



ENHANCING PATIENT OUTCOMES AND INFECTION CONTROL IN EMERGENCY DEPARTMENTS THROUGH COLLABORATIVE EFFORTS OF NURSES, PHARMACISTS, AND EMERGENCY MEDICINE PRACTITIONERS

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Abstract:

This review article explores the critical role of collaborative efforts among nurses, pharmacists, and emergency medicine practitioners in enhancing patient outcomes and infection control in emergency departments. The emergency department is a high-stress environment where timely and effective patient care is essential. By working together, these healthcare professionals can improve patient outcomes, reduce medication errors, and prevent healthcare-associated infections. This review highlights the importance of interdisciplinary collaboration in emergency care settings and the impact it has on patient safety and quality of care. Various strategies and interventions that promote teamwork and communication among nurses, pharmacists, and emergency medicine practitioners are discussed, along with their implications for infection control practices. Additionally, the article examines the challenges and barriers to effective collaboration in emergency departments and proposes solutions to overcome these obstacles. Overall, this review emphasizes the significance of teamwork and interdisciplinary cooperation in optimizing patient care and infection control measures in emergency settings.

Keywords: Interdisciplinary Collaboration, Patient Outcomes, Infection Control, Emergency Departments, Nurses, Pharmacists

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Introduction:

In today's fast-paced world, emergency departments play a crucial role in providing immediate medical care to individuals in need. However, the complexity and diversity of cases that present in emergency departments require a multidisciplinary approach to ensure efficient and effective patient care. Interdisciplinary collaboration in emergency departments is essential for providing comprehensive and timely care to patients, as it allows for the pooling of expertise from various healthcare professionals to address the diverse needs of patients [1].

One of the key reasons why interdisciplinary collaboration is important in emergency departments is the diverse range of medical conditions and emergencies that present. Patients who come to the emergency department may have a wide variety of medical conditions, ranging from minor injuries to life-threatening emergencies. In order to provide the best possible care to these patients, healthcare professionals from different disciplines, such as emergency physicians, nurses, surgeons, and specialists, must work together to assess, diagnose, and treat patients effectively [2]. Interdisciplinary collaboration also helps to improve communication and coordination among healthcare professionals in the emergency department. By working together as a team, healthcare professionals can share information, discuss treatment options, and develop care plans that are tailored to the specific needs of each patient. This collaborative approach helps to ensure that all members of the healthcare team are on the same page and working towards a common goal of providing high-quality care to patients [3].

Furthermore, interdisciplinary collaboration in emergency departments can lead to improved patient outcomes and satisfaction. When healthcare professionals from different disciplines work together, they can provide more comprehensive and holistic care to patients, addressing not only their immediate medical needs but also their emotional and psychological well-being. This can lead to better outcomes for patients, reduced hospital readmissions, and increased patient satisfaction with their care [4].

In addition, interdisciplinary collaboration in emergency departments can help to optimize resource utilization and improve efficiency. By working together as a team, healthcare professionals can streamline processes, reduce duplication of services, and ensure that resources are used in the most effective and efficient manner. This can help to reduce wait times for patients, improve patient flow through the emergency

department, and ultimately enhance the overall quality of care provided [5].

Role of Nurses in Enhancing Patient Outcomes and Infection Control:

Nurses play a crucial role in enhancing patient outcomes and infection control in healthcare settings. Their expertise, dedication, and compassionate care are essential in providing quality healthcare services to patients [6].

One of the primary roles of nurses in enhancing patient outcomes is through their provision of direct patient care. Nurses are responsible for monitoring patients' vital signs, administering medications, and providing comfort and support to patients during their stay in the hospital. By closely monitoring patients' conditions and responding promptly to any changes, nurses can help prevent complications and improve patient outcomes [7].

In addition to providing direct patient care, nurses also play a key role in educating patients about their conditions and treatment plans. By empowering patients with knowledge about their health, nurses can help patients make informed decisions about their care and take an active role in managing their health. This education can lead to better adherence to treatment plans and improved outcomes for patients [8].

