

# Collaborative Care Models in Emergency and Operative Settings: Perspectives from Radiology, Operations, Anesthesia, Emergency Medicine, and Nursing Experts

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## Abstract

Collaborative care models in emergency and operative settings are highly critical in combining the skills of different professionals to enhance improved outcomes. A team approach to patient care encourages greater efficiency and productivity of services through active participation, effective communication, and cooperation among radiologists, surgeons, anesthesiologists, emergency medicine physicians, and nurses. However, there are some limitations of this concept because communication barriers, lack of time, and the need for interprofessional training may impede full expression. This paper explores the essence of collaborative care within high-risk medical environments, describes the role of key healthcare providers, and identifies strategies that optimize teamwork to improve patient care in the setting of emergency and operative care.

**Keywords:** collaborative care, emergency settings, operative care, radiology, anesthesia, nursing.

## Introduction

There has recently been great emphasis on collaborative care models in healthcare, especially in high-stress environments such as those in emergency and operative settings. These models emphasize how radiologists, anesthesiologists, emergency medicine physicians, nurses, and surgeons can work together in concert to improve patient care. Interdisciplinary collaboration in trauma care and surgery is thus an indispensable approach when dealing with patients' increasingly complex and dynamic conditions. In

fact, research studies identify that collaboration within healthcare teams enhances communication, timely interventions, and improves patient outcomes in life-and-death settings such as emergency and surgical ones, when one decision may mean everything for a patient (Flaubert et al., 2021).

Every discipline in healthcare has something different to offer in regards to collaborative care and approaches to the management of the patient. For example, the radiologist is essential for diagnosis, helping the surgical and emergency medicine teams to find the pathology and to decide on a course of treatment. The anesthesiologist maintains the safety of the patient during surgery by being in charge of anesthesia and monitoring the patient during the surgery. Nurses can provide patient care constantly, monitoring and taking care of patients post-surgery. Physicians in emergency medicine are usually the first contact with the patient and serve to rapidly assess, diagnose, and stabilize the patient for further intervention. This role synergy enables a more holistic, effective, and timely care process (Wong et al., 2015; Kaslow et al., 2017).

Despite the evident benefits, full implementation of an effective model for collaborative care at these settings presents several challenges. These include disparities in communication, variance in professional outlook, and disparity in training, all of which tend to block the path of collaboration. In addition, the speedy and stressful nature of emergencies and operative environments pulls at coordination and may cause delays or other mistakes in the providing of care. Such hurdles can only be overcome by continuous professional training, standardized protocols for communication, and a culture that guarantees teamwork. By overcoming these hurdles, there is the possibility of improved patient safety, reduced adverse events, and clinical outcomes finally (Symons et al., 2019; David, 2023).

### **Methodology**

We did a review of the literature on collaborative care models applied in emergency and operative settings, with an emphasis on radiology, anesthesia, operations, emergency medicine, and nursing in these high-risk settings. A search of all relevant studies was made through databases such as PubMed, Google Scholar, and Scopus from 2010 until March 2023. The following phrases were used as search terms: "collaborative care models," "emergency care," "operative settings," "multidisciplinary team," "radiology," "nursing," "anesthesia," and "emergency medicine." Over 300 articles were found through an initial search and screened for relevance on the topic. After removing duplicates and nonqualifying papers, a full-text review of 85 remaining studies was completed. Overall, 30 studies were selected for review and included randomized controlled trials, cohort studies, systematic reviews, and expert opinions, as identified by a measure of evidence quality and relationship to collaborative care models in these settings. These selected articles were compared for key strategies to improve the quality and safety of patient care using an interdisciplinary approach, barriers identified in the operation of such models, and benefits from teamwork in high-risk medical settings.

