Saudi Journal of Medicine and Public Health

https://saudijmph.com/index.php/pub

https://doi.org/10.64483/202522664

Evaluation of Code Blue Response Efficiency in Hospitals: A Multidisciplinary Clinical Performance Study Across Emergency, Anesthesia, Operating Room, Pharmacy, Clinical Nutrition, Health Information, and Health Security Services

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Abstract

Background In-hospital cardiac arrest (IHCA) remains a critical emergency associated with high mortality and significant neurological morbidity. Its incidence ranges from 1–6 per 1000 hospital admissions, emphasizing the need for rapid, coordinated intervention systems such as Code Blue teams. Tertiary hospitals face additional challenges due to high patient volume, case complexity, and resource limitations, especially in low- and middle-income countries.

Aim This study aimed to evaluate Code Blue activations in a tertiary teaching hospital over six years, analyzing frequency, patient characteristics, Early Warning Score (EWS), palliative burden, and clinical outcomes to identify improvement opportunities in emergency response and patient safety.

Methods A descriptive, retrospective review of Code Blue events was conducted. Data included demographic characteristics, activation timing, ROSC outcomes, EWS values, and palliative scores. Intensive care unit arrests were excluded to focus on ward-based events.

Results The overall ROSC rate was 17.7%, aligning with rates reported in comparable middle-income countries but influenced by patient acuity and arrest etiology. Most patients presented with high EWS at admission, indicating significant physiological instability, and many also had high palliative scores, reflecting advanced chronic disease. Sepsis emerged as a major contributor to mortality, highlighting suboptimal early recognition and inconsistent protocol adherence.

Conclusion Code Blue activations were frequently associated with acute physiological deterioration and severe chronic illness, underscoring the need for strengthened early warning systems, structured sepsis management, improved palliative integration, and multidisciplinary coordination. Targeted quality-improvement interventions may reduce preventable cardiac arrests and enhance survival outcomes.

Key Words Code Blue, In-hospital cardiac arrest, Early Warning Score, Palliative score, ROSC, Sepsis, Hospital emergency response, Quality improvement.

Introduction

In-hospital cardiac arrest (IHCA) constitutes one of the most serious medical emergencies encountered within healthcare institutions. Reported incidence ranges between 1 and 6 events per 1000 hospital admissions, with approximately 290,000 cases occurring annually in the United States alone [1][2]. These figures reflect a substantial clinical burden and underscore the necessity for immediate, coordinated, and highly efficient resuscitative interventions to improve survival and neurological outcomes. Delays in recognition or response significantly reduce the likelihood of favorable recovery, making institutional preparedness a decisive factor in patient prognosis. Tertiary hospitals, particularly those serving as referral and teaching centers, operate within complex and high-density environments. Daily activity involves large numbers of healthcare professionals, trainees, patients, and visitors. This continuous flow of individuals increases the probability of acute medical emergencies, including IHCA. While most cardiac arrests occur

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Receive Date: 07 December 2025, Revise Date: 29 December 2025, Accept Date: 31 December 2025

among hospitalized patients with established cardiovascular disease, multiple comorbidities, or those receiving critical care, the risk is not confined to these groups. Sudden cardiac arrest may also affect individuals without previously documented risk factors, including hospital staff and visitors. This broader vulnerability emphasizes the necessity for a comprehensive and adaptable Code Blue system capable of responding effectively to cardiac arrest events involving both patients and non-patients within hospital premises [3–5].

To safeguard patient and institutional safety, hospitals are required to maintain a continuously available resuscitation service, commonly referred to as the Rapid Response or Code Blue team. This team comprises trained healthcare professionals equipped with advanced life support skills and essential emergency equipment. The rapid mobilization of this specialized unit forms the cornerstone of effective IHCA management [3]. International accreditation frameworks, including standards established by the Joint Commission International, identify the presence of a functional and efficient Code Blue system as a critical benchmark of quality in emergency care delivery. Compliance with these standards not only fulfills accreditation requirements but also strengthens institutional capacity to deliver timely and effective resuscitation, thereby improving survival rates and overall clinical outcomes [3][4][6]. Early identification of patients at risk for deterioration represents an essential preventive strategy in reducing IHCA incidence. The Early Warning Score (EWS) serves as a structured clinical assessment tool based on physiological parameters such as level of consciousness, heart rate, systolic blood pressure, oxygen requirement, temperature, and oxygen saturation. It is widely utilized in emergency and outpatient settings to detect early signs of clinical instability. In parallel, the palliative score, derived from World Health Organization criteria for chronic diseases, assists in identifying patients with advanced cardiac, hepatic, pulmonary, renal, neurological conditions, or malignancies who may require palliative-oriented care. The combined use of EWS and palliative scoring systems enables systematic risk stratification, supports clinical decision-making, and facilitates appropriate allocation of healthcare resources. Within this study, these scoring tools were applied to explore their relationship with Code Blue activations, thereby examining the interaction between acute physiological deterioration and underlying chronic disease burden [7]. The present study seeks to evaluate the frequency, demographic characteristics, and clinical outcomes associated with Code Blue activations in a tertiary teaching hospital located in a low-middle-income country. Through systematic analysis of these emergency events, the research aims to clarify contributory risk factors and identify potential gaps in emergency cardiac care delivery. The findings are intended to inform targeted quality improvement initiatives and strengthen institutional response systems to optimize survival and patient safety in the context of in-hospital cardiac arrest.

