. A later review of healthcare teamwork confirmed that these competencies — together with psychological safety, clear roles, and structured communication — are consistently associated with safer, higher-quality care (Rosen et al., 2018). Importantly, teamwork is a set of learnable behaviours, not merely a matter of personality.

3. THEORETICAL FRAMEWORK

3.1 Donabedian's Structure–Process–Outcome Model

Donabedian (1988) proposed that the quality of care can be evaluated through structure (the settings, resources, and organisation of care), process (what is actually done in giving and receiving care), and outcomes (the effects of care on health status). Multidisciplinary teamwork operates across all three. Health administration shapes structure through staffing, skill mix, and information systems; the clinical disciplines shape process through assessment, communication, and coordinated intervention; and the combined effect appears in outcomes such as mortality, complications, length of stay, and patient satisfaction.

3.2 Reason's Swiss Cheese Model

Reason (2000) described organisational defences as layers of Swiss cheese, each with holes representing latent conditions and active failures. Harm occurs when the holes align. A multidisciplinary team creates multiple, independent layers of defence: the pharmacist who detects a dosing error the physician missed, the nurse who notices clinical deterioration, the radiologist who flags an unexpected finding, and the administrator who corrects an unsafe staffing pattern. Effective teamwork ensures that these layers are truly independent and that concerns raised at one layer are heard and acted upon.

3.3 The SEIPS Model

The Systems Engineering Initiative for Patient Safety (SEIPS) model describes how the work system — people, tasks, tools and technologies, physical environment, and organisation — shapes care processes and, in turn, patient and organisational outcomes (Carayon et al., 2006). SEIPS emphasises that teamwork does not happen in a vacuum: it is enabled or constrained by workload, information technology, unit layout, policies, and culture, many of which fall within the responsibility of health administration.

3.4 TeamSTEPPS

TeamSTEPPS, developed by the U.S. Agency for Healthcare Research and Quality and the Department of Defense, is an evidence-based teamwork training system built on four core competencies: leadership, situation monitoring, mutual support, and communication (King et al., 2008). It provides practical tools — briefs, huddles, debriefs, SBAR, call-outs, check-backs, the "two-challenge rule", and the CUS escalation phrases — that translate teamwork principles into everyday behaviour.

3.5 IPEC Core Competencies

The Interprofessional Education Collaborative (2016) defined four domains of competency for collaborative practice: values and ethics for interprofessional practice; roles and responsibilities; interprofessional communication; and teams and teamwork. These domains offer a common language for training and evaluating professionals across disciplines.

Table 2. Theoretical Models and Their Relevance to Multidisciplinary Teams

Model	Core Concept	Relevance to Team-Based Care
Donabedian (1988)	Structure → process → outcome	Links team design and behaviour to measurable outcomes
Reason (2000)	Layered defences against error	Each discipline acts as an independent safety layer
SEIPS (Carayon et al., 2006)	Work system shapes processes and outcomes	Highlights the administrative and technological enablers of teamwork
TeamSTEPPS (King et al., 2008)	Trainable teamwork competencies and tools	Provides practical communication and coordination tools
IPEC (2016)	Four interprofessional competency domains	Common framework for education and evaluation
Quadruple Aim (Bodenheimer & Sinsky, 2014)	Patient experience, population health, cost, and clinician wellbeing	Defines the multiple outcomes teams should pursue

4. THE CONTRIBUTION OF EACH DISCIPLINE

4.1 Medicine: Clinical Leadership and Decision-Making

Physicians carry primary responsibility for diagnosis, the formulation of treatment plans, and many high-risk clinical decisions. In the multidisciplinary team, the physician's role extends beyond individual expertise to clinical leadership: setting clear goals of care, integrating information from other disciplines, inviting challenge, and ensuring that decisions are communicated and understood. Diagnostic error remains a significant source of harm, and studies of diagnostic error in internal medicine have shown that system-related factors — including poor communication and coordination — frequently combine with cognitive factors to cause it (Graber et al., 2005). Physicians who actively draw on the observations of nurses, the medication expertise

of pharmacists, and the interpretive insights of radiologists reduce the cognitive burden on any single decision-maker and improve diagnostic accuracy.

Effective medical leadership in teams is increasingly understood as facilitative rather than authoritarian. A physician who conducts structured interdisciplinary ward rounds, explicitly asks other team members for concerns, and responds respectfully to challenge fosters the psychological safety that allows errors to be caught before they reach the patient.