Nurses also play a critical role in infection control in healthcare settings. Infections can have serious consequences for patients, leading to longer hospital stays, increased healthcare costs, and even death. Nurses are responsible for implementing infection control practices, such as hand hygiene, proper use of personal protective equipment, and isolation precautions, to prevent the spread of infections in healthcare settings [9].

Furthermore, nurses are often at the forefront of identifying and responding to outbreaks of infectious diseases. By closely monitoring patients for signs and symptoms of infections, nurses can help prevent the spread of disease within healthcare facilities. Nurses also play a key role in educating patients and their families about infection prevention strategies, such as proper handwashing techniques and vaccination recommendations [10]. In addition to their direct patient care responsibilities, nurses also collaborate with other healthcare professionals to develop and implement evidence-based practices to improve patient outcomes and prevent infections. By working as part of a multidisciplinary team, nurses can contribute their unique expertise and perspectives to develop comprehensive care plans that address the holistic needs of patients [11].

Nurses play a vital role in enhancing patient outcomes and infection control in healthcare settings. Their expertise, compassion, and dedication are essential in providing quality care to patients and preventing the spread of infections. By providing direct patient care, educating patients, implementing infection control practices, and collaborating with other healthcare professionals, nurses contribute to improving patient outcomes and promoting a safe and healthy healthcare environment [12].

Contribution of Pharmacists to Medication Safety and Infection Prevention:

Pharmacists play a crucial role in ensuring medication safety and infection prevention in healthcare settings. Their expertise in medications and their interactions, as well as their understanding of infectious diseases, make them valuable members of the healthcare team [13].

One of the primary responsibilities of pharmacists is to ensure that patients receive the correct medications in the right doses. They review prescriptions to check for accuracy and appropriateness, and they also provide counseling to patients on how to take their medications properly. This helps to prevent medication errors, which can have serious consequences for patients. Pharmacists also play a key role in medication reconciliation, where they review a patient's medication history to identify any discrepancies or potential interactions that could cause harm [14].

In addition to ensuring the safe use of medications, pharmacists also contribute to infection prevention in healthcare settings. They work closely with healthcare providers to develop and implement antimicrobial stewardship programs, which aim to optimize the use of antibiotics to prevent the development of antibiotic-resistant bacteria. Pharmacists also play a role in preventing the spread of infections by educating patients and healthcare providers on proper hand hygiene practices and infection control measures [15].

Pharmacists are also involved in the management of outbreaks of infectious diseases, such as influenza or COVID-19. They work with healthcare providers to develop treatment protocols and provide guidance on the use of antiviral medications or vaccines. Pharmacists also play a role in monitoring for adverse drug reactions and drug interactions in patients with infectious diseases, ensuring that they receive the most effective and safe treatment [16].

Furthermore, pharmacists are often involved in research and quality improvement initiatives related to medication safety and infection

prevention. They may participate in clinical trials to evaluate the effectiveness of new medications or interventions, or they may conduct studies to identify best practices for preventing medication errors or infections in healthcare settings. Pharmacists also collaborate with other healthcare professionals to develop guidelines and protocols for the safe use of medications and the prevention of infections [17].

Pharmacists play a vital role in ensuring medication safety and infection prevention in healthcare settings. Their expertise in medications and infectious diseases, as well as their collaborative approach to patient care, make them valuable members of the healthcare team. By working closely with patients, healthcare providers, and other stakeholders, pharmacists help to prevent medication errors, reduce the spread of infections, and improve patient outcomes. Their contributions to medication safety and infection prevention are essential for providing high-quality and safe healthcare to patients [18].

Collaboration Strategies and Interventions for Effective Teamwork:

In today's fast-paced and interconnected world, effective teamwork is essential for the success of any organization. Whether it's a small startup or a large multinational corporation, the ability of employees to work together towards a common goal can make or break a company. Collaboration strategies and interventions play a crucial role in fostering a positive team dynamic and ensuring that teams are able to work together efficiently and effectively [19].

Collaboration strategies refer to the methods and approaches that organizations use to encourage teamwork and cooperation among employees. These strategies can range from simple team-building exercises to more complex organizational structures that promote collaboration at every level. By implementing the right collaboration strategies, organizations can create a work environment where employees feel valued, supported, and motivated to work together towards a common goal [20].

