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Multidisciplinary Team Group Effort in Healthcare; The Role of Emergency, Clinical, and Administrative Professionals in Improving Outcomes and Hospital Performance

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Abstract

This study examines how multidisciplinary collaboration among emergency, clinical, and administrative professionals influences patient outcomes and overall hospital performance. Focusing on real-world interactions in acute care settings, it analyzes communication patterns, decision-making processes, and coordinated workflows that bridge clinical and non-clinical roles. By mapping how emergency physicians, nurses, allied health staff, and administrators share information and align priorities during care transitions, the research identifies which collaborative behaviors are most strongly associated with reduced length of stay, lower readmission rates, and improved patient safety metrics. The study also considers contextual factors—such as staffing levels, electronic health record (EHR) integration, and leadership support—that enable or hinder effective teamwork. Using a mixed-methods design, the study combines quantitative performance indicators with qualitative data from interviews, focus groups, and direct observations to generate a comprehensive picture of interprofessional practice. Statistical analyses correlate specific collaborative interventions (for example, structured handoff protocols or interdisciplinary rounds) with measurable improvements in efficiency and clinical outcomes, while thematic analysis reveals perceived barriers like role ambiguity, time pressure, and cultural silos. The findings aim to inform practical recommendations for training, workflow redesign, and policy changes that strengthen multidisciplinary collaboration and, in turn, enhance hospital resilience, patient experience, and operational sustainability.

Keywords: Multidisciplinary Collaboration, Interprofessional Communication, Emergency Medicine, Patient Outcomes, Hospital Performance.

INTRODUCTION

The contemporary healthcare landscape is characterized by an unprecedented level of complexity. Patients often present with multiple, co-morbid conditions, medical technology advances at a rapid pace, and the demands for both clinical excellence and financial sustainability are higher than ever. In this intricate environment, the paradigm of the solitary physician making all critical decisions in isolation is not

only outdated but also potentially hazardous. The solution to navigating this complexity lies in a structured, effective, and dynamic approach known as multidisciplinary collaboration (MDC). This research paper will delve into the critical importance of MDC in healthcare, specifically examining the synergistic roles of emergency, clinical, and administrative professionals in improving patient outcomes and enhancing overall hospital performance. The central thesis of this work is that seamless, respectful, and efficient collaboration among these distinct yet interdependent professional domains is not merely an aspirational goal but a fundamental prerequisite for a high-performing, patient-centered healthcare system.

Multidisciplinary collaboration can be defined as an integrated team approach where professionals from different disciplines work together, sharing responsibilities and expertise to achieve common, patient-focused goals [1]. This model moves beyond simple communication or coordination; it involves a deep level of interaction where the unique knowledge and skills of each professional are valued and integrated into a unified care plan. The theoretical foundation for this approach is rooted in systems theory, which posits that the whole of a system is greater than the sum of its parts [2]. When applied to healthcare, the system—the hospital or care unit—can achieve superior results through the effective integration of its components—the diverse healthcare professionals. The benefits postulated by this theory are manifold, including reduced medical errors, decreased fragmentation of care, improved patient and staff satisfaction, and more efficient use of resources [3].

The impetus for adopting robust collaborative models is driven by several powerful forces. Firstly, evidence-based medicine consistently demonstrates a strong correlation between effective teamwork and improved patient safety. Seminal reports, such as "To Err is Human" by the Institute of Medicine, highlighted that a significant proportion of adverse medical events are attributable to failures in communication and teamwork, not merely individual clinical incompetence [4]. Secondly, accrediting bodies and payers are increasingly linking reimbursement to performance metrics related to patient outcomes and satisfaction. Programs like value-based purchasing create a direct financial incentive for hospitals to foster environments that support collaborative care [5]. Finally, from an ethical standpoint, a collaborative approach ensures that care decisions are holistic, considering the patient's medical, psychological, and social needs, thereby upholding the principle of patient-centered care [6].

Within the broader framework of MDC, the roles of three key professional groups are particularly pivotal: emergency, clinical (encompassing physicians, nurses, and allied health professionals), and administrative staff. The emergency department (ED) serves as the "front door" of the hospital for many patients, functioning in a high-stakes, high-pressure environment where rapid and accurate decision-making is critical. Emergency professionals—including emergency physicians, nurses, and technicians—are experts in triage, stabilization, and initial diagnosis. Their role in collaboration is to provide a concise, accurate handoff of information to the inpatient teams, ensuring continuity of care and preventing errors during transitions [7]. A breakdown in communication between the ED and the receiving clinical units can lead to delays in treatment, medication errors, and patient deterioration [8].

The second group, the core clinical professionals, is responsible for the ongoing management and treatment of the patient. This group includes hospitalists, specialist physicians, registered nurses, physical therapists, respiratory therapists, pharmacists, and social workers. Each brings a unique and essential perspective to the patient's care. For instance, while a physician diagnoses and prescribes treatment, the nurse provides continuous monitoring and patient education, the pharmacist ensures medication safety and efficacy, and the physical therapist focuses on functional recovery. True collaboration occurs in forums such as multidisciplinary rounds or patient care conferences, where these professionals jointly develop and review care plans [9]. Studies have shown that structured interdisciplinary rounds can significantly reduce hospital length of stay and complication rates [10]. The synergy within this group ensures that the care plan is comprehensive and that potential problems are identified from multiple angles.

The third, and often underappreciated, group in the collaborative triad is the administrative professionals. This cohort includes hospital executives, unit managers, quality improvement specialists, and health information managers. Their role is fundamentally different from direct patient care but is no less critical. Administrators are responsible for creating the infrastructure that enables collaboration to flourish. They develop and implement policies, allocate resources, manage budgets, and design workflows that either facilitate or hinder interdisciplinary teamwork [11]. For example, an administrator who invests in a unified electronic health record (EHR) system that is accessible to all disciplines is actively removing a barrier to collaboration. Similarly, by championing a culture of safety and teamwork from the top down, leadership sets the organizational tone that determines whether staff feel empowered to speak up and collaborate effectively [12]. Without the strategic support and resource allocation from administration, the best efforts of clinical and emergency staff can be thwarted by systemic obstacles.

The interaction between these three domains—emergency, clinical, and administrative—creates a dynamic ecosystem. The effectiveness of this ecosystem

directly determines hospital performance on key metrics. When collaboration is strong, the results are tangible: improved patient outcomes (e.g., lower mortality and readmission rates), enhanced patient safety (e.g., reduced adverse drug events and hospital-acquired infections), and greater operational efficiency (e.g., reduced ED wait times, decreased length of stay, and lower costs) [13]. Furthermore, a collaborative environment boosts staff morale and reduces burnout by fostering a sense of shared purpose and mutual support.

Despite the clear benefits, achieving effective multidisciplinary collaboration is fraught with challenges. These include deeply ingrained professional hierarchies, communication barriers due to discipline-specific jargon, logistical constraints like scheduling conflicts, and a lack of formal training in teamwork skills. This paper will argue that overcoming these challenges requires a concerted effort, with administrative leadership playing a key role in implementing targeted strategies such as interdisciplinary training simulations, standardized communication tools (e.g., SBAR - Situation, Background, Assessment, Recommendation), and performance evaluation systems that reward collaborative behavior.

Integrated Roles of Emergency, Clinical, and Administrative Professionals in Patient Care

The modern healthcare delivery system is an intricate tapestry woven from the specialized threads of diverse professions. The paradigm has decisively shifted from a physician-centric model to a collaborative ecosystem where the integrated roles of emergency, clinical, and administrative professionals are fundamental to delivering safe, effective, and efficient patient care. This integration is not a matter of simple proximity but a deliberate, structured process of interaction where the distinct expertise of each group synergizes to create a whole that is greater than the sum of its parts. The journey of a patient through the healthcare system, from crisis to recovery, is a testament to the seamless handoffs and shared decision-making among these professionals. Understanding their integrated roles is crucial for appreciating how complex medical interventions are successfully managed and how healthcare organizations achieve their clinical and operational goals. This section delves into the specific contributions and interactions of these three pillars of the healthcare system, illustrating how their interdependence forms the backbone of patient-centered care.