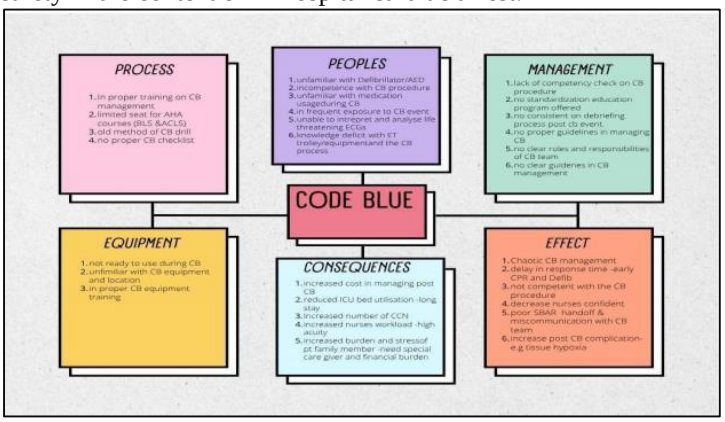

Fig. 1: Blue Code Root Cause Analysis.

Literature Data:

This study provides a comprehensive six-year evaluation of Code Blue activations in a major tertiary referral and teaching hospital in Indonesia. To our knowledge, it represents one of the most detailed institutional descriptions of in-hospital cardiac arrest patterns within this context. A distinctive contribution of this research lies in examining the relationship between acute physiological instability, measured through the Early Warning Score (EWS), and the burden of chronic disease, reflected by palliative scores. Exploring this dual framework offers important insight into the clinical pathways leading to in-hospital cardiac arrest and highlights opportunities for earlier intervention. By linking Code Blue activation data with structured severity assessments, the study establishes a foundation for future quality improvement strategies aimed at reducing preventable cardiac arrest events. One of the principal strengths of this investigation is the large dataset spanning six consecutive years. This longitudinal perspective enables identification of temporal trends and allows interpretation of patterns within broader social and healthcare system changes, including the COVID-19 pandemic. The extended timeframe strengthens the reliability of observed fluctuations and provides context for understanding how operational pressures, patient case mix, and policy implementation influence emergency response systems. The incorporation of EWS and palliative scoring further enhances the analytical depth of the study. These tools offer objective indicators of acute deterioration and chronic disease severity, facilitating a more nuanced understanding of the patient populations most vulnerable to cardiac arrest during hospitalization [8][9].

The annual variation in Code Blue activations likely reflects a combination of institutional and external factors. The marked reduction in activations observed in 2021 coincided with the peak impact of the COVID-19 pandemic.

During this period, many healthcare systems experienced reduced non-COVID admissions, postponement of elective procedures, and redistribution of hospital resources toward pandemic response. Such operational shifts likely influenced both patient volume and patient acuity profiles. Conversely, the higher number of activations in earlier years may suggest limited use of systematic early detection tools prior to the structured implementation of EWS and palliative scoring in 2021. Earlier identification of clinical deterioration through structured scoring systems may contribute to more timely intervention and potentially reduce progression to cardiac arrest. However, this interpretation warrants cautious consideration, as multiple concurrent factors could have influenced observed trends. Importantly, this analysis excluded high-care and intensive-care unit patients, where higher rates of COVID-19–associated in-hospital cardiac arrest have been documented [8][9]. Therefore, the findings primarily reflect ward-based cardiac arrest events and may underestimate the total institutional burden during pandemic surges. The overall Return of Spontaneous Circulation (ROSC) rate of 17.7 percent demonstrates moderate survival outcomes within this tertiary hospital setting. Comparison with reports from other middle-income countries reveals substantial variability. Published data indicate ROSC rates of approximately 40 percent in the United Arab Emirates, 7.4 percent in Uganda, and 38.3 percent in Abu Dhabi [2][8–11]. These differences may arise from variations in study design, patient inclusion criteria, healthcare infrastructure, and arrest characteristics. Some international studies included arrests occurring in intensive care units, where continuous monitoring, rapid intervention, and advanced life support resources are readily available. Inclusion of such cases may elevate reported survival rates. In contrast, the present study focused on ward-based Code Blue events, which often involve delayed recognition of deterioration compared with continuously monitored settings.

