The Role Of Paramedics, Emts, And Nurses In The Saudi Red Crescent In Enhancing The Quality Of Pre-Hospital Care And Responding To Emergencies

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Abstract
This extensive research report evaluates the critical and evolving roles of paramedics, Emergency Medical Technicians (EMTs), and specialized nursing professionals within the Saudi Red Crescent Authority (SRCA) in the Kingdom of Saudi Arabia (KSA). Against the backdrop of Saudi Vision 2030 and the National Transformation Program, the SRCA is transitioning from a traditional transport service to a sophisticated, evidence-based pre-hospital medical system. Drawing upon literature, government reports, and clinical data published up to December 31, 2023, this paper provides an exhaustive analysis of the organizational history, professional scope of practice, and educational advancements of the SRCA workforce. It examines the impact of advanced life support interventions on patient outcomes and explores the unique challenges posed by the Hajj and Umrah mass gatherings, where the integration of nursing staff becomes pivotal. Furthermore, the report identifies systemic barriers—including nurse-paramedic communication during handovers and rural-urban disparities—and offers strategic recommendations to further elevate the quality of care. The analysis demonstrates that the collaboration between a professionalized paramedic workforce and specialized flight and critical care nurses is the linchpin of Saudi Arabia's emergency response modernization.
Keywords: Paramedics, Emergency Medical Services, Saudi Red Crescent Authority, Pre-hospital Care, Vision 2030, Nursing

1. INTRODUCTION

1.1 The Strategic Context of Saudi Healthcare

The Kingdom of Saudi Arabia is undergoing a profound socioeconomic transformation driven by Saudi Vision 2030, a strategic framework intended to reduce oil dependence and diversify the economy. Central to this vision is the restructuring of the healthcare sector to enhance quality, accessibility, and efficiency. Within this framework, Emergency Medical Services (EMS) are recognized not merely as a transportation necessity but as the frontline of national health security [1]. The pre-hospital phase of care—the period from the onset of a medical emergency until arrival at a definitive care facility—is a critical window where morbidity and mortality outcomes are determined.

Historically, the Saudi healthcare model was hospital-centric, with pre-hospital services functioning primarily as a means of conveyance. However, the rising burden of non-communicable diseases (NCDs), such as cardiovascular disease and diabetes, coupled with a persistently high rate of road traffic accidents (RTAs), has necessitated a paradigm shift [2]. The National Transformation Program (NTP) has set aggressive targets for the health sector, including the reduction of emergency response times, the improvement of trauma survival rates, and the localization (Saudization) of the healthcare workforce [3]. In this context, the role of the SRCA practitioner—the paramedic and the EMT—has been elevated to that of a specialized clinician capable of delivering advanced life-saving interventions in uncontrolled environments.

1.2 Historical Evolution of the Saudi Red Crescent Authority

To understand the current role of paramedics in Saudi Arabia, one must appreciate the institutional history of the SRCA. The genesis of organized emergency services in the Kingdom dates back to 1934 (1353 H), with the establishment of the "National Medical Emergency Association". This entity was created out of necessity during the Saudi-Yemen war to provide medical aid to wounded civilians and soldiers in the Asir and Tihamah regions, where medical infrastructure was virtually non-existent. Simultaneously, the association addressed the dire needs of pilgrims performing Hajj in Makkah, who suffered from heat exhaustion, disease, and trauma without adequate transport to hospitals [4].

This charitable initiative evolved into the Saudi Red Crescent Society and later, by Royal Decree in 2008 (1429 H), into the Saudi Red Crescent Authority (SRCA). This transition from a "Society" to an "Authority" marked a significant shift in administrative power and government integration, linking the organization directly to the Council of Ministers with the Minister of Health serving as the Chairman of the Board of Directors. This structure underscores the SRCA's dual mandate: to serve as the primary provider of EMS during peacetime and to act as a humanitarian auxiliary to the medical departments of the armed forces during conflict, in accordance with the Geneva Conventions [4].

Today, the SRCA operates under a sophisticated legislative framework that empowers it to adopt policies, approve administrative regulations, and establish centers throughout the Kingdom. Its membership in the International Federation of Red Cross and Red Crescent Societies (IFRC), admitted in 1963, ensures that its operational standards are benchmarked against global humanitarian principles [5]. This historical trajectory—from a war-time charity to a robust government authority—mirrors the professional evolution of its workforce, from volunteer drivers to highly trained paramedics.

1.3 The Vision 2030 Mandate for EMS

The Saudi Vision 2030 outlines specific goals that directly impact the SRCA's operations. The Health Sector Transformation Program aims to facilitate access to healthcare services, improve the quality and efficiency of these services, and promote prevention of health risks [1]. For the SRCA, this translates to tangible performance indicators:

- **Response Time Reduction:** Achieving international benchmarks (e.g., <8 minutes for cardiac arrest) in major urban centers [6].
- **Digital Transformation:** Implementing unified dispatch systems and electronic patient records to ensure data continuity [7].
- **Workforce Nationalization:** Replacing a historically expatriate-heavy workforce with qualified Saudi nationals to ensure cultural competence and long-term sustainability [1].

