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**Research Article**

# Facilitating Safe Deliveries: The Collaborative Role of the Saudi Red Crescent in Nursing, Internal Medicine, Midwifery, and Health Information Management during Emergency Ambulance Births

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**Abstract:**

In emergency medical situations, the Saudi Red Crescent plays a pivotal role in ensuring safe deliveries through a collaborative approach across various health disciplines, including nursing, internal medicine, midwifery, and health information management. During ambulance births, nurses are often the first responders, trained to provide immediate and effective care to mothers in labor. Their expertise is critical in assessing the condition of the mother and the fetus, managing complications that may arise during transport, and ensuring the well-being of both. Additionally, midwives contribute specialized knowledge in childbirth, focusing on delivery techniques and neonatal care, while internal medicine professionals may assist in addressing any co-existing medical conditions. Health information management professionals are equally essential, as they gather, record, and communicate vital health information to facilitate efficient care during these high-stress situations. By ensuring that accurate medical histories and current health statuses are readily available, they empower the healthcare team to make informed decisions that significantly enhance patient safety. This interdisciplinary collaboration within the Saudi Red Crescent not only optimizes resources but also fosters a supportive environment for mothers, ultimately aiming to

reduce morbidity and mortality rates associated with emergency deliveries. Through this coordinated effort, the Saudi Red Crescent exemplifies a comprehensive approach to maternal health, aligning with global best practices in emergency medical services.

## 1. Introduction

Childbirth, while a profound natural event, is a period of significant physiological transition and vulnerability for both mother and infant. Within the structured safety of a hospital labor ward, a multidisciplinary team stands ready to manage both routine processes and acute complications. However, when labor progresses with unexpected rapidity or begins in geographically isolated or medically underserved locations, this journey is abruptly transposed into the community, often necessitating urgent transport via emergency medical services (EMS). It is within the confined, moving, and resource-limited environment of an ambulance that one of the most high-stakes scenarios in pre-hospital care unfolds: the emergency out-of-hospital birth. These precipitous deliveries, defined as births occurring with little or no warning and without the presence of a skilled birth attendant in a non-facility setting, present a unique constellation of challenges that test the very limits of emergency medical systems [1]. In the Kingdom of Saudi Arabia, a nation characterized by vast desert landscapes, rapidly expanding urban conurbations, and diverse population distributions, the Saudi Red Crescent Authority (SRCA) serves as the critical frontline agency tasked with meeting this challenge. Its mandate extends beyond rapid transit to encompass the provision of proficient, life-sustaining obstetric and neonatal care *en route* to definitive hospital-based services. The efficacy of this mission is not accidental but is fundamentally engineered through a sophisticated, integrated collaborative model. This model strategically synthesizes the specialized competencies of pre-hospital nursing, internal medicine (through emergency physician oversight), midwifery principles, and health information management.

The phenomenon of unplanned out-of-hospital birth, while representing a small percentage of total deliveries, carries a disproportionately high risk of adverse outcomes. Globally, studies indicate that such births are associated with increased rates of neonatal mortality, hypothermia, and respiratory distress, as well as maternal morbidity from complications like postpartum hemorrhage and retained placenta [2]. The pre-hospital environment inherently lacks the controlled conditions of a delivery room: lighting may be poor, space is severely constrained, sterility is difficult to maintain, and the vehicle's motion can interfere with delicate procedures. Furthermore, the EMS crew must operate without the immediate backup of specialized obstetricians, pediatricians, or advanced diagnostic tools. In this context, the SRCA's response becomes a pivotal intervention that can alter the clinical trajectory for two patients simultaneously. The Authority's role is thus dual-natured: it is both a logistic entity ensuring timely transport and an advanced clinical provider delivering essential obstetric and neonatal stabilization. This duality demands a crew composition and skill set that transcends basic life support, venturing into the realm of advanced emergency obstetric and newborn care (EmONC) [3].

The collaborative model adopted by the SRCA is a direct response to the complexity of these emergencies. It moves beyond a simple task-sharing approach to foster a dynamic system of knowledge integration and shared decision-making. At its core is the pre-hospital nurse, whose advanced training blends emergency medical technician skills with specific competencies in maternal and child health. This professional serves as the primary hands-on caregiver, performing clinical assessments, executing deliveries, managing neonatal resuscitation, and providing continuous patient support [4]. However, the nurse does not operate in a vacuum. Their actions are framed and supported by the medical oversight provided by emergency physicians, whose background in internal medicine equips them to manage physiological extremes and complex pathologies. Whether physically present on critical calls or, increasingly, available via telemedicine consultation, these physicians offer diagnostic acumen, guide the management of severe complications like eclampsia or major hemorrhage, and authorize advanced pharmacological and procedural interventions [5]. This physician-nurse partnership forms the classic backbone of emergency medical response.