Etiology of cardiac arrest also plays a critical role in survival outcomes. Studies reporting higher ROSC rates frequently describe a predominance of primary cardiac causes, such as acute myocardial infarction or arrhythmia, conditions that may respond more favorably to prompt defibrillation and advanced cardiac life support. In the present cohort, cardiac etiologies were not the dominant cause of arrest. Instead, a substantial proportion of events were associated with malignancy, sepsis, advanced organ failure, and other chronic or systemic conditions. Arrests occurring in the context of severe infection or multisystem organ dysfunction often reflect progressive physiological decline rather than sudden primary cardiac events. Such scenarios may be less reversible despite appropriate resuscitative efforts [9]. The analysis of Admission Early Warning Scores demonstrated that a majority of patients who later experienced Code Blue activation had EWS values exceeding seven at the time of hospital admission. This finding suggests that many individuals were already physiologically unstable upon entry into the inpatient setting. Elevated EWS values reflect abnormalities in vital signs and consciousness level, indicating significant acute illness severity. These observations reinforce the importance of robust early warning systems and continuous monitoring protocols to detect and address deterioration before progression to cardiac arrest. Timely escalation of care based on high EWS values may reduce the incidence of preventable in-hospital cardiac arrest. Simultaneously, the predominance of high palliative scores among Code Blue patients indicates a substantial burden of chronic disease and advanced illness. Patients with malignancy, advanced organ failure, or progressive neurological conditions often have limited physiological reserve. In such populations, cardiac arrest may represent the terminal phase of disease progression rather than an isolated acute event. The coexistence of high EWS and high palliative scores underscores the complex clinical profile of patients experiencing in-hospital cardiac arrest. Many individuals demonstrated both acute physiological compromise and advanced chronic illness [10].

These findings raise important considerations regarding goals of care discussions and end-of-life planning. Integration of palliative assessment into routine hospital admission processes may support earlier identification of patients who would benefit from advanced care planning conversations. In some cases, clearer documentation of resuscitation preferences could prevent non-beneficial resuscitative attempts and align medical interventions with patient values. Strengthening collaboration between acute care teams and palliative care services may improve both ethical decision-making and resource utilization. The study also highlights the broader implications of structured scoring systems in resource-limited environments. In low- and middle-income countries, healthcare systems often face constraints in staffing, monitoring equipment, and intensive care capacity. Implementing standardized tools such as EWS may provide a cost-effective strategy to identify high-risk patients and prioritize resource allocation. However, scoring systems must be supported by rapid response infrastructure and staff training to translate early detection into effective intervention [8-11]. Several limitations must be acknowledged. The descriptive design precluded formal statistical testing to establish causal relationships between scoring systems and Code Blue outcomes. The analysis did not evaluate time intervals between EWS assessment and cardiac arrest, nor did it examine compliance with escalation protocols. Additionally, exclusion of intensive care unit arrests limits generalizability to the entire hospital population. Despite these constraints, the study provides valuable observational insight into patterns of in-hospital cardiac arrest within a tertiary referral center [2][8].