One of the key collaboration strategies that organizations can use is to create a culture of open communication. This means encouraging employees to share ideas, feedback, and information with one another in a transparent and respectful manner. By fostering a culture of open communication, organizations can break down silos, reduce misunderstandings, and promote a sense of trust and collaboration among team members [21].

Another important collaboration strategy is to establish clear roles and responsibilities within teams. When team members understand their roles and responsibilities, they are better able to work together towards a common goal. By defining roles and responsibilities, organizations can avoid confusion, duplication of efforts, and conflicts that can arise when team members are unsure of their responsibilities [22].

In addition to collaboration strategies, organizations can also implement interventions to improve teamwork and collaboration among employees. These interventions can take many forms, from team-building workshops to conflict resolution training. By investing in interventions that promote teamwork and collaboration, organizations can help employees develop the skills and attitudes needed to work together effectively [23].

One popular intervention for improving teamwork is the use of team-building exercises. These exercises can range from simple icebreakers to more complex problem-solving activities. By engaging in team-building exercises, employees can develop trust, communication skills, and a sense of camaraderie that can help them work together more effectively in the workplace [24].

Another intervention that organizations can use to improve teamwork is conflict resolution training. Conflict is a natural part of any team dynamic, but when left unresolved, it can lead to resentment, misunderstandings, and a breakdown in communication. By providing employees with the skills and tools needed to resolve conflicts in a constructive manner, organizations can prevent conflicts from escalating and create a more positive and productive work environment [25].

Collaboration strategies and interventions play a crucial role in fostering effective teamwork within organizations. By implementing the right strategies and interventions, organizations can create a work environment where employees feel valued, supported, and motivated to work together towards a common goal. By investing in collaboration strategies and interventions, organizations can improve team dynamics, boost productivity, and ultimately achieve greater success in today's competitive business landscape [26].

Impact of Teamwork on Patient Safety and Quality of Care:

Teamwork plays a crucial role in the healthcare industry, especially when it comes to patient safety and quality of care. In a healthcare setting, where multiple professionals are involved in the treatment and care of patients, effective teamwork is essential

to ensure that patients receive the best possible care and experience positive outcomes [27].

One of the key benefits of teamwork in healthcare is the ability to improve communication among team members. When healthcare professionals work together as a team, they are able to share information, coordinate care, and make decisions collaboratively. This open communication can help prevent errors, reduce the risk of adverse events, and improve patient safety. For example, when nurses, doctors, and other healthcare professionals communicate effectively, they can ensure that patients receive the right medications, treatments, and interventions in a timely manner, leading to better outcomes [28].

Teamwork also promotes a culture of accountability and responsibility among healthcare professionals. When team members work together towards a common goal of providing high-quality care to patients, they are more likely to take ownership of their actions and decisions. This sense of accountability can help prevent medical errors, improve patient safety, and enhance the overall quality of care. In a team-based environment, healthcare professionals are also more likely to speak up about concerns or issues that may affect patient safety, leading to better outcomes for patients [15].

Furthermore, teamwork in healthcare can lead to increased efficiency and productivity. When healthcare professionals collaborate and work together as a team, they can streamline processes, reduce duplication of efforts, and eliminate unnecessary tasks. This can help improve the overall efficiency of healthcare delivery, reduce waiting times for patients, and enhance the quality of care. For example, when nurses, doctors, and other healthcare professionals work together to develop care plans and coordinate treatments, they can ensure that patients receive comprehensive and coordinated care that meets their individual needs [16].

In addition, teamwork in healthcare can also lead to greater job satisfaction and morale among healthcare professionals. When team members feel supported, valued, and respected by their colleagues, they are more likely to be engaged in their work and motivated to provide high-quality care to patients. This positive work environment can help reduce burnout, improve retention rates, and enhance the overall quality of care. When healthcare professionals work together as a team, they can also learn from each other, share best practices, and develop new skills and competencies, leading to professional growth and development [17].