Yet, the SRCA's model recognizes that emergency medicine alone may not suffice for a process that is fundamentally physiological, not pathological. Hence, the intentional integration of midwifery principles and, where feasible, certified midwifery professionals, adds a vital dimension. Midwifery brings a holistic, woman-centered philosophy and a deep expertise in the normal progression of labor. This expertise is crucial for recognizing subtle signs of deviation from normalcy, providing effective non-pharmacological pain management, and

handling specific situations like breech deliveries, which may confound practitioners trained only in managing crisis [6]. The midwifery perspective ensures that care in the ambulance respects the birth process while vigilantly guarding for complications.

In the SRCA's context, HIM transforms the electronic patient care report from a mere administrative record into a powerful tool for clinical governance and system learning. Accurate, real-time documentation of assessments, interventions, and outcomes creates a legal record, ensures continuity of care at hospital handover, and, most importantly, generates aggregate data for quality improvement [7]. By analyzing trends in complications, response times, and intervention efficacy, the SRCA can engage in evidence-based refinement of protocols, targeted staff training, and strategic resource allocation. This cycle of documentation, analysis, and feedback closes the loop, ensuring that every emergency birth contributes to the enhancement of future care [8].

## 2. The Multifaceted Role of Pre-Hospital Nursing

Within the confined and dynamic environment of a speeding ambulance, the SRCA nurse operates as the linchpin of clinical care during an emergency birth. Their role is a complex amalgamation of advanced clinical assessment, direct intervention, emotional support, and team coordination, requiring a skill set that bridges emergency medicine and obstetrics. The initial patient encounter is governed by rapid yet thorough primary and secondary surveys, tailored to the obstetric patient. The nurse must swiftly assess the stage of labor, frequency and strength of contractions, status of amniotic membranes, and any signs of imminent delivery or distress, such as crowning or meconium-stained fluid [2]. Concurrently, they monitor maternal vital signs, with particular attention to blood pressure for signs of pre-eclampsia and pulse for indicators of shock, while also establishing intravenous access—a critical procedural skill for potential fluid resuscitation or medication administration [3].

When delivery is unavoidable in the ambulance, the nurse's obstetric competencies come to the fore. They prepare a sterile delivery field as much as the environment allows, guide the mother through the pushing process, and perform the actual delivery with a focus on controlling the emergence of the fetal head and shoulders to prevent perineal tears [4]. Immediate newborn care is then paramount. The nurse must perform rapid suctioning of the mouth and nares if needed, dry and stimulate the newborn vigorously to initiate respiration, assess the Apgar score at one and five minutes, and manage thermal regulation by placing the infant skin-to-skin with the mother or using pre-warmed blankets to combat hypothermia, a significant risk in the pre-hospital setting [5]. In cases of neonatal resuscitation, the nurse is proficient in providing positive pressure ventilation with a bag-valve-mask and initiating chest compressions following established neonatal resuscitation protocols (NRP) [6]. Furthermore, they are responsible for the management of the third stage of labor, including the controlled delivery of the placenta, uterine massage to stimulate contraction and minimize postpartum hemorrhage, and the administration of uterotonic medications like oxytocin as per protocol [7]. Beyond technical tasks, the nurse provides continuous psychological support, offering reassurance, clear communication, and a calming presence to an often frightened and vulnerable patient and family. This comprehensive nursing role forms the essential, hands-on foundation upon which the broader collaborative team builds.

## 3. The Role of Internal Medicine and Emergency Physicians

While nurses provide direct care, the complex and potentially pathological nature of obstetric emergencies necessitates a higher tier of medical oversight and decision-making. This is supplied by emergency physicians, whose training in internal medicine and critical care equips them to manage the physiological extremes and complications that can accompany childbirth. Their role within the SRCA framework, often realized through direct physical presence on critical calls or, more commonly, via telemedicine consultation and robust offline protocols, is one of medical command and management of complexity [8]. The emergency physician provides the diagnostic acumen to discern between normal labor and obstetric catastrophes. They guide the on-scene team in differentiating between benign conditions and life-threatening emergencies such as eclampsia, uterine rupture, shoulder dystocia, or antepartum hemorrhage [9].