4.2 Nursing: Continuous Care and Clinical Surveillance

Nurses are the only professionals present at the bedside around the clock, which makes them the team's principal source of continuous observation and early warning. They assess and monitor patients, administer medications, provide direct care, educate patients and families, coordinate daily activities, and act as patient advocates. Evidence consistently links nursing resources to patient outcomes: higher nurse staffing levels have been associated with lower rates of complications and failure to rescue (Needleman et al., 2002), and both higher nurse staffing and a greater proportion of bachelor-educated nurses have been associated with lower hospital mortality (Aiken et al., 2014).

Within the team, nursing contributes the patient's day-to-day trajectory: changes in vital signs, pain, mobility, mood, intake, and family concerns. Structured communication tools such as SBAR enable nurses to escalate concerns concisely and effectively (Haig et al., 2006). Nurses also play a decisive role in transitions of care — admission, handover between shifts, transfer between units, and discharge — where information loss is a common cause of harm.

4.3 Health Administration: Designing the System for Teamwork

Health administrators and managers rarely touch patients directly, yet their decisions profoundly shape patient outcomes. They determine staffing levels and skill mix, allocate budgets, design care pathways, select and implement information systems, establish policies, manage quality and risk programs, and build organisational culture. Studies of human resource management in hospitals have linked management practices — such as appraisal, training, and team-based working — to lower patient mortality (West et al., 2002). In the multidisciplinary context, the administrative role includes creating the conditions in which teams can function: protected time for interdisciplinary rounds and meetings, interoperable records that all disciplines can read and contribute to, clear role definitions, fair workload distribution, teamwork training, and leadership that models collaboration. Administrators also translate team-level data into organisational learning through quality dashboards, incident analysis, and accreditation processes. Without supportive administration, even skilled clinicians struggle to collaborate effectively.

4.4 Pharmacy: Ensuring Safe and Effective Medication Use

Medications are the most common therapeutic intervention in hospitals and a leading source of preventable adverse events. Clinical pharmacists bring specialised knowledge of pharmacokinetics, interactions, dosing in organ impairment, and evidence-based therapy. Their participation in the multidisciplinary team has been shown to improve outcomes: in a classic study in an intensive care unit, pharmacist participation in physician rounds was associated with a substantial reduction in preventable adverse drug events due to prescribing errors (Leape et al., 1999). A systematic review found that clinical pharmacist involvement in inpatient care reduced adverse drug events and length of stay and improved medication-related outcomes (Kaboli et al., 2006). Key pharmacy contributions include medication reconciliation at admission, transfer, and discharge — a process consistently shown to reduce medication discrepancies (Mueller et al., 2012) — antimicrobial stewardship, therapeutic drug monitoring, management of high-alert medications, parenteral nutrition, patient counselling, and participation in formulary and protocol development. The pharmacist thus acts both as an independent safety check and as an active contributor to therapeutic decisions.

4.5 Radiology: The Diagnostic Foundation

Medical imaging underpins a large proportion of clinical decisions, from the emergency diagnosis of stroke, pulmonary embolism, and trauma to the staging of cancer and the guidance of minimally invasive procedures. Radiologists and radiographers contribute expertise in selecting the most appropriate examination, optimising image quality and radiation safety, interpreting findings accurately, and communicating them in a timely and actionable manner. Interpretive error and discrepancy are recognised challenges in radiology, and many are mitigated by better clinical information on requests, double reading for selected studies, and direct communication between radiologists and referring clinicians (Brady, 2017).

Radiology's integration into the team is most visible in multidisciplinary team meetings and tumour boards, where radiologists review images alongside surgeons, oncologists, pathologists, and nurses. Systematic evidence indicates that multidisciplinary meetings in oncology change diagnostic and management decisions in a meaningful proportion of cases and are associated with improved adherence to guidelines (Pillay et al., 2016). Critical-results communication protocols, which ensure that urgent findings reach the responsible clinician without delay, are another key integration point.