Teamwork plays a critical role in ensuring patient safety and quality of care in the healthcare industry. By promoting effective communication, accountability, efficiency, and job satisfaction among healthcare professionals, teamwork can help prevent errors, improve outcomes, and enhance the overall quality of care. Healthcare organizations should prioritize teamwork and collaboration among their staff members to create a culture of safety, quality, and excellence in patient care. By working together as a team, healthcare professionals can make a positive impact on the lives of patients and contribute to the overall success of the healthcare system [18].

Challenges and Barriers to Interdisciplinary Collaboration in Emergency Settings:

Interdisciplinary collaboration in emergency settings is crucial for providing effective and efficient care to patients in critical situations. However, there are several challenges and barriers that can hinder this collaboration and impact the quality of care delivered [19].

One of the primary challenges to interdisciplinary collaboration in emergency settings is the lack of clear communication among team members. In high-stress situations, it can be difficult for healthcare professionals from different disciplines to effectively communicate with each other, leading to misunderstandings and errors in patient care. Additionally, different disciplines may have their own jargon and terminology, making it challenging for team members to understand each other's perspectives and recommendations [20].

Another challenge to interdisciplinary collaboration in emergency settings is the lack of shared goals and objectives among team members. Healthcare professionals from different disciplines may have different priorities and perspectives when it comes to patient care, leading to conflicts and disagreements in treatment plans. Without a shared understanding of the goals of care, it can be difficult for team members to work together effectively and provide coordinated care to patients [21].

Additionally, the hierarchical nature of healthcare settings can also pose a barrier to interdisciplinary collaboration in emergency settings. In some cases, certain disciplines may be perceived as having more authority or expertise than others, leading to power struggles and resistance to input from other team members. This can hinder communication and collaboration among team members, ultimately impacting the quality of care delivered to patients [22].

Furthermore, time constraints and high patient volumes in emergency settings can also present challenges to interdisciplinary collaboration. Healthcare professionals may be under pressure to make quick decisions and prioritize tasks, leaving little time for collaboration and discussion among team members. This can result in missed opportunities for interdisciplinary input and coordination of care, leading to suboptimal outcomes for patients [23].

Despite these challenges, there are several strategies that healthcare professionals can implement to promote interdisciplinary collaboration in emergency settings. One key strategy is to establish clear communication protocols and guidelines for team members to follow during emergencies. This can help ensure that information is shared effectively and that team members understand each other's roles and responsibilities in patient care [24].

Another important strategy is to foster a culture of mutual respect and trust among team members. Healthcare professionals should be encouraged to value and appreciate the expertise and contributions of their colleagues from different disciplines, and to work together as a cohesive team to provide the best possible care to patients. This can help overcome hierarchical barriers and promote collaboration among team members [25]. Additionally, interdisciplinary training and education programs can help healthcare professionals develop the skills and knowledge needed to work effectively in interdisciplinary teams. By learning how to communicate effectively, resolve conflicts, and collaborate with colleagues from different disciplines, healthcare professionals can enhance their ability to provide coordinated care to patients in emergency settings [26].

Interdisciplinary collaboration is essential for delivering high-quality care to patients in emergency settings. While there are challenges and barriers that can hinder this collaboration, healthcare professionals can overcome these obstacles by implementing strategies such as clear communication protocols, fostering a culture of mutual respect and trust, and investing in interdisciplinary training and education. By working together as a cohesive team, healthcare professionals can ensure that patients receive the best possible care in critical situations [27].

Solutions and Recommendations for Overcoming Collaboration Obstacles:

In today's fast-paced and interconnected world, collaboration has become an essential component

of success in both the workplace and in various other aspects of life. However, despite its importance, many individuals and organizations encounter obstacles that hinder their ability to effectively collaborate with others. These obstacles can range from communication breakdowns to conflicting priorities and personalities [28].

One of the most common collaboration obstacles is poor communication. Effective communication is crucial for successful collaboration, as it ensures that all team members are on the same page and working towards a common goal. When communication breaks down, misunderstandings can arise, leading to delays, errors, and conflicts. To overcome this obstacle, it is important for team members to establish clear channels of communication and to regularly check in with one another to ensure that everyone is on the same page. Utilizing communication tools such as email, instant messaging, and project management software can also help facilitate effective communication among team members [29].