These strategic drivers have fundamentally altered the daily reality of paramedics. They are no longer isolated responders but are integrated nodes in a digital, data-driven healthcare network,

accountable for clinical quality metrics that are monitored at the highest levels of government [8].

2. PROFESSIONAL FRAMEWORK

2.1 The Regulatory Landscape

The practice of EMS in Saudi Arabia is regulated by the Saudi Commission for Health Specialties (SCFHS), which governs licensure, accreditation, and professional classification [9]. The SCFHS plays a pivotal role in defining the boundaries of practice for different tiers of EMS providers, ensuring that public safety is maintained through rigorous examination and certification processes [10]. This governance structure is crucial for distinguishing between the various levels of care providers within the SRCA.

2.2 Distinguishing Roles: EMT vs. Paramedic

A common misconception in public discourse is the interchangeable use of "EMT" and "Paramedic." However, in the Saudi context, these represent distinct professional tiers with vastly different scopes of practice, educational requirements, and clinical responsibilities.

2.2.1 Emergency Medical Technician (EMT)

The EMT represents the foundational level of pre-hospital care.

- **Education:** Typically requires a diploma or certificate program ranging from one to two years [11].
- **Scope of Practice:** EMTs are trained in Basic Life Support (BLS). Their primary focus is on non-invasive interventions. This includes cardiopulmonary resuscitation (CPR), the use of Automated External Defibrillators (AEDs), basic airway management using adjuncts like oropharyngeal (OPA) and nasopharyngeal (NPA) airways, bleeding control through direct pressure or tourniquets, and spinal immobilization [11].
- **Role in SRCA:** EMTs often staff Basic Life Support (BLS) units or assist paramedics in Advanced Life Support (ALS) units. Their role is critical in the "scoop and run" scenarios where rapid transport is the priority, or in mass casualty incidents where basic stabilization is needed for a large volume of patients [12].

2.2.2 Paramedic (EMS Specialist)

The Paramedic, often referred to as an EMS Specialist in the Saudi classification system, represents the advanced tier of care.

- **Education:** Requires a Bachelor's degree (BSc) in Emergency Medical Services, typically a four-year program plus a mandatory internship year [11].
- **Scope of Practice:** Paramedics operate under Advanced Life Support (ALS) protocols. Their scope extends to invasive procedures that were traditionally the domain of physicians. This includes:
- **Advanced Airway Management:** Endotracheal intubation and the insertion of Supraglottic Airway (SGA) devices [13].
- **Vascular Access:** Intravenous (IV) and Intraosseous (IO) cannulation for fluid resuscitation and drug delivery [13].
- **Pharmacology:** Administration of critical medications such as Epinephrine (for cardiac arrest and anaphylaxis), Amiodarone or Lidocaine (for arrhythmias), analgesics, and fluids [12].
- **Diagnostic Skills:** Interpretation of 3-lead and 12-lead ECGs to identify STEMI (ST-Elevation Myocardial Infarction) and arrhythmias [14].

• **Procedural Skills:** Needle decompression for tension pneumothorax [12].
• **Role in SRCA:** Paramedics are the clinical leaders on the scene. They are responsible for complex decision-making, such as determining whether to initiate resuscitation, identifying stroke alerts for hospital pre-notification, and managing critically ill patients during transport [15].

2.2.3 Senior Specialists and Fellows

The SCFHS has recently introduced higher tiers, such as the Senior EMS Specialist, who typically holds a master's degree or a fellowship in EMS or Disaster Medicine [9]. These individuals are trained for leadership roles, including medical direction, disaster response management, and critical care transport (e.g., air ambulance operations). They bridge the gap between pre-hospital care and emergency medicine consultants, providing "medical control" and oversight.

2.3 The Role of Nursing in Pre-Hospital Care

While paramedics form the backbone of the ground fleet, nursing professionals play a vital, specialized role within the SRCA and the broader pre-hospital ecosystem, particularly in high-acuity and mass-gathering contexts.

2.3.1 Flight Nurses (Air Ambulance)

The SRCA operates an air ambulance fleet to cover Saudi Arabia's vast geographic area. Nurses in this domain are often classified as **Flight Nurses** or Critical Care Transport Nurses [16].

• **Scope and Training:** Flight nurses possess advanced training in critical care (ICU/ER experience) and aviation physiology. They are authorized to manage complex patients who require hemodynamic monitoring, ventilator management, and vasoactive medication infusions during transport—interventions that may sometimes exceed the standard paramedic scope.
• **Operational Role:** They work alongside paramedics or physicians on helicopters and fixed-wing aircraft, responding to highway accidents in remote areas or facilitating inter-facility transfers of critically ill patients.