Table 3. Discipline Contributions to Patient Outcomes

Discipline	Core Contributions	Key Team Integration Points	Outcome Influenced
Medicine	Diagnosis, treatment planning, clinical leadership	Interdisciplinary rounds; goals of care; escalation response	Diagnostic accuracy, mortality, appropriateness of care
Nursing	24-hour monitoring, direct care, education, advocacy	SBAR escalation; handover; discharge coordination	Complications, failure to rescue, patient experience
Health Administration	Staffing, resources, systems, policy, culture	Care pathways; information systems; quality governance	Efficiency, safety culture, sustainability
Pharmacy	Medication optimisation, reconciliation, stewardship	Participation in rounds; reconciliation at transitions	Adverse drug events, length of stay, resistance
Radiology	Appropriate imaging, interpretation, image-guided procedures	MDT meetings; critical-result communication	Timely diagnosis, staging accuracy, radiation safety

4.6 Interdependencies Among the Five Disciplines

The contributions described above are not independent; each discipline depends on the others to perform its own role well. The quality of a radiology report depends on the clinical information provided in the physician's request; the pharmacist's ability to optimise dosing depends on accurate weight, renal function, and allergy data documented by nurses and physicians; the nurse's ability to administer medications safely depends on clear orders and pharmacy verification; and every clinical discipline depends on administrative decisions about staffing, equipment, and information systems. Conversely, administrators depend on accurate clinical data and frontline feedback to design effective systems. These interdependencies mean that weaknesses in one discipline propagate through the team. An incomplete imaging request may lead to an inappropriate examination; an unreconciled medication list may lead to a dosing error; and chronic understaffing in nursing reduces the surveillance on which early detection of deterioration depends. Recognising these interdependencies is the first step toward managing them deliberately — for example, by designing structured electronic request forms, shared medication lists, and staffing models that reflect the workload of the whole team rather than of a single profession.

Table 4. Key Interdependencies Between Disciplines

From → To	What Is Exchanged	Risk if It Fails
Medicine → Radiology	Clinical question and relevant history on imaging request	Inappropriate examination; misinterpretation
Radiology → Medicine / Nursing	Timely report; direct communication of critical findings	Delayed diagnosis and treatment

From → To	What Is Exchanged	Risk if It Fails
Medicine → Pharmacy	Clear, complete prescriptions and therapeutic goals	Prescribing errors; suboptimal therapy
Pharmacy → Nursing / Medicine	Verified orders, interaction alerts, dosing advice	Adverse drug events
Nursing → Medicine	Observations, early warning scores, patient concerns	Failure to rescue deteriorating patients
Administration → All	Staffing, systems, policies, protected time	Overload, fragmentation, unsafe conditions
All → Administration	Incident reports, performance data, frontline feedback	Systems that do not reflect clinical reality

5. MECHANISMS OF INTEGRATION

Bringing professionals together in the same building does not by itself create a team. Integration requires deliberate structures and routines through which the five disciplines share information, align goals, and coordinate action.

5.1 Structured Communication

Standardised communication tools reduce ambiguity, particularly across professional and hierarchical boundaries. SBAR (Situation, Background, Assessment, Recommendation) provides a shared mental model for escalating concerns (Haig et al., 2006). Closed-loop communication and read-backs confirm that critical information — such as verbal medication orders or critical imaging results — has been received correctly. Structured handover tools ensure that essential information survives shift changes and transfers.

5.2 Interdisciplinary Rounds and Huddles

Interdisciplinary ward rounds bring physicians, nurses, pharmacists, and other professionals to the patient together, allowing simultaneous review of the clinical picture, medications, nursing concerns, and discharge needs. Brief daily safety huddles allow unit teams — including managers — to identify risks, staffing gaps, and high-risk patients at the start of each shift.

5.3 Multidisciplinary Team Meetings

For complex conditions such as cancer, stroke, and major trauma, formal MDT meetings review cases with all relevant specialties present, including radiology and pathology. These meetings produce consensus treatment plans and reduce the variability that comes from individual decision-making (Pillay et al., 2016).

5.4 Shared Care Pathways and Protocols

Integrated clinical pathways define the expected sequence of assessments and interventions for a condition, specifying the contribution of each discipline and the time standards for each step — for example, door-to-imaging and door-to-needle times in acute stroke. Pathways reduce unwarranted variation and make interdependencies explicit.

5.5 Shared Information Systems

An integrated electronic health record, accessible and writable by all disciplines, is the informational backbone of the team. Computerised provider order entry with clinical decision support, pharmacy verification, picture archiving and communication systems (PACS) linked to radiology reports, and electronic nursing documentation together allow each discipline to see and build on the others' work in real time.