In summary, this six-year evaluation demonstrates that Code Blue activations in a tertiary hospital setting are frequently associated with high acute severity and advanced chronic disease burden. The observed ROSC rate aligns with outcomes reported in comparable middle-income settings but remains influenced by patient characteristics and institutional context. Integration of early warning systems and palliative assessment offers a structured framework to better understand risk profiles and guide targeted interventions. Continued refinement of early detection mechanisms, combined with proactive goals-of-care discussions and strengthened rapid response systems, may contribute to reducing preventable in-hospital cardiac arrest and improving overall patient outcomes [11]. Sepsis-related mortality identified in this study represents a critical area requiring immediate institutional attention. Sepsis remains a leading cause of preventable in-hospital death, particularly in low- and middle-income healthcare systems where delayed recognition and inconsistent protocol adherence persist. Evidence from Taiwan demonstrates that patients with sepsis who subsequently develop in-hospital cardiac arrest experience significantly worse outcomes than septic patients without cardiac arrest, with a 30-day mortality hazard ratio of 3.45 and a one-year mortality hazard ratio of 1.40 [12][13]. These data highlight the compounding risk imposed by cardiac arrest in already critically ill septic patients. The findings reinforce that preventing progression from sepsis to cardiac arrest must be considered a primary target of hospital quality improvement initiatives. Hospitals should adopt structured sepsis management indicators as core performance metrics. Compliance with the one-hour and six-hour sepsis bundles has been associated with improved survival outcomes, particularly when antibiotic administration, fluid resuscitation, lactate measurement, and hemodynamic monitoring are delivered without delay [14][15]. Institutional monitoring of adherence rates should be conducted regularly, with transparent reporting to clinical departments. In addition, infection prevention strategies such as strict hand hygiene compliance, environmental temperature and humidity control, and standardized antimicrobial stewardship programs must be reinforced. These measures reduce hospital-acquired infections and limit the progression of localized infection into systemic inflammatory response and septic shock. Embedding sepsis control management into hospital accreditation benchmarks would further strengthen accountability and drive consistent implementation.

The current findings also emphasize the importance of continuous physiological monitoring and timely escalation of care, particularly for patients located outside intensive care settings. Patients with elevated Early Warning Scores in general wards represent a high-risk population for rapid deterioration [6]. In many tertiary referral hospitals, including those with heavy patient volumes and limited critical care beds, delayed recognition of deterioration remains a systemic challenge. Structured EWS implementation should therefore be coupled with mandatory response algorithms. A high EWS must trigger predefined actions such as rapid response team activation, senior physician review, or transfer to high-dependency units. Additional institutional investment is necessary to support these systems. Expanding the capacity of high-care and intensive care units may reduce delays in transferring unstable patients who require advanced monitoring and organ support [6][16][17]. However, infrastructure expansion alone is insufficient. Continuous professional development programs focused on early warning sign interpretation, sepsis recognition, and advanced life support are essential. Simulation-based training has demonstrated measurable improvement in response time and team coordination during clinical emergencies. Regular competency assessments should be incorporated into hospital policy to ensure clinical readiness sustained. The intersection between acute deterioration and chronic disease burden further complicates clinical decision-making. Palliative care integration within hospital systems remains underdeveloped in Indonesia, where cultural and religious perspectives strongly influence treatment preferences and end-of-life discussions. Research conducted in Indonesia indicates that more than 60 percent of hospitalized patients with non-communicable diseases require palliative care services, yet this need frequently remains unrecognized [18–20]. Furthermore, substantial disagreement persists among clinicians regarding criteria for identifying patients appropriate for palliative referral. This inconsistency contributes to variability in care planning and often results in patients with advanced irreversible disease being managed under full resuscitation status.

Within the present study, many patients categorized with high palliative scores continued to be classified as full-code. This finding suggests limited integration of structured goals-of-care discussions into routine clinical workflow. In advanced malignancy, end-stage organ failure, or progressive neurological disease, cardiac arrest may represent the terminal phase of illness rather than an unexpected acute event. Resuscitative efforts in such contexts often yield low survival rates and may not align with patient values. Strengthening palliative consultation pathways at the point of admission may allow earlier clarification of prognosis and patient preferences. Standardized documentation of resuscitation status should be mandatory for patients with high palliative scores. Cultural sensitivity remains central to effective implementation. Educational initiatives targeting healthcare providers must address communication strategies that respect religious and societal norms while ensuring patients and families receive accurate

prognostic information. Interdisciplinary collaboration among physicians, nurses, ethicists, and spiritual care representatives may facilitate balanced decision-making. Establishing institutional guidelines for end-of-life care can reduce clinician uncertainty and minimize variability in practice. Several methodological limitations should be acknowledged. Early Warning Score and palliative score data were only available from 2021 onward, restricting longitudinal analysis of their association with Code Blue activation across the entire six-year study period. Consequently, conclusions regarding temporal trends in risk stratification remain limited. The single-center design further restricts generalizability, as healthcare delivery models, resource availability, and patient demographics vary significantly across regions. Additionally, reliance on hospital Code Blue logs introduces potential documentation bias. Incomplete or inaccurately recorded events may affect reported activation frequency and outcomes [18-20].