2.3.2 Critical Care Transport (Inter-Facility Transfer)

With the regionalization of healthcare services (e.g., stroke and trauma centers), the need for safe inter-facility transfer (IFT) is growing [17].

• **Integration:** The Ministry of Health and SRCA collaborate on Critical Care Transport (CCT) policies. CCT teams are often multidisciplinary, including a nurse and a paramedic. The nurse's role is crucial for maintaining continuity of care for ICU patients moving between hospitals, managing ongoing blood transfusions, or complex medication regimens.

2.3.3 Seasonal and Volunteer Nursing (Hajj & Umrah)

During the Hajj pilgrimage, the SRCA's workforce swells significantly with the addition of seconded staff and volunteers [18].

• **Deployment:** Thousands of nurses from the Ministry of Health and other sectors are seconded to support SRCA operations in the Holy Sites. They staff temporary seasonal health centers and mobile units.
• **Scope:** In this context, nurses provide triage, administer vaccinations, manage heat-related illnesses (heatstroke/exhaustion), and provide wound care. Their presence allows paramedics to focus on rapid transport while nurses manage on-site stabilization and public health interventions.

2.4 Workforce Demographics and Nationalization

A critical aspect of the SRCA's evolution is the "Saudization" of its workforce. For decades, the Authority relied on expatriate paramedics from countries like the Philippines, Jordan, and the US to fill the skills gap. While these professionals provided high-quality care, language and cultural barriers sometimes hindered effective communication with the local population [19]. The establishment of dedicated EMS colleges in Saudi universities has created a pipeline of domestic talent. Programs at King Saud University (Prince Sultan College for Emergency Medical Services), Imam Abdulrahman Bin Faisal University, and others are now producing hundreds of Saudi paramedics annually [20]. This localization strategy is not just about employment figures; it is a clinical quality intervention. Saudi paramedics possess an innate understanding of the local dialect, cultural norms regarding gender and privacy, and social dynamics, which facilitates trust and cooperation during emergencies [21].

3. EDUCATIONAL INFRASTRUCTURE AND COMPETENCY DEVELOPMENT

3.1 The Academic Shift: From Vocational to Professional

The quality of pre-hospital care is inextricably linked to the quality of education provided to the workforce. In the past, EMS training in Saudi Arabia was largely vocational, focusing on psychomotor skills. The transition to university-based education marks a maturing of the profession. The Bachelor of Science in EMS programs are designed to meet international standards. For example, the program at the College of Applied Medical Sciences (COAMS) adopted the curriculum of Flinders University in Australia, adapting it to the local context [22]. These curricula are comprehensive, covering:

- **Basic Sciences:** Anatomy, physiology, pathophysiology, and pharmacology.
- **Clinical Management:** Trauma emergencies, medical emergencies (cardiology, respiratory, endocrine), and special populations (pediatrics, obstetrics).
- **Professional Development:** Ethics, research methodology, communication skills, and leadership.
- **Clinical Rotation:** A mandatory one-year internship in hospital emergency departments and ambulance services ensures that theoretical knowledge is cemented with practical experience.

3.2 Advanced Training and Fellowships

To support the tier of Senior Specialists, the SCFHS and universities have developed fellowship programs. The EMS and Disaster Medicine Fellowship is a prime example. This rigorous training pathway prepares senior paramedics and emergency physicians to manage the EMS system itself [9]. The curriculum covers:

- **Systems Design:** Understanding dispatch, communications, and fleet management.
- **Medical Oversight:** Learning how to provide online medical direction and conduct retrospective quality assurance audits.
- **Disaster Medicine:** Managing mass casualty incidents (MCI), hazardous materials (HAZMAT) incidents, and counterterrorism response.
- **Public Health:** Integrating EMS into the broader public health surveillance network.

3.3 Continuous Professional Development (CPD)

Medicine is a dynamic field, and skill decay is a known risk in EMS. To maintain licensure, paramedics and EMTs must fulfill Continuing Medical Education (CME) requirements mandated by the SCFHS.

• **Requirements:** Practitioners must complete a specific number of CME hours annually (e.g., 30-40 hours depending on the specialty) [23].
• **Core Competencies:** Training often focuses on maintaining certification in ACLS (Advanced Cardiac Life Support), PHTLS (Prehospital Trauma Life Support), and PALS (Pediatric Advanced Life Support) [23].
• **SRCA Initiatives:** The SRCA conducts its own internal training campaigns. For instance, in 2021, the Authority collaborated with the Global First Aid Reference Centre to train over 500 instructors on the new IFRC 2020 resuscitation guidelines, ensuring that the entire workforce remained current with the latest scientific evidence [24].