### **Literature Review**

A critical literature review was done to assess the state of evidence with regard to collaborative models of care in emergency and operative settings, roles of key disciplines involved in giving care, including radiologists, anesthesiologists, surgeons, emergency medicine physicians, and nurses. Searches were done in the databases PubMed, Google Scholar, and Embase by using combined terms of the subject of interest: "collaborative

care," "multidisciplinary teams," "emergency care," "operative settings," "team-based care," and "nursing." Complementary studies were identified by manual searches of the reference lists. Eligibility consisted of randomized controlled trials, cohort studies, systematic reviews, and expert opinions published in the period between 2010 and 2023. Exclusion criteria consisted of studies focusing on nonhuman subjects, not involving core disciplines, and duplicate studies. A total number of 35 studies met the inclusion criteria to be reviewed. This underpins that the overall improvement in patient outcomes due to these collaborative models occurs through better communication, few errors, and efficiency. Thus, they are quite critical in high-risk ecologies such as casualty rooms and operation theaters, where speed and coordinated actions are very important. However, there remain challenges in the form of communication barriers, time pressures, and an integrated program of training for health professionals. The reviews emphasize the need for structured collaboration, regular team-based training, and role clarification to achieve optimum levels of patient service in emergency and operative settings.

### **Discussion**

Radiology enjoys a pride of place both in the emergency and operative modalities because it provides the fastest, most accurate, and highly informative imaging necessary for diagnosing and managing patients. In the emergency department, radiologists work along with emergency medicine specialists in interpreting imaging studies such as X-rays, CT scans, MRIs, and ultrasounds. Such diagnostic modalities are essential in the diagnosis of serious life-threatening conditions related to but not limited to fractures, internal bleeding, stroke, or even organ damage. The radiologists should ensure that the imaging is carried out efficiently and many times under time pressures and communicate the findings to the clinicians with a view to urgent treatment decisions. In the case of trauma patients, this coordination often makes the difference between swift intervention and belated treatment, often resulting in a major difference in terms of patient outcomes Akhtar, 2023.

In the operative environment, radiologists continue to support the surgical team by providing preoperative imaging that aids in planning the procedure. In complex surgeries like tumor resections or organ transplants, for example, radiologists provide insights into the extent of disease, anatomical variations, and potential complications. In addition, radiological guidance is an essential component during minimally invasive procedures, such as laparoscopy, where real-time imaging may aid surgeons in negotiating through complex structures with precision. The collaboration between radiologists and surgeons allows for more precise planning and better patient outcomes while minimizing the risks associated with traditional open surgeries (Khan, 2023).

The other most important role of radiologists, besides preoperative and intraoperative support, is in postoperative care. Imaging is commonly used in the follow-up on recovery, detection of complications such as infections, bleeding, or impairment of a particular organ, and lastly in the assessment of the success of surgical interventions. Following the procedure for cardiac conditions, a radiologist would be summoned for the evaluation of follow-up chest X-rays or CT scans for complications such as pneumothorax or fluid accumulation. The fact that radiologists can provide emergency and surgical departments with rapid and accurate imaging information adds to the decision-making and improves the quality of health care among patients Asif & Shahzad, 2023.

Another layer to the importance of radiology in collaborative care is its rapidly changing landscape in terms of technology. Innovations such as 3D imaging, portable ultrasound machines, intraoperative CT, or MRI can offer real-time imaging of the highest quality, providing even more precise interventions in both emergency and operative scenes. Radiologists need to be abreast of these developments, working with other professionals in integrating these tools into the patient's best plan of care. Their expertise in the use of high technology enhances the precision and efficacy of overall care provided at critical junctures of care (Razak, Hignett, & Barnes, 2018).

In both emergency and operative settings, surgeons are central to treatment, performing surgery for a wide range of conditions. In the emergency setting, surgeons often are the first to treat life-threatening traumas, acute abdominal pains, or other serious forms of injuries that require immediate surgical intervention. Surgeons have to evaluate the patient's condition as soon as possible, choose the best course of action, and cooperate with anesthesiologists, emergency medicine doctors, and radiologists in ensuring timely treatment. For example, in the case of traumatic injury, the surgeon may depend on imaging studies from radiology to determine the extent of damage while anesthesia providers ready the patient for surgery (David, 2023).

During the actual surgery, there is a need for collaboration with the anesthesiologists in the management of the patient's vital signs to ensure a safe and controlled environment. Surgeons rely on the anesthesia specialist to adjust the anesthetic drugs according to the patient's response and also to maintain adequate levels of sedation throughout the procedure. In complicated surgeries, a surgeon needs to keep communicating with the anesthesia team in order to alter some factors that change regarding the patient's state. The surgical team also collaborates with the nursing staff, who help in positioning the patient and maintaining sterile fields and monitoring vital signs. A collaboration of the surgeon, anesthesiologist, and nursing staff ensures that the safety of the patient is kept first (Kaslow et al., 2017).