The study design focused primarily on descriptive outcomes. Long-term survival beyond immediate Return of Spontaneous Circulation was not examined. Future investigations should evaluate survival to discharge, neurological status at discharge, and one-year survival rates to provide a more comprehensive assessment of patient-centered outcomes. Inclusion of time-to-intervention metrics, such as interval from EWS trigger to physician evaluation or antibiotic administration in sepsis cases, would further clarify modifiable system factors. Strategic quality improvement initiatives must follow a structured chronological framework aligned with the patient care pathway. The admission phase represents a critical control point. Comprehensive assessment upon hospital entry should categorize patients into acute curative care, palliative care, or end-of-life pathways. Early classification allows tailored management strategies and reduces ambiguity during clinical deterioration. For example, patients identified with advanced irreversible disease and poor prognosis may benefit from early palliative consultation rather than aggressive escalation. Effective admission management can reduce unnecessary Code Blue activations. If patients with limited physiological reserve and advanced disease have clearly documented resuscitation preferences, inappropriate full-code responses may decrease substantially. Evidence suggests that structured goals-of-care discussions reduce non-beneficial resuscitation attempts without negatively impacting patient satisfaction. Resource allocation also becomes more efficient when intensive interventions are directed toward patients with reversible conditions and higher likelihood of meaningful recovery [20].

During hospitalization, continuous monitoring systems must operate in parallel with clear escalation algorithms. EWS thresholds should correspond to defined response timelines. Compliance audits can identify delays and system gaps. Regular multidisciplinary mortality reviews should analyze each Code Blue event to determine preventable factors. Feedback loops enable iterative refinement of protocols. At discharge, high-risk patients should receive structured follow-up planning, particularly those recovering from sepsis or critical illness. Post-discharge mortality remains substantial among sepsis survivors. Coordinated outpatient monitoring may reduce readmissions and late mortality. In summary, the study highlights sepsis as a dominant contributor to in-hospital mortality and underscores the compounded risk associated with cardiac arrest. Strengthening sepsis bundle compliance, expanding early warning monitoring, increasing critical care capacity, and integrating palliative assessment at admission represent essential interventions. Addressing these domains through systematic quality improvement can reduce preventable deterioration, align treatment with patient goals, and enhance overall hospital performance. Sustained institutional commitment and culturally informed clinical practice will determine the effectiveness of these measures in reducing in-hospital cardiac arrest and improving patient outcomes.

Role of Emergency, Anesthesia, Operating Room, Pharmacy, Clinical Nutrition, Health Information, and Health Security Services in Code Blue Activation:

Effective Code Blue activation depends on coordinated multidisciplinary performance across several hospital departments. In-hospital cardiac arrest is a time-sensitive emergency that requires structured systems, trained personnel, and immediate access to life-saving resources. International standards emphasize that rapid response systems must function seamlessly across clinical and non-clinical sectors to improve survival outcomes [3][4][6]. The integration of Emergency, Anesthesia, Operating Room, Pharmacy, Clinical Nutrition, Health Information, and Health Security services ensures that Code Blue responses remain timely, organized, and outcome-oriented. The Emergency Department plays a central role in establishing institutional readiness for cardiac arrest management. Emergency physicians and nurses are typically the most experienced in advanced life support protocols and rapid patient assessment. Their expertise shapes hospital-wide resuscitation policies, simulation training, and post-event evaluation. Early recognition systems such as the Early Warning Score are frequently implemented and refined within emergency settings before expansion to inpatient wards [6]. Emergency teams also contribute to protocol standardization, ensuring alignment with international accreditation requirements and resuscitation guidelines [3][4]. In many tertiary centers, emergency specialists serve as leaders or supervisors of Code Blue teams, coordinating advanced cardiac life support measures and post-resuscitation stabilization.