5.6 Team Training and Simulation

Teamwork training programs such as TeamSTEPPS, and interprofessional simulation exercises — for example, simulated cardiac arrests, sepsis scenarios, or obstetric emergencies — allow professionals to practise communication and coordination in a safe environment. Such training improves teamwork behaviours and has been associated with improved clinical processes (Rosen et al., 2018).

Table 5. Integration Mechanisms and Participating Disciplines

Mechanism	Medicine	Nursing	Administration	Pharmacy	Radiology
Interdisciplinary rounds	◆ Lead	◆ Core	Enables time	◆ Core	As needed
Safety huddles	◆	◆ Lead	◆ Core	◆	◆
MDT / tumour boards	◆ Core	◆	Coordinates	◆	◆ Core
Medication reconciliation	◆	◆	Policy	◆ Lead	—
Critical-result communication	◆ Receives	◆ Relays	Policy & audit	—	◆ Initiates
Care pathways	◆	◆	◆ Lead design	◆	◆
Shared EHR	◆	◆	◆ Lead implementation	◆	◆

5.7 Coordinated Transitions of Care

Transitions — from the emergency department to the ward, from intensive care to general wards, between shifts, and from hospital to home — are moments of particular vulnerability. Information that is held by one discipline can easily be lost when responsibility passes to another. A well-integrated team treats each transition as a shared process rather than a single professional's task. At discharge, for example, the physician confirms the clinical plan and follow-up, the nurse educates the patient and family on self-care and warning signs, the pharmacist reconciles medications and counsels the patient on any changes, radiology ensures that pending results or recommended follow-up imaging are communicated, and administration ensures that appointments, transport, and home-care referrals are in place.

Structured discharge checklists, teach-back methods to confirm patient understanding, and follow-up telephone calls by nurses or pharmacists within days of discharge are practical tools that reduce post-discharge adverse events and readmissions. Incidental imaging findings that require follow-up are a recognised gap at transitions; shared tracking systems that flag such findings to both the radiologist and the responsible clinician help ensure they are not lost.

5.8 Leadership and Organisational Culture

Teamwork is profoundly shaped by leadership at every level. At the bedside, team leaders set the tone through briefings, explicit role allocation, and openness to input. At the unit level, nurse managers, medical heads, pharmacy leads, and radiology supervisors model collaboration and resolve interprofessional friction. At the organisational level, executive leaders decide whether teamwork is treated as a strategic priority — reflected in budgets, policies, performance indicators, and recognition — or left to chance.

A culture of safety and collaboration is built through consistent behaviours: leaders who visit units and ask staff about risks, incident-reporting systems that focus on learning rather than blame, and recognition of team achievements rather than only

individual ones. A just culture distinguishes between human error, at-risk behaviour, and reckless behaviour, responding to each appropriately; this encourages staff to report incidents and near misses, which are essential sources of team learning.

6. impact of multidisciplinary teams on patient outcomes

A growing body of evidence links effective multidisciplinary teamwork to improved outcomes across several domains. While the quality of individual studies varies and causal attribution is challenging in complex systems, the overall direction of the evidence is consistent.

6.1 Patient Safety

Teamwork failures are implicated in a large share of adverse events, and improvements in teamwork are associated with fewer errors. Reviews of teamwork in dynamic healthcare settings such as operating rooms, intensive care, and emergency departments show that team behaviours like coordination, communication, and leadership are related to clinical performance and patient safety (Manser, 2009). Pharmacist participation in rounds reduces preventable adverse drug events (Leape et al., 1999), and structured communication tools reduce information loss at handovers.

6.2 Clinical Effectiveness and Mortality

A synthesis of the evidence on in-hospital multidisciplinary teams concluded that such teams improve outcomes across a range of conditions, including reductions in complications, mortality, and length of stay in settings such as trauma, stroke, cardiac, and surgical care (Epstein, 2014). Stroke units, which are organised around coordinated multidisciplinary care, are one of the clearest examples of how team organisation itself functions as an effective intervention. Hospital management practices that support team working have also been associated with lower mortality (West et al., 2002).

6.3 Efficiency and Resource Use

Coordinated teams reduce duplicated tests, unnecessary imaging, delays between steps of care, and avoidable readmissions. Clinical pharmacist involvement has been associated with shorter length of stay (Kaboli et al., 2006), and structured discharge planning involving nursing, pharmacy, and medicine reduces readmissions. Integrated pathways reduce variation that often drives unnecessary cost.