The integration begins at the critical point of entry: the Emergency Department (ED). Emergency professionals, including physicians, nurses, and technicians, act as the first responders and master diagnosticians under extreme pressure. Their primary role is one of rapid assessment, resuscitation, and stabilization, making split-second decisions that can determine a patient's trajectory. However, their effectiveness is profoundly amplified through integration with the wider hospital system. For instance, the emergency physician's initial diagnosis and treatment plan must be effectively communicated to the hospitalist or specialist who will assume care. This is where tools like the SBAR (Situation, Background, Assessment, Recommendation) protocol become vital, ensuring a standardized and accurate transfer of information [14]. The emergency nurse's handoff to the inpatient unit nurse is equally critical, covering nuances of the patient's condition, family dynamics, and responses to initial treatments that may not be fully captured in the medical chart. This seamless transition mitigates the risks associated with care fragmentation, which is a leading cause of medical errors [15]. Thus, the emergency team's role is integrated not in isolation, but as the essential initiator of a continuous care pathway.

Once the patient is stabilized and admitted, the baton is passed to the core clinical team, whose role is one of comprehensive and sustained management. This group represents the broadest spectrum of expertise, including hospitalists, specialist physicians, registered nurses, pharmacists, physical and respiratory therapists, social workers, and dietitians. Integration within this team is the engine of inpatient care. The model of multidisciplinary rounds exemplifies this integration perfectly. During these rounds, each professional contributes their unique assessment. The physician presents the medical plan, the nurse reports on the patient's vital signs, pain levels, and response to care, the pharmacist reviews the medication profile for potential interactions, the therapist discusses mobility goals, and the social worker addresses discharge planning needs [16]. This collective forum ensures that the care plan is holistic, addressing not just the disease, but the person as a whole. Research has consistently shown that such structured interdisciplinary collaboration leads to significantly better outcomes, including reduced hospital-acquired infections, lower mortality rates, and decreased length of stay [17]. The integrated clinical team functions as a checks-and-balances system, where the diverse perspectives act as a safeguard against oversight and error, ultimately crafting a robust and patient-specific roadmap to recovery.

The integration between the emergency and clinical teams is a dynamic, two-way street. While the ED initiates the process, the inpatient units provide feedback that is essential for system-wide improvement. For example, if a patient admitted from the ED frequently experiences a specific complication, such as a medication error during transition, the clinical team's feedback can lead the emergency department to revise its protocols. This continuous feedback loop, often facilitated by quality improvement departments, is essential for refining processes and enhancing patient safety across the entire organization [18]. Furthermore, the clinical team's ability to provide efficient care is heavily dependent on the initial workup and accurate

diagnosis performed in the ED. A delay or error at the point of entry can create ripple effects, complicating the inpatient stay and consuming more resources. Therefore, the integration between these two clinical domains is not sequential but cyclical, fostering a culture of shared responsibility and mutual accountability for the patient's journey from admission to discharge.

The third, and arguably the most foundational, element of this integrated framework is the role of administrative professionals. Their integration is not at the bedside but within the very architecture of the healthcare system. Administrators, including executives, managers, and IT specialists, are the enablers of collaboration. They are responsible for creating the conditions under which clinical integration can thrive. This involves strategic decisions that have a direct impact on patient care. For example, the implementation of a unified Electronic Health Record (EHR) system is an administrative function that fundamentally transforms integration. A well-designed EHR gives all providers—emergency and clinical—instant, simultaneous access to the same patient data, reducing communication gaps and duplicate testing [19]. Similarly, administrators allocate the financial and human resources necessary to support interdisciplinary activities, such as funding for training programs in teamwork and communication skills or ensuring adequate staffing levels to allow professionals time to participate in collaborative rounds [20].

Perhaps the most critical integrative role of administration is shaping the organizational culture. Leadership must actively champion a culture of psychological safety, where a nurse feels empowered to question a physician's order if they have a concern, or a therapist feels comfortable suggesting an alternative approach to care [21]. Without this top-down endorsement of collaboration, hierarchical barriers can stifle the open communication necessary for effective integration. Administrators also integrate care from a macro perspective by developing performance metrics that reward teamwork and positive patient outcomes rather than just individual productivity. By aligning financial and operational incentives with the goals of integrated care, leadership ensures that collaboration is not just an ideal but a measurable and rewarded practice [22].

Roles and Responsibilities: Emergency, Clinical, and Administrative Professionals Defined

A clear and precise definition of the roles and responsibilities of each professional group within a healthcare organization is the cornerstone of effective multidisciplinary collaboration. While integration is the goal, it cannot be achieved without first understanding the distinct functions, expertise, and accountabilities that each contributor brings to the patient care continuum. Ambiguity in roles can lead to task duplication, critical omissions, interprofessional conflict, and ultimately, compromised patient safety. This section provides a detailed delineation of the primary responsibilities of emergency, clinical, and administrative professionals, highlighting how their specialized domains of practice, while distinct, are designed to interlock seamlessly within the healthcare system. By establishing this foundational clarity, we can better appreciate how these roles synergize to form a cohesive and high-performing unit.

The role of emergency professionals is defined by urgency, diagnostic acumen, and stabilization. Operating in a high-stakes, often chaotic environment, the Emergency Department (ED) team's primary responsibility is to manage acute and undifferentiated illness and injury. The emergency physician acts as the team leader, tasked with rapid assessment, diagnosis, and initiation of life-saving treatments. Their crucial skill is the ability to generate a broad differential diagnosis with limited information and to prioritize care based on the severity of the patient's condition, a process known as triage. Key responsibilities include performing complex procedures (e.g., intubation, central line placement), interpreting diagnostic tests under time pressure, and making critical decisions regarding patient disposition—admission, discharge, or transfer [23]. The emergency nurse's role is equally vital, encompassing continuous patient monitoring, medication administration, patient advocacy, and acting as a central communication hub between the physician, the patient, the family, and other departments. Emergency nurses are also experts in trauma care and crisis management [24]. Together, their core responsibility is not to provide definitive care for chronic conditions, but to identify and manage immediate threats to life and limb, ensuring the patient is stable enough for the next phase of treatment.

In contrast to the emergent nature of the ED, the roles and responsibilities of the core clinical professionals are characterized by comprehensive, sustained, and holistic patient management. This group assumes care once the patient is admitted to the hospital, and their work is focused on treatment, healing, and recovery. The attending physician, often a hospitalist or a specialist, bears the ultimate responsibility for the medical diagnosis and treatment plan. Their duties include conducting detailed histories and physical examinations, ordering and interpreting diagnostic tests, performing procedures specific to their specialty, and prescribing medications. They lead the development of the overall care plan in collaboration with the broader team [25]. The registered nurse (RN) is responsible for the continuous, 24/7 implementation and evaluation of this care plan. Nursing responsibilities are extensive and include administering medications, monitoring patient responses to treatment, providing patient and family education, performing wound care, and, most importantly, serving as the patient's primary advocate at the bedside. The nurse's constant presence provides a unique, holistic perspective on the patient's progress and well-being [26].

The clinical domain is further enriched by a diverse array of allied health professionals, each with a highly specialized scope of practice. The clinical pharmacist is responsible for ensuring medication safety, reviewing orders for appropriateness, checking for drug interactions, and educating patients on their medications [27]. Physical and occupational therapists are accountable for assessing and improving the patient's functional mobility and ability to perform activities of daily living, which is critical for recovery and safe discharge [28]. Respiratory therapists manage ventilators and administer treatments for patients with pulmonary conditions. Social workers and case managers address the psychosocial and discharge planning needs, coordinating post-acute care services and ensuring a safe transition out of the hospital [29]. The defining characteristic of this group is the depth of their specialized knowledge applied over the duration of the patient's stay, with a shared responsibility for achieving the best possible long-term outcome.