With preoperative and intraoperative care, there is also postoperative engagement by the surgical team. For any patient undergoing surgery, surgeons will closely follow them after the surgery to observe for complications associated with infection, bleeding, or failure of any organ. The surgeon helps the nurses in monitoring the patient's general condition, pain, and keeping an eye on whether the patient is recovering according to expectations. More so, surgeons may work in collaboration with experts like radiologists in ordering imaging studies when the patient exhibits some unexpected symptoms or complications after surgery. Integration of surgical expertise with other healthcare professionals is fundamental during recovery to ensure the best outcomes (Symons et al., 2019).

Surgeons are also very much involved in educating patients and in communication. In both emergency and elective surgical settings, surgeons should explain procedures, prospective risks, and expected outcomes to patients and their relatives. Such communications will be mandatory for informed consent and realistic anticipation during recovery. This includes close collaboration with nurses to ensure that all information and support are provided to patients and their families both before and after the procedure, thereby making sure that the experience is even more rewarding and attaining the highest level of satisfaction in the services offered until recovery is attained (Khorram-Manesh, 2024).

The anesthesia providers play a crucial role in emergency and operative care, controlling the pain and sedation levels of patients before, during, and after procedures. Anesthesia specialists in the emergency department are expected to collaborate with teams in the emergency medicine area for the stabilization of patients, particularly those who have had critical injuries or illnesses that required urgent surgical intervention. They shall assess the patient's condition, including airway management, and determine the appropriate anesthetic approach. In the case of trauma, for example, the providers need to quickly assess the situation with regard to the need of the patient for pain control and sedation, ensuring his airway is protected and vital functions like respiration and circulation are maintained (Yarmohammadian et al., 2017).

Therefore, during the operation, the anesthesia providers take full responsibility for monitoring the levels of the patient's anesthesia throughout the procedure. It is believed that the adjustment of anesthetic drugs helps keep the patient sedated enough to manage pain and deal with vital signs like heart rate, blood pressure, and oxygenation of the body. Anesthesia specialists should also be responsive to any sudden alterations in the patient's condition and work closely with the surgical team to make immediate adjustments. Consequently, the coordination with the surgical team should be stronger in high-risk surgeries, in which the patient has either cardiovascular disease or respiratory problems, among other things that need special attention (Alnsour et al., 2024).

Postoperatively, the anesthesia providers continue to be involved in the care of the patient. They take care of the pain relief and sedation as the patient tries to emerge from anesthesia. This may entail the readjustment of pain medication or the use of other means, such as nerve blocks or epidurals, to achieve good pain control. The anesthesia providers also team up with nursing to observe how the patient progresses while coming out of the anesthesia in case there are complications related to nausea, vomiting, or even respiratory depression, which are to be acted on (Scholzen et al., 2024).

Beyond the operating room, anesthesia providers bring emergency care into nonsurgical settings in the management of active sedation for patients undergoing diagnostic or therapeutic procedures or managing a patient's acute pain resulting from serious trauma. In this scenario, anesthesia providers must work in concert with emergency medicine physicians to ensure pain management is appropriate, the patient is stable, and any potential risks associated with sedation or anesthesia are at a minimum. Their expertise and experience with airway management and pain control are paramount in the outcome of events requiring rapid action (Kuza & McIsaac, 2018).

The emergency physicians see the patient in acute stages of their illness, and they occupy a sphere that contributes to the initial assessment and follow-up care of the patients on an emergency and operative stage. It is they who, in an emergency setting, are able to identify the nature of the patient's condition and the priority of care and order initial management. They should be specially trained to deal with acute episodes of a variety of medical and surgical emergencies such as trauma, cardiac events, respiratory distress, and stroke. The ability to rapidly and correctly make decisions is thus vital, and they would have to depend much upon other specialists: cooperation with radiologists, anaesthesiologists, and nurses in the course of stabilizing the patient and defining the optimal course of action (Masoumi et al., 2023).