Anesthesia services provide critical expertise in airway management and hemodynamic stabilization. Securing the airway during cardiac arrest directly influences oxygenation and neurological outcomes. Anesthesiologists possess advanced skills in endotracheal intubation, difficult airway management, and pharmacologic sedation. Their involvement improves procedural efficiency during high-stress resuscitation scenarios. Furthermore, anesthesia teams guide post-return of spontaneous circulation management, including ventilation strategies and circulatory support. Studies demonstrate that coordinated advanced airway management during in-hospital cardiac arrest contributes to improved survival metrics [2][8–11]. The presence of anesthesia personnel during Code Blue activation enhances procedural success rates and reduces delays in definitive airway control. The Operating Room contributes both technical infrastructure and specialized personnel. In situations where cardiac arrest occurs intraoperatively or requires emergent surgical intervention, operating room teams ensure rapid access to sterile environments, surgical instruments, and perfusion support. Surgeons may be required in cases involving trauma, hemorrhage, or reversible surgical causes of arrest. The operating room also supports extracorporeal resuscitation programs in advanced tertiary centers. Even outside intraoperative contexts, operating room staff participate in institutional training exercises and maintain familiarity with resuscitation workflows, strengthening hospital-wide preparedness. Pharmacy services play a decisive role in ensuring immediate availability and correct administration of resuscitation medications. Advanced cardiac life support protocols require timely delivery of epinephrine, amiodarone, atropine, and other emergency drugs. Delays or dosing errors directly compromise patient survival. Hospital pharmacies must maintain standardized Code Blue medication kits with regular auditing of expiration dates and stock levels. Pharmacists also contribute to protocol development, medication safety monitoring, and post-event medication review. In sepsis-related arrests, rapid antibiotic preparation and administration are essential components of care, aligning with recommended one-hour and six-hour bundle compliance measures [14][15]. Pharmacy oversight strengthens medication accuracy and supports antimicrobial stewardship efforts to reduce preventable deterioration.

Clinical Nutrition services, though not directly involved in acute resuscitation maneuvers, influence patient vulnerability to cardiac arrest through long-term metabolic optimization. Malnutrition weakens immune response, delays recovery, and increases susceptibility to infection and sepsis. Evidence indicates that a substantial proportion of hospitalized patients with chronic disease require comprehensive nutritional assessment and support [18–20]. Inadequate nutritional management may exacerbate frailty and impair physiological reserve, increasing the likelihood of deterioration reflected in high Early Warning Scores. Integrating nutritional evaluation into admission assessment improves resilience and may indirectly reduce Code Blue incidence. Health Information Services provide the structural backbone for data integrity and quality improvement. Accurate documentation of Code Blue activation times, response intervals, interventions, and outcomes enables performance evaluation. Reliable data collection allows hospitals to calculate Return of Spontaneous Circulation rates and compare institutional outcomes with international benchmarks [2][8–11]. Health information systems also facilitate integration of Early Warning Score alerts into electronic medical records, ensuring automated escalation when thresholds are exceeded [6]. Without robust documentation systems, meaningful audit and policy refinement remain impossible. Data transparency supports institutional accountability and continuous improvement. Health Security Services ensure environmental control and rapid logistical coordination during emergencies. Code Blue events often require immediate crowd management, elevator prioritization, and corridor clearance to allow rapid team access. Security personnel facilitate safe movement of equipment and staff, particularly in large tertiary hospitals with high visitor traffic. During pandemic conditions, security teams also enforce infection control protocols to reduce cross-contamination risks [8][9]. Efficient environmental control reduces response delays and preserves clinical focus during high-intensity resuscitation efforts.

The effectiveness of Code Blue activation depends not solely on clinical expertise but on synchronized performance across these departments. Multidisciplinary simulation training strengthens communication and role clarity. Structured debriefings after each event allow identification of system gaps. Continuous investment in training, infrastructure, and interdepartmental coordination remains essential to achieving improved survival outcomes. In summary, Emergency, Anesthesia, Operating Room, Pharmacy, Clinical Nutrition, Health Information, and Health Security services collectively form the operational framework of an effective Code Blue system. Their coordinated engagement enhances early recognition, rapid intervention, medication safety, data accuracy, and logistical efficiency. Alignment with evidence-based protocols and accreditation standards [3][4][6] strengthens institutional capacity to respond to in-hospital cardiac arrest and improves the potential for meaningful patient recovery.

Conclusion:

This six-year evaluation demonstrates that in-hospital cardiac arrest within a tertiary teaching hospital is strongly influenced by acute physiological

instability and advanced chronic disease burden. The modest ROSC rate reflects the complexity of patient conditions and systemic limitations in early detection and rapid response. High EWS and high palliative scores among many patients indicate that deterioration was frequently predictable, underscoring the importance of proactive monitoring and structured goals-of-care discussions. Sepsis emerged as a leading preventable cause of mortality, emphasizing the urgency of strengthening early sepsis recognition, bundle compliance, and infection-control strategies. Enhancing rapid response infrastructure, expanding critical-care capacity, and improving interdisciplinary communication are essential to reducing treatment delays. Integrating palliative assessment into routine admissions may also prevent non-beneficial interventions and better align care with patient preferences. Sustained institutional commitment, training, and system-wide coordination remain crucial for improving survival and minimizing preventable in-hospital cardiac arrests.

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