In scenarios like severe postpartum hemorrhage, the physician directs a multi-faceted response that may include ordering specific fluid resuscitation strategies, instructing the administration of higher doses or additional uterotonics, and guiding the use of non-invasive techniques like bimanual uterine compression [10]. For a newborn in persistent respiratory depression despite initial steps, the physician oversees the escalation of resuscitation, potentially including endotracheal intubation or emergency umbilical venous catheterization,

procedures that require advanced authorization and guidance [11]. Their expertise is also critical in managing co-morbidities; for instance, a laboring patient with a known cardiac condition or diabetic ketoacidosis requires a nuanced approach that balances obstetric and medical priorities, a task for which the emergency physician is uniquely trained [12]. Furthermore, they bear the ultimate responsibility for decisions regarding destination selection, choosing the most appropriate hospital (e.g., one with a neonatal intensive care unit or a specialized obstetric high-dependency unit) based on the mother and newborn's condition. This layer of physician-led oversight ensures that the pre-hospital team is not operating in isolation but is supported by a depth of medical knowledge capable of managing the most severe deviations from a normal birth.

## 4. Integration of Midwifery Principles and Practice

The integration of midwifery knowledge into the SRCA model represents a strategic enhancement of the service's obstetric capability. While not all SRCA staff may be qualified midwives, the incorporation of midwifery principles, and in some advanced models, the inclusion of certified nurse-midwives (CNMs) on specialized teams or in consultative roles, provides a focus on the normalcy of birth alongside the ability to detect abnormality [13]. Midwifery brings a holistic, woman-centered philosophy that complements the acute, problem-oriented approach of emergency medicine. A professional with midwifery expertise contributes a deep, intuitive understanding of the physiological process of labor and birth. They excel in providing non-pharmacological comfort measures, such as positioning techniques, breathing coaching, and massage, which can be profoundly effective in managing pain and anxiety in the ambulance setting where pharmacological options may be limited [14].

Their skilled hands and eyes are trained to conduct detailed abdominal palpation (Leopold's maneuvers) to determine fetal position and presentation, a key factor in anticipating potential complications like breech or transverse lie [15]. In the event of a complicated delivery, such as a breech presentation, their specific training in managing such births can be invaluable in guiding the team to avoid interventions that might trap the fetal head [16]. Moreover, midwifery emphasizes continuity and postpartum bonding; they are adept at facilitating immediate skin-to-skin contact, assisting with initial breastfeeding initiation, and providing comprehensive postpartum education—all of which contribute to neonatal thermoregulation, successful lactation, and maternal emotional well-being, even in the transient ambulance environment [17]. This specialty acts as a crucial bridge, ensuring that emergency medical intervention is delivered with a profound respect for the natural birth process, thereby improving the experiential and clinical outcomes for low-risk mothers who unexpectedly deliver pre-hospital, while simultaneously providing expert support for high-risk situations.

## 5. Communication and Shared Decision-Making in a Confined Space

The true efficacy of the SRCA's model is not merely the sum of its parts but is generated in the dynamic, real-time synergy between the nurse, physician (on-scene or via telemedicine), and midwifery-informed practice. This collaboration is orchestrated through relentless communication and shared situational awareness within the high-pressure, confined ambulance compartment. The nurse, as the primary hands-on caregiver, serves as the eyes and ears, providing continuous verbal updates on the mother's cervical dilation, contraction pattern, fetal heart tones (if monitored), and the newborn's condition post-delivery [18]. The physician, synthesizing this stream of information, asks targeted questions, offers diagnostic considerations, and formulates a management plan. The professional with midwifery expertise may focus on interpreting the progress of labor physiologically and advising on comfort and positioning.

A practical illustration of this synergy is the management of shoulder dystocia. Upon recognizing the "turtle sign," the nurse would immediately announce the complication. The team would then work in a coordinated, pre-rehearsed manner. The midwifery-informed member might suggest initial maneuvers like McRoberts positioning (sharp flexion of the maternal thighs onto the abdomen) and suprapubic pressure, which the nurse would help implement [19]. The physician, informed of the situation, would be anticipating the need for subsequent maneuvers (e.g., Rubin's or Woods' screw) and preparing for the possibility of a post-dystocia resuscitation for the neonate. This seamless, non-hierarchical flow of information and action, where each member's expertise is respected and utilized, minimizes delays, reduces errors, and creates a calm, purposeful environment. This interdisciplinary teamwork transforms a potentially catastrophic event into a managed clinical scenario, directly

translating into improved odds for both mother and child.

## 6. Health Information Management for Quality and Learning

Underpinning and enabling this clinical collaboration is the critical, though often less visible, pillar of Health Information Management (HIM). In the context of SRCA emergency births, HIM transcends simple documentation to become a cycle of data-driven quality assurance and system improvement. It begins at the point of care with the electronic Patient Care Report (ePCR). This is not merely an administrative form but a rich, structured data source. The documenting clinician—typically the nurse or team leader—must accurately record times (dispatch, scene arrival, delivery, hospital arrival), detailed clinical assessments, all interventions performed (medications, dosages, procedures), maternal and neonatal outcomes, and the handover report given to the receiving hospital staff [20]. This documentation must adhere to strict legal, regulatory, and professional standards, as it serves as a permanent legal record and is essential for continuity of care.