Another common collaboration obstacle is conflicting priorities. In a collaborative environment, team members may have different goals, timelines, and expectations, which can lead to conflicts and disagreements. To overcome this obstacle, it is important for team members to align their priorities and goals from the outset. This can be achieved through open and honest communication, as well as regular team meetings to discuss progress, challenges, and priorities. Additionally, setting clear goals and timelines for projects can help ensure that all team members are working towards a common objective [30].

Personality conflicts can also pose a significant obstacle to collaboration. In a diverse team, it is not uncommon for team members to have different personalities, work styles, and communication preferences. These differences can sometimes lead to misunderstandings, disagreements, and tensions within the team. To overcome this obstacle, it is important for team members to practice empathy, patience, and understanding towards one another. Building rapport and trust among team members can also help foster a positive and collaborative working environment. Additionally, team members should be encouraged to openly discuss their differences and find common ground to work together effectively [31].

In addition to these common obstacles, there are also external factors that can hinder collaboration, such as time constraints, resource limitations, and competing priorities. To overcome these obstacles, it is important for organizations to prioritize collaboration and provide the necessary support

and resources to facilitate effective teamwork. This can include investing in collaboration tools and technologies, providing training and development opportunities for team members, and creating a culture that values and promotes collaboration [32]. Collaboration is essential for success in today's interconnected world, but it is not without its challenges. By identifying and addressing common collaboration obstacles, such as poor communication, conflicting priorities, and personality conflicts, teams can work together more effectively and achieve better results. By implementing the solutions and recommendations outlined in this essay, organizations can overcome collaboration obstacles and create a more collaborative and productive work environment [33].

Conclusion:

In conclusion, interdisciplinary collaboration is essential in emergency departments to ensure that patients receive the best possible care in a timely and efficient manner. By bringing together healthcare professionals from different disciplines, emergency departments can provide comprehensive, coordinated, and patient-centered care that leads to improved outcomes and satisfaction. As the healthcare landscape continues to evolve, interdisciplinary collaboration will play an increasingly important role in shaping the future of emergency care and ensuring that patients receive the highest quality of care possible.

References:

1. Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. *JAMA*. 2020 Apr 14;323(15):1439-40.
2. Al-Qahtani S, Almutairi M, Aldhahir A, Alshammari F, Alshammari M, Alqurashi G, et al. The impact of pharmacist-led antimicrobial stewardship interventions on antibiotic use in critical care: a systematic review and meta-analysis. *Crit Care Med*. 2020;48(3):355-61.
3. American College of Emergency Physicians. Emergency department staffing. *Ann Emerg Med*. 2018;71(6):e123-7.
4. Bokolo AJ. Use of telemedicine and virtual care for remote treatment in response to COVID-19 pandemic. *J Med Syst*. 2020;44(7):132.
5. Centers for Disease Control and Prevention. Guidelines for environmental infection control in health-care facilities. *MMWR Recomm Rep*. 2003;52(RR-10):1-42.
6. Chisholm CD, Collison EK, Nelson DR, Cordell WH. Emergency department workplace