The roles and responsibilities of administrative professionals are fundamentally different from direct patient care, yet they form the essential infrastructure upon which all clinical activities depend. Their work is strategic, operational, and systemic. Healthcare executives and senior leaders (e.g., CEOs, CNOs, CMOs) are responsible for setting the organization's mission, vision, and strategic goals. They ensure the financial viability of the institution by managing multi-million dollar budgets, negotiating with insurers, and making strategic investments in technology and facilities. A core part of their responsibility is to foster an organizational culture that prioritizes patient safety, quality improvement, and professional collaboration [30]. Unit managers and directors have more localized responsibilities, overseeing specific departments. They are accountable for staffing, scheduling, budgeting for their unit, ensuring compliance with hospital policies and accreditation standards, and supporting the professional development of their staff. They act as the crucial liaison between frontline staff and senior leadership, translating strategic goals into operational reality [31].

Other key administrative roles include health information management professionals, who are responsible for maintaining the integrity, confidentiality, and accessibility of patient medical records, a function critical to both care coordination and legal compliance [32]. Quality improvement and patient safety officers are tasked with developing and monitoring clinical metrics, analyzing incident reports, and leading initiatives to reduce medical errors and improve patient outcomes [33]. Finally, IT professionals support the entire ecosystem by managing the Electronic Health Record (EHR) systems, ensuring their reliability, security, and functionality to facilitate seamless information sharing among all providers [34]. The overarching responsibility of the administrative cohort is to create, maintain, and optimize the systems, resources, and culture that enable emergency and clinical professionals to perform their duties effectively and safely. They are the architects and engineers of the healthcare delivery system.

Mechanisms of Collaboration: Processes, Tools, and Technologies that Enable Teamwork

Effective collaboration within the high-stakes environment of the Emergency Department (ED) does not occur spontaneously; it requires deliberate implementation of structured mechanisms. These mechanisms—comprising standardized processes, communication tools, and enabling technologies—form the essential infrastructure that transforms a group of individual experts into a cohesive, high-reliability team. The chaotic and unpredictable nature of emergency care, with its constant interruptions and influx of critically ill patients, demands systems that promote clarity, predictability, and shared situational awareness. Without such mechanisms, communication falters, tasks are missed, and patient safety is compromised. This section explores the critical processes, tools, and technologies that facilitate effective teamwork among emergency professionals, enabling them to perform under pressure and ensure seamless coordination both within the ED and with other hospital departments.

The foundation of collaboration in the ED is built upon standardized processes that create a common workflow and expectations for all team members. One of the most critical processes is the formalized handoff, which occurs during shift changes and when transferring patient care to other units. Ad-hoc verbal reports are prone to omission and error. To combat this, structured mnemonics like ISBAR (Identify, Situation, Background, Assessment, Recommendation) provide a consistent framework for communication, ensuring that all vital information is conveyed efficiently and accurately [35]. Another key process is the implementation of multidisciplinary rounds within the ED. While challenging in a fast-paced setting, brief, focused "huddles" at the start of a shift or for complex cases allow physicians, nurses, and technicians to collaboratively set priorities, assign roles, and anticipate potential challenges for the upcoming period [36]. Furthermore, the use of clinical pathways and order sets for common conditions like sepsis, stroke, or myocardial infarction standardizes care based on best evidence. These pathways ensure that every team member, regardless of discipline, understands the sequence of necessary interventions, reducing variability and delays in treatment [37]. These processes institutionalize collaboration, making it a routine part of emergency workflow rather than an exception.

Complementing these standardized processes are specific communication tools designed to cut through the noise and hierarchy of the ED environment, fostering psychological safety and clear information exchange. The SBAR tool, previously mentioned for inter-departmental handoffs, is equally vital for intra-team

communication within the ED. It empowers a nurse to succinctly and confidently articulate a concern about a patient's changing condition to a physician, structuring the conversation to be focused and actionable [38]. For team management during a medical resuscitation, the TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) program offers invaluable tools. The concept of a "closed-loop communication" is crucial: when a physician gives an order ("Nurse, administer 500 micrograms of epinephrine"), the nurse repeats back the order ("Administering 500 micrograms of epinephrine"), and the physician confirms ("Correct"). This simple three-step process verifies that the message was received and understood correctly, preventing tragic medication errors [39]. Another TeamSTEPPS tool is the "check-back," a formal process for verifying the understanding of information. Perhaps the most critical tool for ensuring safety is the "CUS" framework (I am Concerned, I am Uncomfortable, this is a Safety issue), which provides a clear, escalating script for any team member to voice concerns and halt a potentially unsafe action, effectively flattening traditional hierarchies in the interest of patient safety [40]. These tools provide a common language for teamwork, ensuring that communication is not only frequent but also effective and reliable.

Technology serves as the third pillar, providing the platforms that make these processes and tools operational on a large scale. The most significant technological advancement enabling collaboration is the Electronic Health Record (EHR). A well-integrated EHR provides a single, shared source of truth for the entire care team. Physicians enter orders, nurses document assessments and administration, and all results from labs and imaging are available in real-time to everyone simultaneously. This eliminates the need for constant verbal updates on test results and reduces the risk of information being lost in paper charts [41]. Beyond the EHR, clinical decision support (CDS) systems embedded within the EHR can alert the entire team to critical situations, such as a patient with sepsis criteria or a drug-drug interaction, prompting immediate and collaborative action [42]. Communication is further enhanced by secure messaging platforms designed for healthcare (e.g., HIPAA-compliant chat applications). These allow for quick, asynchronous questions and updates between team members without the disruption of overhead paging or searching the department for a person [43]. Finally, tracking boards—large digital displays in the ED—provide at-a-glance situational awareness for the entire team. They show the status of every patient (e.g., waiting, being seen, awaiting admission), the assigned nurse and physician, and key metrics, allowing for dynamic resource allocation and collective management of departmental flow [44].

The true power of these mechanisms is realized when they are integrated into a single, cohesive system. For example, when a patient with chest pain arrives, the tracking board alerts the team. The sepsis clinical pathway in the EHR guides the nurse and physician through a standardized set of orders. The nurse uses SBAR to report initial findings to the physician. During a critical intervention, the team uses closed-loop communication to administer medications. Once the patient is stabilized and requires admission, an ISBAR report is generated from the EHR data and used for handoff to the inpatient unit. This seamless integration of process, tool, and technology creates a highly reliable environment.

However, the implementation of these mechanisms is not without challenges. Resistance to change, inadequate training, and technology that is not user-friendly can hinder adoption. The effectiveness of any tool is contingent upon a culture that supports its use. Leadership must actively foster a culture of psychological safety where staff feel empowered to use the CUS words without fear of reprisal [45]. Ongoing, interprofessional training through simulation exercises is essential for teams to practice using these mechanisms in a risk-free environment before applying them in a real clinical crisis. In conclusion, the move from theoretical collaboration to practical teamwork in the emergency setting is engineered through the deliberate application of structured processes, validated communication tools, and smart technologies. These mechanisms are not optional extras but fundamental components of a modern, safe, and efficient Emergency Department. They encode collaboration into the very DNA of emergency care, ensuring that even under the most intense pressure, the team functions as a unified whole, dedicated to achieving the best possible outcomes for every patient.

Impact on Patient Outcomes: Evidence Linking Multidisciplinary Teams to Clinical Quality

The ultimate validation of any healthcare model lies in its demonstrable impact on patient outcomes and system performance. The theoretical appeal of multidisciplinary collaboration is firmly supported by a growing and robust body of empirical evidence that directly links effective teamwork to superior clinical quality, enhanced patient safety, and improved hospital efficiency. Moving beyond anecdotal accounts, this section examines the concrete evidence demonstrating how the integrated efforts of emergency, clinical, and administrative professionals directly translate into measurable benefits for patients and healthcare organizations alike. The correlation is clear: when collaboration is structured, intentional, and supported, the results manifest in reduced mortality, fewer complications, higher patient satisfaction, and optimized resource utilization. This evidence provides a compelling mandate for healthcare leaders to invest in cultivating a collaborative culture, as it is not merely an ethical imperative but a strategic one with proven returns on investment.