6.4 Patient Experience

Patients value consistent information, clear explanations, and the sense that their care team is "on the same page". Conflicting messages from different professionals undermine trust. Teams that communicate effectively with each other are better able to communicate coherently with patients and families, improving satisfaction and engagement.

6.5 Workforce Wellbeing

The Quadruple Aim adds the wellbeing of the health-care workforce to the traditional goals of better care, better health, and lower costs (Bodenheimer & Sinsky, 2014). Good teamwork distributes workload, provides mutual support, and reduces moral distress, while dysfunctional teams contribute to burnout and turnover. A Cochrane review of interprofessional collaboration interventions found that practice-based interventions may slightly improve patient functional status, adherence to recommended practices, and the use of resources, although the certainty of evidence was limited (Reeves et al., 2017) — underlining the need for rigorous evaluation of team interventions.

6.6 Patients and Families as Team Members

Contemporary models of interprofessional care increasingly regard the patient and family not as passive recipients but as members of the care team (World Health Organization, 2010). Patients hold unique knowledge of their own symptoms, preferences, and history, and families often notice subtle changes in a patient's condition before professionals do. Practices such as bedside rounds with patient participation, shared decision-making, family presence during care planning, and patient-activated escalation systems — which allow families to call for review when they are worried about deterioration — extend the team's situational awareness and reinforce patient-centred goals.

In the Saudi context, where families are deeply involved in the care of their relatives, structured family engagement is both culturally congruent and clinically valuable. Clear communication from a coordinated team, rather than separate and sometimes inconsistent messages from each discipline, builds family trust and supports safe care after discharge.

Table 6. Summary of Evidence on Team-Based Care and Outcomes

Outcome Domain	Illustrative Evidence	Key Team Mechanism
Medication safety	Pharmacist on rounds reduced preventable ADEs (Leape et al., 1999); pharmacist care reduced ADEs and LOS (Kaboli et al., 2006)	Pharmacy integration into rounds
Nursing-sensitive outcomes	Staffing linked to complications and failure to rescue (Needleman et al., 2002); mortality (Aiken et al., 2014)	Adequate nursing resources and surveillance
Oncology decisions	MDT meetings change management and improve guideline adherence (Pillay et al., 2016)	Radiology and pathology at MDT
Hospital mortality	Team-based HR practices associated with lower mortality (West et al., 2002)	Administrative support for teamwork
Clinical outcomes	Multidisciplinary in-hospital teams improve outcomes (Epstein, 2014)	Coordinated care pathways
Teamwork performance	Team behaviours linked to safety in dynamic settings (Manser, 2009)	Communication and leadership training

7. ILLUSTRATIVE CASE: THE TEAM IN ACTION

The following composite case, constructed for illustration, shows how the five disciplines combine around a single patient.

A 71-year-old woman with diabetes, hypertension, and atrial fibrillation presents to the emergency department with sudden weakness of the right arm and difficulty speaking. The emergency **nurse** recognises the signs of stroke using a structured screening tool and activates the hospital's stroke pathway. The **physician** examines her promptly and requests urgent imaging. **Radiology**, alerted through the pathway, performs computed tomography and CT angiography within minutes; the radiologist identifies no haemorrhage and a large-vessel occlusion, and communicates the result directly to the treating team by telephone, followed by a written report.

Before thrombolysis, the **clinical pharmacist** reviews her medication list and identifies that she has been taking an oral anticoagulant, prompting the team to check the timing of her last dose and coagulation status. Together, the physician and pharmacist agree on the safest treatment approach, and she is transferred for endovascular thrombectomy. In the stroke unit, nurses monitor her neurological status and swallowing, the pharmacist reconciles her medications and plans secondary prevention, and the team holds an interdisciplinary meeting with rehabilitation colleagues to plan discharge.

Throughout, **health administration** is present in the background: the stroke pathway, the round-the-clock availability of imaging, the staffing of the stroke unit, the integrated electronic record linking orders, images, and medication reconciliation, and the quality dashboard that tracks door-to-imaging times are all products of administrative design. The patient leaves hospital with minimal disability. No single professional produced this outcome; it resulted from the alignment of five disciplines within a deliberately designed system.

In time-critical care, the speed and safety of treatment depend less on any individual and more on how smoothly the hand-offs between disciplines occur.