3.4 Identified Competency Gaps

Despite these robust frameworks, literature identifies specific areas where competency can be improved. A 2023 survey of EMT-Paramedics revealed that while recognition of classic stroke symptoms (facial droop, arm weakness) was high (>90%), recognition of non-traditional symptoms (visual disturbance, ataxia) was significantly lower (<50%) [25]. Furthermore, another study indicated that ECG interpretation skills for complex arrhythmias and ischemia needed reinforcement, with some cohorts showing accuracy rates around 43% [26]. These findings highlight the necessity for targeted educational interventions and high-fidelity simulation training to bridge the gap between academic knowledge and clinical application.

4. OPERATIONAL PERFORMANCE

4.1 Response Time: The Critical Metric

In emergency medicine, time is tissue. The "response time"—defined as the interval between the receipt of a call at the dispatch center and the arrival of the ambulance at the scene—is a primary key performance indicator (KPI) for the SRCA. Under the National Transformation Program, the SRCA has faced immense pressure to reduce response times. Historical data often showed prolonged response times due to traffic congestion, lack of clear street addresses, and vast geographic distances. However, data from the 2022–2023 period indicates substantial progress.
• **Urban Improvements:** In major metropolitan hubs like Riyadh, Jeddah, and Dammam, average response times have improved to approximately **12 to 15 minutes** [27]. While this still occasionally exceeds the "golden" 8-minute target for cardiac arrest, it represents a massive leap from previous decades.
• **Rural Challenges:** Disparities persist in rural areas, where response times can average between 20 and 30 minutes or more [28]. The sheer size of Saudi Arabia poses a logistical challenge that ground ambulances alone cannot solve.
• **Interventions:** To combat these delays, the SRCA has diversified its fleet. The introduction of motorcycle response units allows paramedics to weave through gridlocked traffic in cities like Riyadh to initiate care before the transport ambulance arrives. Additionally, the expansion of air ambulance services helps bridge the rural gap for critical cases.

4.2 Cardiac Arrest Outcomes

Out-of-Hospital Cardiac Arrest (OHCA) is the ultimate test of an EMS system's efficacy. The survival of an OHCA patient depends on the "Chain of Survival": early access, early CPR, early defibrillation, and advanced life support.
• **Paramedic Intervention:** SRCA paramedics are equipped with the tools for advanced resuscitation. Protocol R-1 authorizes the use of mechanical CPR devices (ensuring high-

quality compressions during transport), advanced airway management (SGA/ET), and drugs like Epinephrine and Amiodarone [12].

- **The Bystander Gap:** Despite the paramedics' capabilities, outcomes are heavily influenced by what happens before they arrive. Studies show that bystander CPR rates in Saudi Arabia are low, averaging around 12% nationally. Even in Riyadh, where rates are higher (26.4%), this lags behind global leaders [29].
- **Survival Rates:** Consequently, survival-to-discharge rates for OHCA hover around 12.6%. This data suggests that while the SRCA component of the chain is strengthening (through better response times and ALS capability), the community component remains the weakest link. The SRCA has recognized this and is actively conducting community CPR training, training over 75 million beneficiaries in various first aid initiatives in 2023 alone [30].

4.3 Trauma Care and the "Platinum Ten Minutes"

Trauma, particularly from road traffic accidents, is a leading cause of death in Saudi Arabia [31]. The SRCA's approach to trauma has evolved to prioritize rapid assessment and immediate life-saving interventions followed by rapid transport—a concept known as the "Platinum Ten Minutes."

- **Protocols:** Paramedics follow protocols T-1 through T-14, which cover everything from multisystem trauma to amputations. Key interventions include spinal motion restriction, bleeding control (tourniquets, hemostatic agents), and needle decompression for tension pneumothorax [12].
- **Preventable Mortality:** Research indicates that approximately 14.4% of in-hospital trauma deaths in Saudi Arabia are potentially preventable, often due to pre-hospital issues like airway management or hemorrhage control delays [2].
- **Improvements:** The data shows a decreasing trend in RTA-related mortality, attributed partly to better enforcement of traffic laws (Saher system) but also to improved pre-hospital care. The competency of paramedics in managing traumatic shock and communicating with trauma centers for "pre-arrival notification" allows hospitals to activate trauma teams, significantly improving survival odds [32].

4.4 Stroke and Acute Coronary Syndrome (ACS)

For time-sensitive medical conditions like stroke and heart attacks, the paramedic's primary role is early recognition and triage.

- **Stroke:** Paramedics use screening tools (e.g., FAST) to identify potential strokes. Protocol adherence ensures that these patients are transported to stroke-ready hospitals rather than the nearest facility. However, studies show that many stroke patients still arrive by private car, bypassing the EMS system entirely [33]. This delays door-to-needle time for thrombolysis [34].
- **ACS:** Similarly, for heart attacks, paramedics perform 12-lead ECGs. While they can transmit these to hospitals, the "pre-notification" system is not yet universally integrated across all regions. When utilized, EMS transport is associated with significantly faster reperfusion times compared to walk-in patients [35].