The true power of HIM is realized post-event. These ePCRs, along with dispatch logs and hospital outcome data (where linkage is established), are aggregated and anonymized for analysis [21]. HIM professionals, in collaboration with clinical leads, can analyze this data to answer vital questions: What are the most common complications encountered during ambulance births? What is the average response time to such calls in different regions? Is there a correlation between specific pre-hospital interventions (e.g., prophylactic oxytocin) and reduced rates of postpartum hemorrhage at the receiving hospital? [22]. This analysis allows for the identification of clinical trends, gaps in protocols, and training needs. For instance, if data reveals inconsistent management of neonatal hypothermia, it can trigger the development of a new mandatory training module and the procurement of improved thermal protection equipment for all ambulances [23]. Furthermore, well-managed information systems facilitate clinical research and audit, enabling the SRCA to contribute to the evidence base for pre-hospital obstetric care and to benchmark its performance against national and international standards. Thus, HIM closes the loop, ensuring that every emergency birth contributes to the refinement of the system, fostering a culture of continuous learning and evidence-based practice.

## 7. Challenges and Barriers to Optimal Collaborative Care

Despite the robust framework, the delivery of optimal collaborative care in this setting faces significant challenges. The physical constraints of the ambulance itself are a primary barrier, limiting movement, access to equipment, and the ability to maintain sterility [24]. Environmental factors, such as extreme heat, poor lighting, or an unstable vehicle in motion, further complicate procedures. Resource limitations, including the availability of specialized equipment like transport incubators or point-of-care ultrasound, can vary across the Kingdom's regions [25]. Perhaps most critically, the high-stress, low-frequency nature of these events poses a human factors challenge. Team members may not regularly practice together, and the infrequency of actual out-of-hospital births can lead to skill decay, despite regular simulation training [26]. Communication can break down under stress, and role confusion can occur, especially if the team composition varies. Additionally, effective collaboration with the receiving hospital is not automatic; incomplete handovers or a lack of feedback on patient outcomes can fragment the care continuum and hinder system learning [27]. Addressing these challenges requires dedicated strategies in training, resource allocation, and protocol design.

## 8. Strategies for Enhancement:

To overcome these barriers and strengthen the collaborative model, the SRCA can implement several targeted strategies. High-fidelity, multidisciplinary simulation training is arguably the most powerful tool. Regularly scheduled simulations that recreate the ambulance environment with full teams—including nurses, physicians, and midwifery consultants—can build muscle memory for procedures, reinforce communication frameworks like SBAR (Situation, Background, Assessment, Recommendation), and foster team cohesion [28]. These simulations should drill both common scenarios and rare, high-acuity events like postpartum hemorrhage or neonatal resuscitation.

The expansion of telemedicine capabilities offers another transformative opportunity. Reliable, high-quality audio-visual links from the ambulance to a central command physician or a specialist obstetrician can provide real-time expert guidance, effectively bringing a specialist consultant virtually into the ambulance [29]. This can aid in complex decision-making, provide reassurance to the on-scene team, and enhance documentation through

direct observation. Furthermore, the nationwide standardization and regular updating of evidence-based clinical practice guidelines and checklists for emergency childbirth and neonatal care are essential. These protocols, accessible in digital format in every ambulance, ensure a consistent baseline of care across the Kingdom and reduce cognitive load during crises [30]. Finally, formalizing feedback loops with receiving hospitals to close the circle on patient outcomes is crucial for transforming individual cases into systemic learning.

### 9. Conclusion:

In conclusion, the management of emergency ambulance births by the Saudi Red Crescent Authority epitomizes the necessity and power of interdisciplinary collaboration in modern healthcare. The intricate interplay between the hands-on, comprehensive care provided by pre-hospital nursing, the diagnostic and complex-case oversight of emergency medicine physicians, the woman-centered, physiological expertise rooted in midwifery, and the cyclical, improvement-driven practice enabled by robust Health Information Management creates a safety net for mothers and newborns in their most vulnerable moments. This integrated model ensures that the ambulance is not just a transport vehicle but a competent, mobile extension of the maternity care system. While challenges related to environment, resources, and human factors persist, strategic investments in simulation, telehealth, protocol standardization, and feedback mechanisms can further fortify this collaborative framework. As the SRCA continues to refine this approach, it serves not only to safeguard the lives of Saudi citizens but also to establish a replicable benchmark for excellence in pre-hospital emergency obstetric care globally. The ultimate measure of this collaboration's success is reflected in every healthy mother and newborn who, against the odds of a precipitous pre-hospital birth, are delivered safely into the hands of definitive care, their outcomes optimized by a seamless symphony of specialized skills working in unison.

## Author Statements:

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