One of the most significant areas where multidisciplinary collaboration demonstrates a profound impact is in the management of time-sensitive medical conditions, where standardized, team-based protocols are critical. The treatment of sepsis, a leading cause of hospital mortality, provides a powerful example. The implementation of multidisciplinary sepsis response teams, involving emergency physicians, nurses, pharmacists, and laboratory technicians working from a unified protocol, has been consistently shown to improve adherence to early goal-directed therapy bundles. This includes faster administration of antibiotics, quicker fluid resuscitation, and improved monitoring. Studies have demonstrated that such collaborative approaches lead to a significant reduction in mortality rates, with one large meta-analysis reporting a mortality odds ratio of 0.66 for patients treated by a multidisciplinary sepsis team compared to standard care [46]. Similarly, in the management of acute stroke, the "Code Stroke" team—comprising emergency personnel, neurologists, radiologists, and nurses—ensures rapid assessment, imaging, and administration of thrombolytic therapy. The efficiency of this collaborative model is directly correlated with reduced "door-to-needle" times, which is a primary determinant of patient survival and functional recovery [47]. This evidence underscores that in critical care, time saved through seamless teamwork directly translates into brain and lives saved.

Beyond acute resuscitation, the positive impact of multidisciplinary collaboration extends to the entire inpatient journey, significantly influencing key quality metrics such as hospital-acquired conditions (HACs) and length of stay (LOS). Hospital-acquired infections, such as ventilator-associated pneumonia (VAP) and central line-associated bloodstream infections (CLABSI), are major sources of patient harm and cost. The formation of multidisciplinary teams to implement and monitor evidence-based bundles of care has proven highly effective. For instance, a team involving physicians, nurses, and respiratory therapists collaboratively adhering to a VAP prevention bundle (e.g., elevating the head of the bed, daily sedation holidays, oral care) has been shown to reduce infection rates to near-zero levels in many institutions [48]. This success is attributed to the shared ownership and accountability fostered within the team, where each member plays a vital role in protocol adherence. Furthermore, the integration of clinical pharmacists into patient care rounds has a direct impact on medication safety. Pharmacists' interventions in reviewing medication orders for appropriateness, dosing, and interactions have been linked to a substantial decrease in adverse drug events (ADEs), which are a common cause of patient injury and prolonged hospitalization [49].

The effect on hospital efficiency is equally evident. Structured interdisciplinary rounds (IDRs) are a cornerstone of collaborative care that directly impact the patient's length of stay. During IDRs, the entire team—physicians, nurses, case managers, social workers, and therapists—discusses the patient's progress and barriers to discharge. This proactive, coordinated planning prevents delays that occur when disciplines work in silos. Research has consistently shown that hospitals implementing daily IDRs experience a statistically significant reduction in average length of stay without compromising quality of care [50]. A shorter LOS not only reduces the risk of hospital-acquired complications for the patient but also improves hospital throughput, freeing up beds for patients waiting in the emergency department and thereby alleviating ED overcrowding. This creates a positive feedback loop where collaboration in one area (inpatient units) improves performance in another (the emergency department), enhancing overall hospital performance [51].

The benefits of multidisciplinary collaboration also extend to patient-centered outcomes and long-term health system performance. Patient satisfaction, increasingly tied to hospital reimbursement through value-based purchasing models, is strongly influenced by their perception of coordinated care. When patients experience a cohesive team where members are communicative and consistent in their messaging, their trust and satisfaction increase. Studies using the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey have found a positive correlation between patients' ratings of "care coordination" and their overall satisfaction scores [52]. Moreover, effective collaboration is crucial for successful discharge planning, which directly affects readmission rates. A multidisciplinary discharge process involving nurses, physicians, pharmacists educating the patient on new medications, and social workers arranging follow-up care ensures a safe transition home. This comprehensive approach has been demonstrated to reduce preventable 30-day hospital readmissions, particularly for patients with chronic conditions like heart failure and COPD [53].

From an organizational performance perspective, the financial implications are substantial. While investing in collaborative structures (e.g., training, dedicated time for rounds) incurs initial costs, the return is realized through avoided costs associated with medical errors, reduced length of stay, lower infection rates, and decreased readmissions. Hospitals with strong collaborative cultures exhibit better performance on value-based purchasing metrics, leading to higher reimbursements from payers like Medicare [54]. Furthermore, a collaborative environment has a positive impact on healthcare worker burnout. When professionals feel supported by a team, can voice concerns freely, and share the burden of complex decisions, job satisfaction increases and burnout decreases. This, in turn, leads to better staff retention, reducing the high costs associated with turnover and preserving institutional knowledge [55].

Technology and Information Systems Supporting Collaborative Healthcare Delivery

In the modern healthcare ecosystem, technology and information systems serve as the central nervous system that enables and enhances multidisciplinary collaboration. While effective teamwork is fundamentally a human endeavor, its scale, efficiency, and reliability are profoundly amplified by digital tools that connect the disparate roles of emergency, clinical, and administrative professionals. These technologies transform isolated data points into a cohesive stream of shared knowledge, creating a common operational picture that is essential for coordinated action. From the moment a patient enters the emergency department to their discharge and beyond, information systems work in the background to bridge communication gaps, automate workflows, and provide decision support. This section explores the specific technologies that underpin collaborative healthcare delivery, examining how Electronic Health Records, communication platforms, and data analytics tools integrate the efforts of diverse professionals to directly improve patient outcomes and hospital performance [56].

The cornerstone of health information technology is the Electronic Health Record (EHR). Far more than a digital replacement for paper charts, a well-implemented EHR system is the foundational platform for collaboration. It provides a single, shared source of patient truth that is accessible in real-time to authorized providers across the continuum of care. For the emergency physician, the EHR offers immediate access to a patient's medical history, previous diagnoses, and current medications, which is critical for making informed decisions quickly. For the inpatient clinical team, the EHR contains the ED workup, including triage notes, initial assessments, and diagnostic results, ensuring continuity and preventing redundant testing. For administrators, the EHR aggregates data for reporting on quality metrics, resource utilization, and compliance. The interoperability of EHR systems—their ability to exchange data with other systems—is particularly vital. When the hospital EHR can seamlessly receive records from a primary care physician's office or a nearby clinic, it provides a more complete patient story, enabling safer and more effective care [57]. By centralizing information, the EHR eliminates the traditional silos that hindered collaboration, ensuring that every team member, regardless of their discipline or location, is working from the same information.

Building upon the foundational data layer of the EHR, specialized technologies are deployed to facilitate real-time communication and dynamic coordination, particularly within the fast-paced emergency environment. Emergency Department Information Systems (EDIS) are specialized modules integrated with the main EHR that include digital tracking boards. These large, visible displays provide an at-a-glance overview of the entire department's status, showing each patient's location, chief complaint, treating team, and progress through the care process. This promotes shared situational awareness, allowing physicians, nurses, and administrators to collectively manage patient flow and allocate resources efficiently [58]. For direct communication, secure messaging platforms that comply with patient privacy laws (like HIPAA) have become indispensable. These applications, similar to commercial chat tools, allow for quick, asynchronous communication. A nurse can message a physician about a lab result, a pharmacist can clarify an order, or an administrator can alert the team to a bed availability status without the disruptions of overhead paging. This reduces communication delays and streamlines workflow [59].

Perhaps the most powerful technological adjuncts for collaboration are Clinical Decision Support (CDS) systems. These are intelligent software tools embedded within the EHR that analyze patient data against a knowledge base to provide actionable insights to the care team. CDS can take many forms: alerts that notify both the nurse and physician when a patient meets sepsis criteria; reminders for preventive care like vaccinations; and drug-drug interaction warnings that pop up for the pharmacist and prescriber simultaneously. By providing evidence-based prompts at the point of care, CDS systems act as a "second brain" for the entire team, reducing cognitive load and helping to standardize care according to best practices [60]. Furthermore, computerized provider order entry (CPOE) systems, where physicians enter orders directly into the EHR, have revolutionized safety. CPOE legibly captures orders and automatically routes them to the appropriate department (pharmacy, laboratory, radiology), eliminating errors from handwritten notes and ensuring that every team member sees the plan instantly [61]. These technologies create a networked environment where information triggers coordinated action automatically.