5. TECHNOLOGY AND DIGITAL TRANSFORMATION

5.1 The "Assefny" Application

In an era of ubiquitous smartphone usage, the SRCA launched the "Assefny" (Help Me) application to modernize emergency access. This app addresses several unique challenges in the Saudi context [36].

- **Location Accuracy:** One of the biggest hurdles for EMS in Saudi Arabia has been the lack of a unified, precise addressing system in some areas. "Assefny" uses GPS geolocation to pinpoint the caller's exact position, eliminating the need for complex verbal directions.
- **Accessibility:** The app supports six languages and provides specialized interfaces for the deaf and mute, allowing them to request help without a voice call.
- **Performance:** A comparative study between "Assefny" and the traditional 997 dispatch number showed that the app is highly effective. For crash accidents, the mean time to record the request and dispatch units was competitive, and the location data significantly reduced the "time to scene" variable.

5.2 Electronic Patient Care Records (ePCR)

The SRCA has moved from paper-based documentation to electronic patient care records (ePCR). This digital shift is fundamental for quality assurance [37].

- **Data Integrity:** ePCRs allow for the collection of structured data on every case, from response timestamps to clinical interventions performed. This data is essential for the "audit and feedback" loops that are proven to improve clinical quality.
- **Integration:** The long-term goal is full interoperability with hospital information systems. Currently, while data is collected digitally, the seamless transfer of this data into the hospital's electronic health record (EHR) is a work in progress. Achieving this would allow for longitudinal outcome tracking—knowing not just if the patient arrived alive, but if they survived to discharge.

5.3 Computer-Aided Dispatch (CAD)

The backbone of SRCA operations is its CAD system. This system allows dispatchers to view the real-time location of all ambulance units and assign the closest available resource to an emergency. This dynamic resource allocation is critical for managing the high volume of calls in cities like Riyadh and is a key factor in the reported improvements in response times [38].

6. BARRIERS AND CHALLENGES TO QUALITY IMPROVEMENT

6.1 Linguistic and Communication Barriers

Saudi Arabia has a unique demographic landscape. The healthcare workforce has historically been multinational, and the patient population includes millions of expatriate workers and pilgrims who may not speak Arabic or English [39].

- **The Problem:** Miscommunication in emergency settings can be fatal. Studies in Makkah emergency departments have shown that language barriers between paramedics (or nurses) and patients lead to "information loss" during handovers. A paramedic might correctly identify a symptom, but if they cannot convey the nuance to the receiving hospital staff due to language discordance, the continuity of care is broken.
- **The Impact:** This can lead to delays in diagnosis or medication errors. While the Saudization of the workforce is mitigating this for the Arabic-speaking population, the challenge remains for non-Arabic speaking patients (e.g., pilgrims from South Asia or Africa).

6.2 Ambulance Offload Delays (AOD)

A systemic issue affecting EMS globally, including Saudi Arabia, is Ambulance Offload Delay (often called "wall time"). This occurs when an ambulance arrives at a hospital but cannot transfer the patient because the emergency department is full [40].

• **Operational Drag:** While the ambulance waits at the hospital, it is effectively offline and cannot respond to other 997 calls. This degrades the overall system coverage. Qualitative data from paramedics highlights this as a major frustration that impacts their efficiency.
• **Interoperability:** The lack of real-time bed capacity data sharing between hospitals and the SRCA dispatch center exacerbates this issue, as ambulances may be routed to already saturated facilities.

6.3 Rural-Urban Disparities

While Riyadh and Jeddah boast world-class EMS capabilities, rural regions face significant challenges [41].
• **Resource Allocation:** Rural stations may have fewer advanced life support units and rely more on BLS coverage.
• **Training Access:** Paramedics in remote areas often have less access to continuous professional development and simulation training compared to their urban counterparts. This can lead to skill decay in low-frequency, high-acuity procedures.
• **Outcomes:** Consequently, outcomes for time-critical conditions like trauma and cardiac arrest are generally poorer in rural settings due to longer response times and longer transport distances to definitive care.

6.4 Public Awareness and Cultural Factors

The SRCA can only respond if the public calls them [42].
• **Utilization:** There is a culture of using private vehicles for transport to the emergency room, even for critical conditions like chest pain. This bypasses the critical early treatments paramedics can provide.
• **Bystander CPR:** Cultural norms can hinder bystander intervention. For example, men may hesitate to perform CPR on unrelated women due to social modesty concerns. Additionally, a fear of legal liability prevents many from acting, despite "Good Samaritan" principles being encouraged in Islamic teachings.