Radiology becomes closely integrated with the emergency medicine team when ordering diagnostic imaging, highly important in elucidating injuries or diseases requiring urgent

intervention. For instance, a suspicion of stroke might trigger an emergency physician to order a CT scan or MRI, which the radiologist interprets in good time to inform treatment decisions. In trauma situations, emergency physicians rely on imaging to locate fractures, internal bleeding, or organ damage. Such collaboration ensures that critical conditions are rapidly diagnosed and treated; thus the chance of complications is minimized (Wong et al., 2015).

After a diagnosis is secured, emergency physicians work with anesthesia providers and surgeons to orchestrate the patient's care. For example, in surgical cases, the emergency physician may prepare the patient for the operating theater with pre-advancement of fluids and stabilization of vital signs in advance. They also interact with specialists in anesthesia to ensure appropriate sedation and analgesia during the intervention. In other instances, the emergency medicine team may well initiate life-saving interventions, such as securing the airway or compressions of the chest, if surgical or anesthesiology support is en route to their location (Ravaghi et al., 2020).

Apart from clinical practice, emergency medicine physicians also more often have to handle patient flow facilitation and strategic decisions on resource utilization within the emergency department. They triage patients in terms of level of severity of illness and ensure that the most acute are attended to first. They coordinate with the nursing staff to ensure that patients are being well observed and that appropriate testing and procedures are done on time. Essentially, this plays a vital role in running an effective and efficient emergency care system (Ebrahimian et al., 2018).

Nurses ensure that both emergency and operative care teams run smoothly. Nurses are usually at the front line of patient assessment and monitoring, providing timely care, working alongside physicians, anesthesiologists, surgeons, and other specialized professionals in the health team to ensure that every aspect of patient needs is provided. Thus, nurses in the emergency department should triage patients by their condition, give initial treatments such as intravenous fluids or medications, and prepare patients for diagnostic procedures or surgery. They are also very important when trying to comfort patients and their families at distress times, easing anxiety, and enabling clarity in communication with the medical team (Veenema et al., 2016).

In this environment, they will be helping surgeons and anesthesia providers in keeping the patient in a sterile environment, preparing and positioning the patient as necessary for the surgery, and continuously monitoring the patient's vitals during the surgery itself. This includes having all surgical instruments prepared and ready, assisting in the preparing and administering of medications, and helping to maintain the overall flow of the procedure. The patient's response to anesthesia is also monitored, and their observations are relayed back to the surgical team with regards to changes in the patient's vital signs and other signs of distress. From here, it becomes quickly obvious how the attention to detail and rapid response time of these individuals makes them an important factor in the overall outcome of the surgery (Baack & Alfred, 2013).

They are also involved in the care of the patient during the postoperative period. Specifically, they monitor the recovery of a patient from anesthesia, manage his or her level of pain, and monitor the occurrence of complications relating to infection, bleeding, or difficulties in breathing. They collaborate with the rest of the treatment team to ensure that the patient's recovery is going well, in addition to teaching patients and their families during this period. The importance of early detection and timely response to such

complications cannot be overstated in preventing adverse events and hastening a patient's return to his or her previous state of health (Flaubert et al., 2021).

Nurses also act as a bridge of communication among various health practitioners to ensure that information is timely and accurately imparted. This is in both operative and emergency settings and, in such instances, very paramount for organizing care between interprofessional teams. They advocate for the patients, ensuring that their needs are taken into consideration, and the care plan is implemented while offering merciful and patient-centered care throughout the process. Their role is quite indispensable for the success of collaborative care models

(Rebmann, Carrico, & English, 2008).

### **Conclusion**

Collaborative care models in emergency and operative settings ensure improvement in patient outcomes by creating positive interactions among the established variety of healthcare professionals. Radiologists, anesthesiologists, emergency medicine physicians, nurses, and surgeons need to have appropriate communication, coordination, and decision-making in order to provide timely and accurate intervention. This model promotes safety to patients; also, it provides more efficiency and a holistic approach to care, especially in time-sensitive and high-risk environments where every minute counts. While the benefits of collaboration are clear, formidable hurdles continue to stand in the way of the full execution of these models at the clinical level. The extremely demanding nature of emergency and operative care will always pose barriers to communication, professional silos, and seamless integration of members into the team. These will have to be surmounted by giving due attention to creating cultures of collaboration, investing in interdisciplinary education, and developing systems to support effective teamwork. If that happens, the potential for collaborative care to further transform emergency and operative settings remains tremendous.

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