The collaborative potential of technology extends beyond direct patient care into the realms of performance analytics and patient engagement, which are crucial for continuous improvement. Data analytics and business intelligence platforms extract data from the EHR and other hospital systems to generate dashboards and reports. For clinical professionals, these tools can show outcomes for specific patient populations, helping them refine their practices. For administrators, they provide real-time metrics on key performance indicators such as average length of stay, ED wait times, and readmission rates. This data-driven approach enables multidisciplinary quality improvement committees to identify problems, monitor the impact of new collaborative protocols, and make informed decisions about resource allocation [62]. Telehealth and remote monitoring technologies are also expanding the boundaries of collaboration. Specialists can now conduct

virtual consultations into the ED from off-site, expanding access to expertise. For discharged patients, remote monitoring devices can send vital signs to a central platform monitored by a team of nurses and case managers, enabling early intervention and preventing readmissions [63].

However, the implementation of technology is not a panacea. Poorly designed or implemented systems can create new barriers to collaboration, a phenomenon known as "e-iattrogenesis." If the EHR is cumbersome and requires excessive data entry, it can shift the clinician's focus from the patient to the screen, hindering face-to-face teamwork [64]. The success of any technological tool is contingent upon interoperability—the ability of different systems to exchange and use data. When systems cannot communicate, information silos re-emerge, defeating the purpose of a collaborative platform [65].

Barriers and Facilitators: Organizational, Cultural, and Regulatory Influences on Collaboration

The implementation of effective multidisciplinary collaboration in the Emergency Department (ED) is not a straightforward technical challenge; it is a complex socio-technical endeavor influenced by a web of organizational structures, cultural norms, and regulatory frameworks. While the benefits of teamwork are well-documented, numerous significant barriers can hinder its practice, often causing well-intentioned initiatives to falter. Conversely, a thoughtful understanding of these obstacles allows for the identification and cultivation of powerful facilitators that can create an environment where collaboration thrives. This section examines the key organizational, cultural, and regulatory factors that act as either barriers or facilitators to collaboration among emergency, clinical, and administrative professionals, providing a realistic assessment of the challenges and the strategic levers available to overcome them.

Organizational barriers are perhaps the most visible and tangible impediments to collaboration. A primary obstacle is structural silos, where departments operate as independent "kingdoms" with separate budgets, reporting lines, and priorities. This siloed structure can create conflicting goals; for example, pressure on the ED to reduce "door-to-doctor" times may conflict with the inpatient unit's focus on reducing length of stay, leading to friction during patient handoffs and admissions [66]. Resource constraints, particularly chronic understaffing and high patient volumes, pose another critical barrier. When emergency professionals are overwhelmed, the luxury of time for structured huddles or comprehensive consultations with other services evaporates. Collaboration becomes perceived as an inefficient delay rather than a valuable process, leading to a regression to quick, unilateral decisions [67]. Furthermore, the physical layout of many EDs is not designed for teamwork. Lack of dedicated spaces for private interdisciplinary discussions can force sensitive conversations into crowded hallways, compromising confidentiality and the quality of communication [68]. From a technological standpoint, the absence of interoperable health information systems is a major organizational barrier. When the ED's tracking system cannot communicate seamlessly with the inpatient nursing system or the primary care EHR, information gaps occur, forcing staff to rely on inefficient and error-prone manual workarounds [69].

While organizational barriers are significant, the cultural and interpersonal challenges to collaboration are often more deeply entrenched and difficult to change. The most pervasive cultural barrier is the traditional hierarchical structure of medicine, which can stifle open communication. In an environment where a junior nurse or a medical technician may hesitate to voice concerns to a senior physician for fear of reprisal or being labeled as disruptive, critical information can be lost. This hierarchy undermines the concept of psychological safety, which is the shared belief that one can speak up without risk of punishment or humiliation [70]. Closely related is the problem of professional tribalism, where different groups (e.g., physicians, nurses, administrators) develop strong in-group identities and stereotypes about other groups. This can lead to an "us versus them" mentality, fostering mistrust and a lack of appreciation for the unique expertise that each profession contributes to patient care [71]. A further cultural barrier is the absence of shared mental models. Without common training on teamwork principles, each profession may have a different understanding of roles, responsibilities, and communication protocols. For instance, a physician may assume a nurse understands the rationale for a treatment plan without explicitly stating it, while the nurse may be waiting for a more detailed explanation before feeling comfortable executing it. This ambiguity can lead to errors and frustration [72].

Fortunately, for every barrier, there exists a potential facilitator. Organizational facilitators include conscious structural redesign. Hospitals can create integrated service lines that align incentives across the emergency and inpatient departments, rewarding collective outcomes rather than individual departmental metrics [73]. Leadership must also prioritize adequate staffing and resource allocation, recognizing that time for collaboration is not a waste but an investment in quality and safety. Designing EDs with collaborative workspaces, such as central physician-nursing stations and small conference rooms for huddles, can physically encourage teamwork [74]. The implementation of user-friendly, interoperable health information technology that supports, rather than hinders, workflow is a critical organizational facilitator. When technology makes it easier to collaborate than to work alone, adoption follows naturally.

Culturally, the most powerful facilitator is the deliberate cultivation of psychological safety by leadership. When department chairs, nurse managers, and hospital executives consistently model respectful communication, actively solicit input from all team members, and respond non-defensively to concerns, they set a tone that empowers everyone to contribute fully. Establishing this culture requires interprofessional education and team training programs, such as TeamSTEPPS, which provide a common language and set of tools for communication (e.g., SBAR, CUS, check-backs). By training together, emergency physicians, nurses, and technicians break down stereotypes and build mutual respect, creating a shared mental model for effective teamwork [75]. Clear, co-developed protocols for common situations like sepsis, trauma, and patient handoffs also serve as powerful facilitators. When the plan is standardized and everyone understands their role within it, it reduces ambiguity and reinforces a sense of shared purpose.

Regulatory and external pressures also play a dual role. Regulations can be a barrier if they are overly burdensome and divert time and energy away from direct patient care and team interaction. However, they can also be powerful facilitators. Accreditation standards from bodies like The Joint Commission that mandate processes such as medication reconciliation and structured handoffs force organizations to implement collaborative practices they might otherwise neglect. Similarly, value-based purchasing models from Medicare and other payers, which tie reimbursement to patient outcomes and satisfaction scores, create a strong financial incentive for hospitals to break down silos and foster collaboration to improve performance on these metrics.

Training and Professional Development for Collaborative Healthcare Practice

The transition from a collection of expert individuals to a high-functioning, collaborative team is not an innate process; it is a skill that must be deliberately taught, practiced, and reinforced. While healthcare education has traditionally excelled at developing deep disciplinary knowledge, it has often fallen short in preparing professionals for the complexities of interdisciplinary teamwork. Therefore, targeted training and continuous professional development focused specifically on collaborative practice are essential components of building a safe and effective healthcare system. Such training moves beyond theoretical knowledge to instill the practical competencies—communication, role clarity, mutual respect, and shared decision-making—required for seamless cooperation in high-pressure environments like the emergency department. This section explores the critical elements of effective interprofessional education (IPE) and ongoing development programs designed to equip emergency, clinical, and administrative professionals with the tools necessary for successful collaboration.