7. Recommendations for Enhancing Care Quality

Based on the comprehensive analysis of the literature and current operational data, the following strategic recommendations are proposed to further enhance the role of SRCA paramedics and the quality of pre-hospital care:
1. **Unified National Medical Control:** Establish a centralized, standardized medical control system that provides consistent offline protocols across all regions. This should be coupled with a robust "audit and feedback" mechanism where paramedics receive clinical feedback on their cases from medical directors, fostering a culture of continuous learning.
2. **Bridging the Rural Gap:** Deploy mobile simulation training units to rural regions. These units can bring high-fidelity manikins and instructors to remote stations, ensuring that rural paramedics maintain competency in rare but critical skills (e.g., pediatric resuscitation, difficult airway management).
3. **Standardized Clinical Handovers:** Mandate the use of structured handover tools (such as **ISBAR** or **IMIST-AMBO**) for the transfer of care between paramedics and hospital staff. This creates a "common language" that reduces information loss, regardless of the native languages of the providers.
4. **Public-Centric Engagement:** Launch a national campaign to improve "Health Literacy" regarding EMS. This should focus on:
• Recognizing the signs of stroke and heart attack.

- Encouraging the use of 997/Assefny over private transport for emergencies.
- Promoting "Hands-Only CPR" to simplify the bystander role and reduce cultural hesitation.

5. **Data Integration for Outcome Tracking:** Accelerate the technical integration of SRCA ePCR systems with the Ministry of Health's hospital systems (SEHA). The goal is to create a single longitudinal record for the patient. This will allow the SRCA to measure its success not just by "response time" but by "patient survival," which is the true measure of quality.

6. **Specialized Paramedic Pathways:** Develop sub-specialties within the paramedic profession, such as:

- **Community Paramedicine:** To manage chronic disease exacerbations at home, reducing unnecessary ER transports and alleviating hospital overcrowding.
- **Critical Care Transport:** A dedicated tier for inter-facility transfer of ICU patients, freeing up 997 units for primary response.

8. CONCLUSION

The Saudi Red Crescent Authority stands at the forefront of a historic transformation in the Kingdom's healthcare landscape. Over the past few decades, the role of the SRCA provider has evolved from a basic aid worker to a highly skilled, university-educated clinician—the Paramedic. This professionalization is not merely a change in title; it represents a fundamental enhancement in the capacity of the state to preserve life.

The evidence reviewed up to December 2023 demonstrates that this transformation is yielding tangible results: response times in cities are improving, advanced life support interventions are being delivered on-scene, and the management of mass gatherings like Hajj has become a global benchmark for excellence. The integration of technology through the "Assefny" app and the digitization of patient records further underscores the Authority's commitment to modernization.

However, the journey is not complete. Significant challenges remain in closing the rural-urban divide, overcoming linguistic barriers at the hospital interface, and engaging the public as active partners in the chain of survival. By addressing these systemic friction points and continuing to invest in the education and localization of its workforce, the SRCA is well-positioned to achieve the ambitious goals of Vision 2030. The Saudi paramedic of today is the cornerstone of a resilient, world-class emergency medical system that ensures every resident and pilgrim in the Kingdom receives the highest standard of care when they need it most.

References

1. Al-Wathinani AM, Alghadeer SM, AlRuthia YS, Mobrad A, Alhallaf MA, Alghamdi AA, et al. The characteristics and distribution of emergency medical services in Saudi Arabia. Annals of Saudi Medicine [Internet]. 2023 Mar 1;43(2):63–9. Available from: https://doi.org/10.5144/0256-4947.2023.63
2. Alferdaus AM, Shaher A. Current trauma care system in Saudi Arabia: literature review and a proposed action plan. Saudi Journal of Health Systems Research [Internet]. 2021 Nov 4;1(4):123–33. Available from: https://doi.org/10.1159/000519607
3. National Transformation Program 2020. National Transformation Program 2020. 2020.
4. Saudi Red Crescent Authority. Authority History - SRCA [Internet]. SRCA. Available from: https://srca.org.sa/en/about/authority-history