8. THE SAUDI ARABIAN CONTEXT

8.1 Vision 2030 and the Health Sector Transformation

The Health Sector Transformation Program under Vision 2030 aims to improve access, quality, and efficiency, and to shift the system toward prevention and value-based, patient-centred care (Health Sector Transformation Program, 2021). The new Model of Care organises services around patient needs through "systems of care" — such as urgent care, planned procedures, chronic conditions, and women's and children's health — each of which inherently requires multidisciplinary coordination. The reorganisation of public services into regional health clusters, intended to provide integrated care to defined populations, further reinforces the need for coordinated, team-based delivery across hospitals and primary care.

8.2 Regulatory and Professional Structures

The Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI) sets national standards that address many team-related processes, including patient assessment, care planning, medication management, communication of critical results, handover, infection control, and quality improvement. The Saudi Commission for Health Specialties (SCFHS) regulates the classification, registration, training, and continuing professional development of physicians, nurses, pharmacists, radiology professionals, and health administrators, and its postgraduate training programs offer an opportunity to embed interprofessional competencies. The Saudi Food and Drug Authority (SFDA) contributes to medication and medical-device safety, including pharmacovigilance that relies on reporting from clinical teams.

8.3 Digital Health Infrastructure

Saudi Arabia has invested heavily in digital health. National initiatives include electronic prescribing through the Wasfaty platform, which connects prescribers and community pharmacies; the Nphies platform for health-insurance and health-information exchange; the Seha Virtual Hospital, which provides remote specialist support — including tele-radiology and virtual consultations — to hospitals across the Kingdom; and the Sehhaty application for patients. These platforms provide a foundation for information sharing across disciplines and institutions, and their full integration into team workflows could substantially strengthen coordination.

8.4 Workforce Characteristics

The Saudi health workforce is diverse, combining Saudi professionals with a large number of professionals trained in many different countries. This diversity brings rich expertise, but it also means that team members may bring different professional norms, communication styles, and expectations about hierarchy. Saudisation policies and expanding national training programs are increasing the number of Saudi nurses, pharmacists, radiology technologists, and health administrators. Shared training in standardised communication and teamwork tools helps create a common team culture across this diversity.

8.5 National Quality and Patient Safety Priorities

Saudi Arabia has placed patient safety and quality at the centre of its health transformation. National patient safety initiatives, the accreditation cycle of CBAHI, and the performance-measurement systems used by health clusters all create mechanisms through which team-related processes can be monitored and improved. Indicators such as compliance with critical-result communication, medication reconciliation rates, handover compliance, door-to-imaging times for stroke, and readmission rates directly reflect the quality of multidisciplinary coordination. Aligning these indicators across disciplines — so that physicians, nurses, pharmacists, radiology professionals, and administrators are jointly accountable for shared outcomes rather than separately accountable for discipline-specific tasks — would strengthen the incentive for genuine collaboration.

The growth of Saudi health-care education also offers an important opportunity. As universities expand programs in medicine, nursing, pharmacy, radiological sciences, and health administration, shared interprofessional modules, joint simulation exercises, and common clinical placements can help future professionals develop a team identity from the beginning of their careers, rather than encountering interprofessional collaboration for the first time in the workplace.

Table 7. Saudi Enablers of Multidisciplinary Teamwork

Enabler	Relevance to Teams	Opportunity
Model of Care / systems of care	Organises services around patient journeys	Define team composition for each system of care
Health clusters	Integrated care for defined populations	Cross-facility multidisciplinary pathways
CBAHI standards	Accreditation of communication, medication, and handover processes	Embed team metrics in accreditation surveys
SCFHS training & CPD	Professional competence across disciplines	Interprofessional modules in residency and CPD
Wasfaty, Nphies, Seha Virtual Hospital	Digital information sharing and remote expertise	Connect pharmacy, radiology, and clinical teams in real time

9. BARRIERS TO EFFECTIVE MULTIDISCIPLINARY TEAMWORK

Despite strong evidence and policy support, effective teamwork is difficult to achieve in practice. The main barriers include:

- ◆ **Professional hierarchy:** steep authority gradients can discourage nurses, pharmacists, and junior staff from speaking up about safety concerns.
- ◆ **Professional silos:** separate education, departments, and reporting lines reinforce discipline-specific identities rather than shared team identity.
- ◆ **Role ambiguity:** unclear boundaries — for example, between clinical pharmacist and physician prescribing roles — lead to duplication or gaps.
- ◆ **Communication failures:** unstructured handovers, incomplete imaging requests, and delayed reporting of critical results.
- ◆ **Workload and staffing pressures:** heavy workloads leave little time for interdisciplinary rounds and meetings.
- ◆ **Fragmented information systems:** separate or poorly interoperable systems for pharmacy, radiology, and clinical documentation.
- ◆ **Cultural and linguistic diversity:** differences in communication styles and language among an internationally trained workforce.
- ◆ **Limited teamwork training:** most professionals are educated in uniprofessional programs with little shared learning.
- ◆ **Weak measurement:** few organisations measure team performance or link it to patient outcomes.

9.1 The Role of Psychological Safety

Many of these barriers converge on a single concept: psychological safety, the shared belief that team members can speak up, ask questions, and admit mistakes without fear of humiliation or punishment. In teams with low psychological safety, the independent defensive layers described by Reason (2000) collapse, because concerns are not voiced. Leaders in all disciplines — and especially physicians and managers, who hold the most formal authority — shape psychological safety through their everyday responses to questions and challenges.

9.2 Managing Interprofessional Conflict

Disagreement is inevitable in teams composed of professionals with different training and perspectives, and constructive disagreement is valuable: it surfaces alternative interpretations and catches errors. Conflict becomes harmful when it is personal, unresolved, or suppressed. Common sources include disputes over clinical decisions, workload distribution, perceived disrespect of professional roles, and competition for scarce resources such as imaging slots or beds.

Effective conflict management relies on shared goals — redirecting attention to what is best for the patient — together with clear escalation pathways, structured tools such as the CUS phrases ("I am Concerned, I am Uncomfortable, this is a Safety issue") and the two-challenge rule from TeamSTEPPS, and leaders who address recurring tensions promptly and fairly. Health administrators can reduce structural sources of conflict by clarifying roles, ensuring equitable workloads, and creating forums in which interprofessional issues can be discussed openly. Teams that manage conflict well tend to be more cohesive, more innovative, and safer.

9.3 Barriers Specific to Each Discipline

Table 8. Discipline-Specific Barriers and Responses

Discipline	Common Barrier	Suggested Response
Medicine	Time pressure; traditional hierarchical leadership	Structured, time-limited interdisciplinary rounds; leadership training
Nursing	Heavy workload; reluctance to challenge	Safe staffing; SBAR training; psychological safety
Health Administration	Distance from clinical frontline	Regular leadership rounds; clinician involvement in decisions
Pharmacy	Insufficient clinical pharmacist coverage on wards	Ward-based pharmacist models prioritising high-risk units
Radiology	Limited clinical information on requests; reporting backlogs	Structured electronic requests; critical-result protocols; tele-radiology support

10. THE UNITE FRAMEWORK

Building on the preceding analysis, this paper proposes the **UNITE Framework** for integrating medicine, nursing, health administration, pharmacy, and radiology into high-performing multidisciplinary teams. The framework comprises five mutually reinforcing pillars.

Table 9. The UNITE Framework for Multidisciplinary Team Integration

Pillar	Description	Key Actions	Indicators
U — Unified patient-centred goals	All disciplines work toward explicit, shared goals for each patient	Shared care plans; goals of care documented; patient and family involvement	Proportion of patients with shared documented goals
N — Navigated structured communication	Standardised, closed-loop communication across disciplines	SBAR; structured handover; critical-result protocols; daily huddles	Handover compliance; critical-result timeliness

Pillar	Description	Key Actions	Indicators
I — Integrated and clarified roles	Every discipline understands its own and others' roles	Role charters; interdisciplinary rounds; pharmacist and radiologist inclusion in MDTs	Attendance at rounds and MDTs; role-clarity survey
T — Technology-enabled coordination	Shared digital tools connect the team in real time	Integrated EHR; CPOE with decision support; PACS integration; national platforms	Interoperability coverage; alert response times
E — Evaluation of shared outcomes	Team performance is measured and fed back	Team dashboards; incident review; teamwork climate surveys; outcome audit	Mortality, ADEs, LOS, readmission, patient experience

10.1 How the Framework Operates

The pillars of UNITE operate as a cycle. Unified goals give the team a common purpose; structured communication carries information reliably between disciplines; integrated roles ensure that each professional's contribution is expected and used; technology provides the shared informational environment; and evaluation measures whether the team is improving outcomes and identifies where to strengthen the other pillars. In Donabedian's terms, roles and technology strengthen structure; goals and communication strengthen process; and evaluation focuses attention on outcomes.