The foundation of collaborative practice is laid during foundational education through Interprofessional Education (IPE). IPE occurs when students from two or more health professions learn about, from, and with each other to enable effective collaboration and improve health outcomes. The goal is to break down the silos that begin in academic institutions before they become entrenched in clinical practice. Effective IPE programs move beyond simple exposure to include joint coursework, simulated patient scenarios, and case-based learning where nursing, medical, pharmacy, and administration students work together to solve complex patient problems [76]. These experiences allow students to appreciate the expertise, responsibilities, and perspectives of other professions, fostering mutual respect and challenging stereotypes early in their professional development. By learning together, they begin to develop a shared mental model—a common understanding of team goals, processes, and each other's roles—which is a critical precursor to effective teamwork in a real-world clinical setting [77]. The core competencies targeted by IPE, as defined by the Interprofessional Education Collaborative (IPEC), include values and ethics, roles and responsibilities, interprofessional communication, and teams and teamwork [78].

While IPE sets the stage, the most impactful training for active healthcare professionals occurs through structured team training programs implemented within the clinical environment. The gold standard in this domain is the Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) framework. TeamSTEPPS, developed by the Agency for Healthcare Research and Quality (AHRQ), provides an evidence-based set of tools and strategies for improving teamwork and communication. Its core skills include leadership, situation monitoring, mutual support, and communication, with practical tools like SBAR (Situation-Background-Assessment-Recommendation) for structured handoffs, call-outs for clear communication during emergencies, and the two-challenge rule and CUS words ("I am Concerned, I am Uncomfortable, this is a Safety issue") to empower any team member to assertively voice concerns [79]. The effectiveness of TeamSTEPPS training is maximized when it is delivered to intact clinical units—such as an entire emergency department shift—rather than to individuals, ensuring the entire team shares a common language and approach.

A crucial methodology for cementing these teamwork skills is interprofessional simulation-based training. High-fidelity simulation labs recreate realistic clinical scenarios, such as a cardiac arrest or a septic shock patient, allowing emergency physicians, nurses, respiratory therapists, and pharmacists to practice together in a risk-free environment. Simulation provides a safe space to make mistakes, refine communication protocols, and debrief as a team immediately after the

scenario. During debriefing, facilitated by a trained instructor, participants can openly discuss what went well, what broke down, and how they can improve their collaborative performance [80]. This experiential learning is far more powerful than passive lecture-based training. Furthermore, just-in-time training and microlearning—short, focused training sessions delivered at the point of care—can reinforce collaborative behaviors. For example, a 10-minute huddle before a shift to review a specific communication tool or a brief simulation drill can effectively maintain skills and keep teamwork principles top-of-mind for busy clinicians [81].

Sustaining a culture of collaboration requires ongoing professional development and reinforcement that extends beyond initial training sessions. A key strategy is the integration of collaborative competencies into performance evaluations and clinical privileging. When professionals are assessed and rewarded not only for their individual clinical acumen but also for their effectiveness as team players—such as their communication skills, their willingness to assist colleagues, and their adherence to collaborative protocols—it sends a powerful message that teamwork is a core organizational value [82]. Leadership development is another critical facet. Managers, department chairs, and senior administrators must be trained to model collaborative behavior, create psychologically safe environments where staff feel comfortable speaking up, and actively facilitate interprofessional interactions [83]. They are responsible for ensuring that time is protected for collaborative activities, such as structured interdisciplinary rounds, and that resources are allocated for ongoing team training.

The ultimate goal of this comprehensive training and development framework is to create a self-reinforcing cycle of improvement. As teams become more proficient, they experience the benefits firsthand: reduced stress, more efficient workflows, and better patient outcomes. This positive reinforcement motivates continued engagement in collaborative practices. In conclusion, investing in interprofessional education, team training programs like TeamSTEPPS, simulation, and ongoing leadership development is not an optional luxury but a strategic imperative for modern healthcare organizations. It is the essential process through which the abstract ideal of multidisciplinary collaboration is translated into tangible skills and behaviors. By equipping emergency, clinical, and administrative professionals with the competencies to work together effectively, healthcare organizations can finally unlock the full potential of their workforce, leading to the enhanced patient safety, improved outcomes, and superior organizational performance that define a truly high-reliability system [84]. The journey toward exemplary collaboration is continuous, and dedicated professional development is the vehicle that drives this journey forward [85].

CONCLUSION

In conclusion, this research unequivocally establishes that multidisciplinary collaboration is the cornerstone of high-quality, safe, and efficient healthcare delivery. The journey of a patient through the healthcare system is a complex continuum that relies on the seamless integration of the acute, diagnostic expertise of emergency professionals, the sustained, therapeutic care of clinical teams, and the enabling, strategic oversight of administrative leaders. The evidence is clear: when these groups function as a cohesive unit, supported by effective processes, technologies, and a supportive culture, the results are profoundly positive. Hospitals experience measurable gains in clinical outcomes, operational efficiency, and financial performance, while patients benefit from safer, more coordinated, and more satisfying care experiences. However, achieving this level of integration is not a passive process. It requires a deliberate and sustained commitment from all levels of the organization. Leadership must actively dismantle silos, champion a culture of psychological safety, and allocate resources for collaborative tools and training. The implementation of evidence-based frameworks like TeamSTEPPS and investment in interprofessional education are non-negotiable for developing the necessary teamwork competencies. Furthermore, technology must be leveraged as a unifying force, with interoperable systems designed to connect rather than isolate team members. Ultimately, the future of healthcare excellence hinges on our ability to move beyond professional boundaries and embrace a truly collaborative identity. The challenges of modern medicine are too complex for any single profession to tackle alone. By fostering an environment where the distinct expertise of emergency, clinical, and administrative professionals is valued, integrated, and aligned toward a common purpose, healthcare organizations can transform themselves into highly reliable systems capable of delivering the exceptional care that every patient deserves. This paper serves as a compelling call to action for continued research, education, and leadership focused on making multidisciplinary collaboration the enduring foundation of healthcare worldwide.

REFERENCES

1. D'Amours SK1, Rastogi P, Ball CG. Utility of simultaneous interventional radiology and operative surgery in a dedicated suite for seriously injured patients. Curr Opin Crit Care. 2013;19:587–93. doi: 10.1097/MCC.0000000000000031.
2. Arriaga AF, Gawande AA, Raemer DB, Jones DB, Smink DS, Weinstock P, *et al.,* Harvard Surgical Safety Collaborative. Pilot testing of a model for insurer-driven, large-scale multicenter simulation training for operating room teams. Ann Surg. 2014;259:403–10. doi: 10.1097/SLA.0000000000000342.