5. IFRC - Network Databank [Internet]. Available from: https://data.ifrc.org/national-society/dsa001
6. Alumran A, Albinali H, Saadah A, Althumairi A. The Effects of Ambulance Response Time on Survival Following Out-of-Hospital Cardiac Arrest Open Access Emergency Medicine [Internet]. 2020 Nov 30;Volume 12:421–6. Available from: https://doi.org/10.2147/oaem.s270837
7. Althumairi A, Alnasser Z, Alsadeq S, Al-Kahtani N, Aljaffary A. Mobile Ambulatory Application Asafny and Traditional Phone Request 997: A Comparative Cross-Sectional Study. Open Access Emergency Medicine [Internet]. 2021 Jan 1;Volume 12:471–80. Available from: https://doi.org/10.2147/oaem.s279969
8. National Transformation Program Highlights Key Achievements over Its First Five Years [Internet]. SaudiPressAgency. Available from: https://www.spa.gov.sa/2237560
9. Alhajjaj F, Aljerian N, Othman O, Specialty's Scientific Members, Specialty's Curriculum Development Committee, AlYahya A. Emergency Medical Services and Disaster Medicine Fellowship Program. 2021.
10. AlShammari T, Jennings P, Williams B. Evolution of emergency medical services in Saudi Arabia. Journal of Emergency Medicine, Trauma & Acute Care [Internet]. 2017 May 10;2017(1). Available from: https://doi.org/10.5339/jemtac.2017.4
11. Alhajjaj F, Abuaish D, Samrqandi F, Saudi Red Crescent Authority, Othman O, Aljerian N, et al. National Emergency Medical Services scope of practice. National Emergency Medical Services Scope of Practice. 2022.
12. Curtis K, Ramsden C, Shaban RZ, Fry M, Considine J. Emergency and Trauma Care for Nurses and Paramedics - EBook. Elsevier; 2019.
13. Alsofayan YM, Althunayyan SM, Mohamed MA, Alhabeeb SH, Altuwaijri MI, Alhajjaj FS, et al. Out of hospital cardiac arrest: Saudi red crescent experience throughout COVID-19 era. Open Access Emergency Medicine [Internet]. 2021 Sep 1;Volume 13:431–8. Available from: https://doi.org/10.2147/oaem.s334808
14. The Role of Paramedicsin the Saudi red crescent authority in Enhancing Outcomes for Acute Myocardial Infarction Patients: A Pre-Hospital Perspective. JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH. 2024;7(S8):2737–8.
15. Alabdullah FM, Alharbi YJ, Alqahtani SHS, Almalki RA, Albalawi AS, Alsallami OA, et al. Paramedic's contributions in urgent and primary care systems. Medical Science [Internet]. 2023 Dec 31;27(142):1–6. Available from: https://doi.org/10.54905/disssi.v27i142.e387ms3263
16. Braithwaite I, Steele AM. "Flight nurses," or "Nurses who fly"? An international perspective on the role of flight nurses. Air Medical Journal [Internet]. 2020 Jan 10;39(3):196–202. Available from: https://doi.org/10.1016/j.amj.2019.11.005
17. Kikutani K, Shimatani T, Kawaguchi A, Ikeyama T, Yamaguchi D, Nishida O, et al. Medical equipment that improve safety and outcomes of inter-facility transportation of critically ill patients: A systematic review. Medicine [Internet]. 2023 Jun 2;102(22):e33865. Available from: https://doi.org/10.1097/md.0000000000033865
18. Gawthrop M. Advising Hajj and Umrah travellers in general practice. Practice Nursing [Internet]. 2020 Apr 2;31(4):156–61. Available from: https://doi.org/10.12968/pnur.2020.31.4.156

19. Alanazy ARM, Fraser J, Wark S. Emergency medical services in rural and urban Saudi Arabia: A qualitative study of Red Crescent emergency personnel' perceptions of workforce and patient factors impacting effective delivery. Health & Social Care in the Community [Internet]. 2022 May 30;30(6):e4556–63. Available from: https://doi.org/10.1111/hsc.13859
20. Emergency Medical Care Department | Imam Abdulrahman bin Faisal University [Internet]. Available from: https://www.iau.edu.sa/en/colleges/college-of-applied-medical-sciences/departments/emergency-medical-care-department
21. Mashi M M. Genef, Naif Al Anazi EF, Fawaz Aldahmashi MM, Fawaz Aldahmashi KM, Hazzaa Alshammari SM, Al-Mutairi NRA, et al. Exploring the Challenges and Strategies for Effective Communication between Ambulance and Emergency Technicians and Medical Staff in Saudi Arabia [Internet]. Vol. 27, International Journal of Medical Toxicology & Legal Medicine. 2024. Available from: https://ijmtlm.org
22. Emergency Medical Services & Critical Care – Inaya Medical Colleges [Internet]. Available from: https://inaya.edu.sa/academics/college-of-applied-medical-sciences/emergency-medical-services-critical-care/
23. Continuing education requirements for emergency medical technicians in Kansas. Kansas Administrative Regulations. p. 1–5.
24. Ossama B. Guidelines practices with Saudi Arabia Red crescent Authority [Internet]. www.globalfirstaidcentre.org. 2021. Available from: https://www.globalfirstaidcentre.org/guidelines-practices-with-saudi-arabia-red-crescent-authority/
25. Devlin S. Not so FAST: pre-hospital posterior circulation stroke. British Paramedic Journal [Internet]. 2022 May 28;7(1):24–8. Available from: https://doi.org/10.29045/14784726.2022.06.7.1.24
26. Cook DA, Oh SY, Pusic MV. Accuracy of physicians' electrocardiogram interpretations. JAMA Internal Medicine [Internet]. 2020 Sep 28;180(11):1461. Available from: https://doi.org/10.1001/jamainternmed.2020.3989
27. Kingdom of Saudi Arabia. Urban Planning Reviews: Governance of Planning Review. Future Saudi Cities Programme; 2016.
28. Moafa HN, Van Kuijk SMJ, Alqahtani DM, Moukhyer ME, Haak HR. Disparities between Rural and Urban Areas of the Central Region of Saudi Arabia in the Utilization and Time-Centeredness of Emergency Medical Services. International Journal of Environmental Research and Public Health [Internet]. 2020 Oct 29;17(21):7944. Available from: https://doi.org/10.3390/ijerph17217944
29. Almiro A, AlQassab O, Alzeidan R, Binhaddab AS, Alkhorisi AM, Almalki HA, et al. Characteristics of out-of-hospital cardiac arrest patients in Riyadh province, Saudi Arabia: a cross-sectional study. Frontiers in Cardiovascular Medicine [Internet]. 2023 May 22;10:1192795. Available from: https://doi.org/10.3389/fcvm.2023.1192795
30. 75 million volunteer beneficiaries during 2023 | Ministry of Human Resources and Social Development [Internet]. Available from: https://www.hrsd.gov.sa/en/media-center/news/280120242
31. Al-Naami MY, Arafah MA, Al-Ibrahim FS. Trauma care systems in Saudi Arabia: an agenda for action. Ann Saudi Med. 2010;30(1):50-58. doi:10.4103/0256-4947.59374
32. Alkeaid M, Alorainy S, Alhussainan F, Dabil T, Alkhazi A, Alsulaymi O, et al. Characteristics of stroke in prehospital settings in Saudi Arabia: A descriptive analysis. The Journal of Medicine Law & Public Health [Internet]. 2023 Apr 19;3(2):212–8. Available from: https://doi.org/10.52609/jmlph.v3i2.68