10.2 The Administrative Role in UNITE

Health administration is the enabler that makes UNITE sustainable. Administrators protect time for rounds and MDT meetings, invest in interoperable information systems, fund teamwork training, set staffing standards that permit collaboration, and establish dashboards that make team performance visible. They also model the behaviour expected of teams by involving clinicians from all disciplines in decisions that affect their work.

10.3 Implementation Phasing

- ◆ **Phase 1 — Readiness (0–6 months):** leadership commitment, teamwork climate baseline survey, role charters, and TeamSTEPPS training for pilot units.
- ◆ **Phase 2 — Pilot (6–18 months):** interdisciplinary rounds with pharmacist participation, structured handover, critical-result protocols, and team dashboards in selected units such as internal medicine, intensive care, and stroke.
- ◆ **Phase 3 — Scale-up (18–36 months):** organisation-wide rollout, integration with cluster-level pathways and national digital platforms, and incorporation of team indicators into accreditation and performance management.

11. Future Directions

Several developments are likely to reshape multidisciplinary teamwork in the coming decade. Artificial intelligence is being applied to imaging interpretation, early-warning systems for clinical deterioration, and medication-error detection; these tools will function best as additional "team members" whose outputs are integrated into human team decisions, rather than as replacements for professional judgement. Virtual care is extending teams beyond the walls of a single hospital, allowing radiologists, pharmacists, and specialists to contribute remotely to patients across a region. Value-based payment models will increasingly reward outcomes that depend on coordinated care, strengthening the business case for teamwork.

Research priorities include rigorous evaluation of team interventions in Saudi hospitals, studies of teamwork across culturally diverse workforces, development of validated Arabic-language teamwork measures, and evaluation of how national digital platforms affect interprofessional coordination and patient outcomes.

12. RECOMMENDATIONS

12.1 For Policymakers and Regulators

- ◆ Define standard multidisciplinary team composition for each system of care within the Model of Care.
- ◆ Incorporate teamwork and interprofessional communication indicators into CBAHI accreditation.
- ◆ Embed interprofessional education in undergraduate and SCFHS postgraduate training programs.

12.2 For Health Administrators

- ◆ Protect time and space for interdisciplinary rounds, huddles, and MDT meetings.
- ◆ Invest in interoperable systems linking clinical, pharmacy, and radiology information.
- ◆ Establish team performance dashboards and act on teamwork climate survey results.
- ◆ Ensure staffing levels and skill mix that permit collaboration rather than mere task completion.

12.3 For Clinical Professionals

- ◆ Physicians: lead inclusively, invite challenge, and use structured rounds.
- ◆ Nurses: use SBAR and structured handover, and escalate concerns confidently.
- ◆ Pharmacists: participate actively in rounds and lead medication reconciliation at every transition.
- ◆ Radiology professionals: participate in MDTs, communicate critical findings directly, and advise on appropriate imaging.

12.4 For Educators and Researchers

- ◆ Use simulation-based interprofessional training to build teamwork skills.
- ◆ Evaluate team interventions using patient-outcome measures in the Saudi context.

13. CONCLUSION

The evidence reviewed in this paper supports a clear conclusion: patient outcomes depend not only on the expertise of individual professionals, but on how well those professionals work together. Medicine provides diagnostic and therapeutic leadership; nursing provides continuous care, surveillance, and advocacy; pharmacy safeguards and optimises medication use; radiology provides timely and accurate diagnostic information; and health administration designs the system in which all of this happens. Each discipline is necessary, but none is sufficient on its own.

Effective integration requires deliberate design — shared goals, structured communication, clear and respected roles, connected information systems, and continuous measurement — as captured in the proposed UNITE Framework. It also requires a culture of psychological safety in which every team member can speak up for the patient.

For Saudi Arabia, the Vision 2030 health transformation, the Model of Care, health clusters, robust accreditation and professional regulation, and advanced national digital platforms provide an exceptional foundation. By intentionally building multidisciplinary teams on this foundation, Saudi health institutions can deliver care that is safer, more effective, more efficient, and more responsive to the needs of patients and their families.

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