3. Papaconstantinou HT, Jo C, Reznik SI, Smythe WR, Wehbe-Janek H. Implementation of a surgical safety checklist: Impact on surgical team perspectives. Ochsner J. 2013;13:299–309.
4. Mangum SS, Cutler K. Increased efficiency through OR redesign and process simplification. AORN J. 2002;76:1041–6.
5. Estryn-Behar MR, Milanini-Magny G, Chaumon E, Deslandes H, Fry C, Garcia F, *et al.,* Shift change handovers and subsequent interruptions: Potential impacts on quality of care. J Patient Saf. 2014;10:29–44.
6. Overdyk FJ, Harvey SC, Fishman RL, Shippey F. Successful strategies for improving operating room efficiency at academic institutions. Anesth Analg. 1998;86:896–906.
7. Ha ugen AS, Murugesh S, Haaverstad R, Eide GE, Søfteland E. A survey of surgical team members' perceptions of near misses and attitudes towards Time Out protocols. BMC Surg. 2013;13:46.
8. Jacobs GB, Wille RL. Consequences and potential problems of operating room outbursts and temper tantrums by surgeons. Surg Neurol Int. 2012;(3 Suppl 3):S167–73.
9. Justic M. Does "ICU psychosis" really exist? Crit Care Nurse. 2000;20:28–37.
10. Hwang DY, Yagoda D, Perrey HM, Tehan TM, Guanci M, Ananian L, *et al.,* Assessment of satisfaction with care among family members of survivors in a neuroscience intensive care unit. J Neurosci Nurs. 2014;46:106–16.
11. Koivunen M, Anttila M, Kuosmanen L, Katajisto J, Välimäki M. Team climate and attitudes toward information and communication technology among nurses on acute psychiatric wards. Inform Health Soc Care. 2014 Jan 6; doi: 10.3109/17538157.2013.872112.
12. Paige JT, Garbee DD, Kozmenko V, Yu Q, Kozmenko L, Yang T, *et al.,* Getting a head start: High-fidelity, simulation-based operating room team training of interprofessional students. J Am Coll Surg. 2014;218:140–9.
13. Adobamen PR, Egbage EE. Ear, nose, throat, head and neck surgery department functioning as a team in Nigeria: Any benefit? Indian J Otolaryngol Head Neck Surg. 2014;(66 Suppl 1):299–302.
14. Anderson C1, Talsma A. Characterizing the structure of operating room staffing using social network analysis. Nurs Res. 2011;60:378–85.
15. Antoniadis S, Passauer-Baierl S, Baschnegger H, Weigl M. Identification and interference of intraoperative distractions and interruptions in operating rooms. J Surg Res. 2014;188:21–9.
16. Arriaga AF, Gawande AA, Raemer DB, Jones DB, Smink DS, Weinstock P, *et al.,* (Duplicate entry removed to ensure unique references)
17. Garbee DD, Kozmenko V, Yu Q, Kozmenko L, Yang T, *et al.,* Getting a head start: High-fidelity, simulation-based operating room team training of interprofessional students. J Am Coll Surg. 2014;218:140–9.
18. Paige JT, Garbee DD, Kozmenko V, Yu Q, Kozmenko L, Yang T, *et al.,* Getting a head start: High-fidelity, simulation-based operating room team training of interprofessional students. J Am Coll Surg. 2014;218:140–9.
19. Hall P., Weaver L. Interdisciplinary education and teamwork: A long and winding road. Med. Educ. 2001;35:867–875. doi: 10.1046/j.1365-2923.2001.00919.x
20. Nancarrow S., Booth A., Ariss S., Smith T., Enderby P., Roots A. Ten principles of good interdisciplinary team work. Hum. Resour. Health. 2013;11:19. doi: 10.1186/1478-4491-11-19
21. Sinsky C., Willard-Grace R., Schutzbank A., Sinsky T.A., Margolius D., Bodenheimer T. In search of joy in practice: A report of 23 high-functioning primary care practices. Ann. Fam. Med. 2013;11:272–278. doi: 10.1370/afm.1531
22. Bodenheimer T., Sinsky C. From triple to quadruple aim: Care of the patient requires care of the provider. Ann. Fam. Med. 2014;12:573–576. doi: 10.1370/afm.1713
23. World Health Organization. Framework for Action on Interprofessional Education and Collaborative Practice. Geneva: 2010. (accessed 30 December 2022)
24. Van Der Vegt G.S., Bunderson J.S. Learning and performance in multidisciplinary teams: The importance of collective team identification. Acad. Manag. J. 2005;48:532–547. doi: 10.5465/amj.2005.17407918
25. Pannick S., Davis R., Ashrafian H., Byrne B.E., Beveridge I., Athanasiou T., Wachter R.M., Sevdalis N. Effects of interdisciplinary team care interventions on general medical wards: A systematic review. JAMA Intern. Med. 2015;175:1288–1298. doi: 10.1001/jamainternmed.2015.2421
26. Hall P., Weaver L. Interdisciplinary education and teamwork: A long and winding road. Med. Educ. 2001;35:867–875. doi: 10.1046/j.1365-2923.2001.00919.x
27. Siouta N., Van Beek K., Van der Eerden M.E., Preston N., Hasselaar J.G., Hughes S., Garralda E., Centeno C., Csikos A., Groot M., *et al.,* Integrated palliative care in Europe: A qualitative systematic literature review of empirically-tested models in cancer and chronic disease. BMC Palliat. Care. 2016;15:56. doi: 10.1186/s12904-016-0130-7
28. Addington-Hall J.M., O'Callaghan A.C. A comparison of the quality of care provided to cancer patients in the UK in the last three months of life in in-patient hospices compared with hospitals, from the perspective of bereaved relatives: Results from a survey using the VOICES questionnaire. Palliat. Med. 2009;23:190–197. doi: 10.1177/0269216309102525
29. Grądalski T., Sojka J., Straszak K. Koszty opieki nad chorymi z nowotworem złośliwym u kresu

życia na oddziale wewnętrznym szpitala i w hospicjum stacjonarnym. Med. Paliatywna/Palliat. Med. 2017;9:89–97.
30. Katkin J.P., Kressly S.J., Edwards A.R., Perrin J.M. Guiding principles for team-based pediatric care. Pediatrics. 2017;140:e20171489. doi: 10.1542/peds.2017-1489
31. Kucukarslan S.N., Peters M., Mlynarek M., Nafziger D.A. Pharmacists on rounding teams reduce preventable adverse drug events in hospital general medicine units. Arch. Intern. Med. 2003;163:2014–2018. doi: 10.1001/archinte.163.17.2014
32. O'Leary K.J., Buck R., Fligiel H.M., Haviley C., Slade M.E., Landler M.P., Kulkarni N., Hinami K., Lee J., Cohen S.E., *et al.,* Structured interdisciplinary rounds in a medical teaching unit: Improving patient safety. Arch. Intern. Med. 2011;171:678–684. doi: 10.1001/archinternmed.2011.128
33. Sinsky C., Willard-Grace R., Schutzbank A., Sinsky T.A., Margolius D., Bodenheimer T. In search of joy in practice: A report of 23 high-functioning primary care practices. Ann. Fam. Med. 2013;11:272–278
34. Sinsky C., Willard-Grace R., Schutzbank A., Sinsky T.A., Margolius D., Bodenheimer T. In search of joy in practice: A report of 23 high-functioning primary care practices. Ann. Fam. Med. 2013;11:272–278
35. IOM - Institute of Medicine. To Err Is Human. Building a Safer Health System. Washington, D.C.: National Academy Press; 2000. [PubMed] [Google Scholar]
36. Bernstein SL, Asplin BR. Emergency department crowding: old problem, new solutions. Emerg Med Clin North Am. 2006;24:821–37. doi: 10.1016/j.emc.2006.06.013. [DOI] [PubMed] [Google Scholar]
37. NHS - National Health Service, Department of Health. The NHS Plan. A Plan for Investment. A Plan for Reform. London, England: Stationery Office; 2000. [Google Scholar]
38. Olshaker JS. Managing emergency department overcrowding. Emerg Med Clin North Am. 2009;27:593–603. doi: 10.1016/j.emc.2009.07.004. [DOI] [PubMed] [Google Scholar]
39. Sinsky C., Willard-Grace R., Schutzbank A., Sinsky T.A., Margolius D., Bodenheimer T. In search of joy in practice: A report of 23 high-functioning primary care practices. Ann. Fam. Med. 2013;11:272–278. doi: 10.1370/afm.1531. [DOI] [PMC free article] [PubMed] [Google Scholar]
40. Leonard MW, Frankel AS. Role of effective teamwork and communication in delivering safe, high-quality care. Mt Sinai J Med. 2011;78:820–6. doi: 10.1002/msj.20295. [DOI] [PubMed] [Google Scholar]
41. Eitel DR, Rudkin SE, Malvehy MA. *et al.,* Improving service quality by understanding emergency department flow: a white paper and position statement prepared for the American academy of emergency medicine. J Emerg Med. 2010;38:70–79. doi: 10.1016/j.jemermed.2008.03.038. [DOI] [PubMed] [Google Scholar]
42. Willoughby KA, Chan BTB, Strenger M. Achieving wait time reduction in the emergency department. Leadersh Health Serv. 2010;23:304–19. doi: 10.1108/17511871011079010. [DOI] [Google Scholar]
43. Nancarrow S., Booth A., Ariss S., Smith T., Enderby P., Roots A. Ten principles of good interdisciplinary team work. Hum. Resour. Health. 2013;11:19. doi: 10.1186/1478-4491-11-19. [DOI] [PMC free article] [PubMed] [Google Scholar]
44. Des Jarlais DC, Lyles C, Crepaz N. TREND Group. Improving the reporting quality of nonrandomized evaluations of behavioral and public health interventions: the TREND statement. Am J Public Health. 2004;94:361–366. doi: 10.2105/AJPH.94.3.361. [DOI] [PMC free article] [PubMed] [Google Scholar]
45. Salas E, Sims DE, Burke CS. Is there a "Big Five" in teamwork? Small Group Research. 2005;36:555. doi: 10.1177/1046496405277134. [DOI] [Google Scholar]
46. World Health Organization. Framework for Action on Interprofessional Education and Collaborative Practice. Geneva: World Health Organization; 2010. [Google Scholar]
47. Kozlowski SWJ, Bell BS. In: Handbook of psychology (Vol. 12): Industrial and Organizational Psychology. Work groups and teams in organizations; pp. 333–375. Wiley; 2003. [Google Scholar]
48. Hackman JR. In: Handbook of organizational behavior. The design of work teams. Prentice-Hall; 1987. [Google Scholar]
49. Mazzocato P, Hvitfeldt Forsberg H, Thiele Schwarz U. Team behaviors in emergency care: a qualitative study using behavior analysis of what makes team work. Scand J Trauma Resusc Emerg Med. 2011;15. doi: 10.1186/1757-7241-19-70. [DOI] [PMC free article] [PubMed] [Google Scholar]
50. World Health Organization Classifyng health workers: mapping occupations to the international standard classi-fication. Available.
51. Taylor MR, Barton KS, Kingsley JM, *et al.,* Defining a "Good Death" in Pediatric Oncology: A Mixed Methods Study of Healthcare Providers. Children (Basel) 2020;7:86. doi: 10.3390/children7080086.
52. University of Toronto Temerty faculty of medicine. home page | centre for interprofessional education. Available.
53. Sreepathy P, Kim YJ, Ahuja Z, *et al.,* The association between implementation of multidisciplinary rounds and clinical outcomes. Front Cardiovasc Med. 2022;9:1005150. doi: 10.3389/fcvm.2022.1005150.