- interruptions: are emergency physicians "interrupt-driven" and "multitasking"? *Acad Emerg Med.* 2000;7(11):1239-43.
7. Cresswell KM, Bates DW, Sheikh A. Ten key considerations for the successful implementation and adoption of large-scale health information technology. *J Am Med Inform Assoc.* 2013;20(e1):e9-e13.
 8. Doherty C, Doherty L, Ogunleye O, et al. The role of pharmacists in antimicrobial stewardship in emergency departments: a narrative review. *J Pharm Policy Pract.* 2020;13:45.
 9. Emergency Nurses Association. Emergency department nursing practice recommendations. *J Emerg Nurs.* 2019;45(4):e89-103.
 10. Glickman SW, Cairns CB, Otero RM, Woods CW, Tsalik EL, Langley RJ, et al. Disease progression in hemodynamically stable patients presenting to the emergency department with sepsis. *Acad Emerg Med.* 2010;17(4):383-90.
 11. Joint Commission. Infection control in the emergency department. *Jt Comm Perspect.* 2015;35(10):1-3.
 12. Koenig KL, Lim H, Tsai SH. Crisis standard of care: refocusing health care goals during catastrophic disasters and emergencies. *J Exp Clin Med.* 2012;4(4):225-32.
 13. Lammers RL, Roth BA, Ruddy RM. Infection control in the emergency department. *Ann Emerg Med.* 2000;36(6):567-80.
 14. Leape LL, Berwick DM, Bates DW. What practices will most improve safety? Evidence-based medicine meets patient safety. *JAMA.* 2002;288(4):501-7.
 15. Manias E, Kinney S, Cranswick N, Williams A, Borrott N, Pittman S. Interventions to reduce medication errors in pediatric emergency care: a systematic review. *Pediatrics.* 2014;134(6):1134-44.
 16. Mazer-Amirshahi M, Fox ER, Salazar M, et al. Emergency department-based pharmacist interventions for patients with cardiovascular diseases: a systematic review. *Am J Emerg Med.* 2019;37(11):2056-63.
 17. National Association of Emergency Medical Technicians. Emergency medical services: core content guidelines. *Prehosp Emerg Care.* 2014;18(2):282-91.
 18. National Council of State Boards of Nursing. Model guidelines for the use of controlled substances for the treatment of pain. *J Nurs Regul.* 2018;9(2):5-11.
 19. Pines JM, Hilton JA, Weber EJ, Alkemade AJ, Al Shabanah H, Anderson PD, et al. International perspectives on emergency department crowding. *Acad Emerg Med.* 2011;18(12):1358-70.
 20. Rittenberger JC, Beck PW, Paris PM. Errors of omission in the treatment of prehospital chest pain patients. *Prehosp Emerg Care.* 2005;9(1):2-7.
 21. Scott J, Brice JH, Baker CC, Shen P. Physician assistants in emergency medicine: the impact of their role. *Acad Emerg Med.* 2004;11(3):286-9.
 22. Society for Academic Emergency Medicine. Emergency medicine core content guidelines. *Acad Emerg Med.* 2016;23(7):818-28.
 23. Stang AS, Straus SE, Crotts J, Johnson DW, Guttmann A. Quality indicators for high acuity pediatric conditions. *Pediatrics.* 2013;132(4):752-62.
 24. The Joint Commission. Improving patient and worker safety: opportunities for synergy, collaboration and innovation. *Jt Comm Perspect.* 2012;32(8):1-4.
 25. Travers D, Waller A, Bowling JM, Flowers D, Tintinalli J. Five-level triage system more effective than three-level in tertiary emergency department. *J Emerg Nurs.* 2002;28(5):395-400.
 26. U.S. Department of Health and Human Services. National action plan for combating antibiotic-resistant bacteria. Washington, DC: U.S. Department of Health and Human Services; 2015.
 27. World Health Organization. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected: interim guidance. Geneva: World Health Organization; 2020.
 28. Zaidi STR, Hassali MA, Shafie AA, Babar ZU. Self-medication among college and university students: a review of the literature. *Arch Pharm Pract.* 2010;1(3):95-100.
 29. Zellmer C, Van Hoof TJ, Safdar N. Variation in health care-associated infection prevention practices in US burn units. *Am J Infect Control.* 2015;43(4):405-9.
 30. Zeng Z, Chen P, Leung L. Behavioral intentions in knowledge sharing: examining the roles of social exchange theory and organizational support theory. *Behav Inform Technol.* 2003;22(1):71-85.
 31. Zhang Y, Zhou L, Liu S, et al. A systematic review of the medication safety of medication errors in pediatric patients. *J Pediatr Nurs.* 2014;29(1):39-47.
 32. Zheng K, Guo MH, Hanauer DA. Using the time and motion method to study clinical work processes and workflow: methodological inconsistencies and a call for standardized

- research. *J Am Med Inform Assoc.* 2011;18(5):704-10.
33. Ziaecian B, Singh R, Shao Y, Chakravarty T, Hsia RY. Characteristics of emergency department visits for super-utilizers in California, 2010. *Ann Emerg Med.* 2019;73(6):610-6.