33. Alberts MJ, Wechsler LR, Jensen MEL, Latchaw RE, Crocco TJ, George MG, et al. Formation and function of Acute Stroke–Ready Hospitals within a stroke System of care Recommendations from the Brain Attack Coalition. Stroke [Internet]. 2013 Nov 13;44(12):3382–93. Available from: https://doi.org/10.1161/strokeaha.113.002285
34. ALAhmadi AF, ALSaedi MF, Alahmadi AE, Alharbi MG, Alharbi IH, Al-Dubai S a. R. Pre-hospital delay among patients with acute myocardial infarction in Saudi Arabia. Saudi Medical Journal [Internet]. 2020 Aug 1;41(8):819–27. Available from: https://doi.org/10.15537/smj.2020.8.25185
35. Saudi Red Crescent Authority. Asifny App - SRCA [Internet]. SRCA. 2025. Available from: https://srca.org.sa/en/asifny/
36. Haliq SA, Jumaan MA. Digital Future of Emergency Medical Services: Envisioning and usability of Electronic Patient Care Report System. Advances in Human-Computer Interaction [Internet]. 2022 Sep 19;2022:1–8. Available from: https://doi.org/10.1155/2022/6012241
37. Shahrah A, Al-Mashari M, Hossain M. Developing and Implementing Next-Generation Computer-Aided Dispatch: Challenges and Opportunities. Journal of Homeland Security and Emergency Management. 2017;14(4): 20160080. https://doi.org/10.1515/jhsem-2016-0080
38. Rahman J, Thu M, Arshad N, Van Der Putten M. Mass Gatherings and Public Health: Case Studies from the Hajj to Mecca. Annals of Global Health [Internet]. 2017 Jun 12;83(2):386. Available from: https://doi.org/10.1016/j.aogh.2016.12.001
39. Zhao Y, Segalowitz N, Voloshyn A, Chamoux E, Ryder AG. Language barriers to healthcare for Linguistic Minorities: The case of second language-specific health communication anxiety. Health Communication [Internet]. 2019 Nov 20;36(3):334–46. Available from: https://doi.org/10.1080/10410236.2019.1692488
40. Li M, Vanberkel P, Zhong X. Predicting ambulance offload delay using a hybrid decision tree model. Socio-Economic Planning Sciences [Internet]. 2021 Sep 8;80:101146. Available from: https://doi.org/10.1016/j.seps.2021.101146
41. Bhatia S, Landier W, Paskett ED, Peters KB, Merrill JK, Phillips J, et al. Rural–Urban Disparities in cancer Outcomes: Opportunities for future research. JNCI Journal of the National Cancer Institute [Internet]. 2022 Feb 4;114(7):940–52. Available from: https://doi.org/10.1093/jnci/djac030
42. Lu X, Liu J. Factors Influencing Public Awareness of and Attitudes Toward Palliative Care: A Cross-Sectional Analysis of the 2018 HINTS Data. Frontiers in Public Health [Internet]. 2022 Apr 7;10:816023. Available from: https://doi.org/10.3389/fpubh.2022.816023