54. IPEC Interprofessional Education Collaborative. 2021. Available.
55. James A. Mazzocato P, Hvitfeldt Forsberg H, Thiele Schwarz U. Team behaviors in emergency care: a qualitative study using behavior analysis of what makes team work. Scand J Trauma Resusc Emerg Med. 2011;15. doi: 10.1186/1757-7241-19-70.
56. Kang XL, Brom HM, Lasater KB, *et al.,* The Association of Nurse–Physician Teamwork and Mortality in Surgical Patients. West J Nurs Res. 2020;42:245–53. doi: 10.1177/0193945919856338.
57. Sinsky C., Willard-Grace R., Schutzbank A., Sinsky T.A., Margolius D., Bodenheimer T. In search of joy in practice: A report of 23 high-functioning primary care practices. Ann. Fam. Med. 2013;11:272–278. doi: 10.1370/afm.1531.
58. SFS 2003:460. Lag om etikprövning av forskning som avser människor. [Act concerning the Ethical Review of Research Involving Humans] [Internet]. Stockholm: Swedish Code of Statutes.
59. Hirshon JM, Risko N, Calvello EJB, *et al.,* Health systems and services: the role of acute care. Bull World Health Organ. 2013;91:386–8. doi: 10.2471/BLT.12.112664.
60. Baxter SK, Brumfitt SM. Professional differences in interprofessional working. J Interprof Care. 2008;22:239–51. doi: 10.1080/13561820802054655.
61. Will KK, Johnson ML, Lamb G. Team-Based Care and Patient Satisfaction in the Hospital Setting: A Systematic Review. J Patient Cent Res Rev. 2019;6:158–71. doi: 10.17294/2330-0698.1695.
62. Lindgren J, *et al.,* Australian Institute of health and welfare Hospital info Acute Care. 2019. Available.
63. World Health Organization. Classifyng health workers: mapping occupations to the international standard classi-fication. Available.
64. Ali N, Schierholz E, Reed D, *et al.,* Identifying Gaps in Resuscitation Practices Across Level-IV Neonatal Intensive Care Units. Am J Perinatol. 2024;41:e180–6. doi: 10.1055/a-1863-2312.
65. Shaw RL, Morrison R, Webb S, *et al.,* Challenges to well-being in critical care. Nurs Crit Care. 2024;29:745–55. doi: 10.1111/nicc.13030.
66. Ziemek J, Hoge N, Woodward KF, *et al.,* Hospital personnel perspectives on factors influencing acute care patient outcomes: a qualitative approach to model refinement. BMC Health Serv Res. 2024;24:805. doi: 10.1186/s12913-024-11271-x.
67. Oredsson S, Jonsson H, Rognes J. *et al.,* A systematic review of triage-related interventions to improve patient flow in emergency departments. Scand J Trauma Resusc Emerg Med. 2011;19 doi: 10.1186/1757-7241-19-43.
68. Taberna M, Gil Moncayo F, Jané-Salas E, *et al.,* The Multidisciplinary Team (MDT) Approach and Quality of Care. Front Oncol. 2020;10:85. doi: 10.338
69. Kirkpatrick DL. How to start an objective evaluation of your training program. J Am Soc Train Dir. 1956;10:18–22.
70. The Joint Commission National patient safety goals effective January 1, 2014: Hospital accreditation program.
71. Kirkpatrick DL. Great ideas revisited: revisiting Kirkpatrick's four-level model. Train Dev. 1996;50:54–59.
72. Grogan EL Stiles RA France DJ, *et al.,* The impact of aviation-based teamwork training on the attitudes of health-care professionals. J Am Coll Surg. 2004;199:843–848.
73. Nielsen PE Goldman MB Mann S, *et al.,* Effects of teamwork training on adverse outcomes and process of care in labor and delivery: a randomized controlled trial. Obstet Gynecol. 2007;109:48–55.
74. Boet S Bould MD Fung L, *et al.,* Transfer of learning and patient outcome in simulated crisis resource management: a systematic review. Can J Anaesth. 2014;61:571–582.
75. Hughes AM Gregory ME Joseph DL, *et al.,* Saving lives: a meta-analysis of team training in healthcare. J Appl Psychol. 2016;101:1266–1304.
76. Bliss LA Ross-Richardson CB Sanzari LJ, *et al.,* Thirty-day outcomes support implementation of a surgical safety checklist. J Am Coll Surg. 2012;215:766–776.
77. Fargen KM Velat GJ Lawson MF, *et al.,* Enhanced staff communication and reduced near-miss errors with a neurointerventional procedural checklist. Journal of Neurointerventional Surgery. 2013;5:497–500.
78. Halverson AL Andersson JL Anderson K, *et al.,* Surgical team training: the Northwestern Memorial Hospital experience. Arch Surg. 2009;144:107–112.
79. Halverson AL Casey JT Andersson J, *et al.,* Communication failure in the operating room. Surgery. 2011;149:305–310.
80. Kleiner C Link T Maynard MT, *et al.,* Coaching to improve the quality of communication during briefings and debriefings. AORN J. 2014;100:358–368.
81. Krimminger D Sona C Thomas-Horton E, *et al.,* A multidisciplinary QI initiative to improve OR-ICU handovers. Am J Nurs. 2018;118:48–59.
82. Levy PD Dancy JN Stowell SA, *et al.,* Lessons in flying: crew resource management as a quality improvement method for acute coronary syndromes care. Crit Pathw Cardiol. 2014;13:36–42.
83. Lisbon D Allin D Cleek C, *et al.,* Improved knowledge, attitudes, and behaviors after implementation of TeamSTEPPS training in an academic emergency department: a pilot report. Am J Med Qual. 2016;31:86–90.
84. Mahoney JS Ellis TE Garland G, *et al.,* Supporting a psychiatric hospital culture of safety. J Am Psychiatr Nurses Assoc. 2012;18:299–306.
85. Mancuso MP Dziadkowiec O Kleiner C, *et al.,* Crew resource management for obstetric and neonatal teams to improve communication during cesarean births. J Obstet Gynecol Neonatal Nurs. 2016;45:502–514