

Assessing Occupational Safety Risks And Prevention Strategies Among Ambulance Personnel In The Saudi Red Crescent Authority In Light Of The Objectives Of Vision 2030

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Abstract

Background:

Saudi Arabia's Vision 2030 represents a transformative national strategy that seeks to diversify the economy, enhance the quality of life, and position the Kingdom as a leading global tourism destination. As visitor numbers rapidly increase through projects such as NEOM, AlUla, and the Red Sea Development, the need for specialized tourist ambulance services becomes critical to ensuring safety, trust, and visitor satisfaction.

Aim:

This study proposes a comprehensive vision and conceptual framework for managing tourist ambulance services in Saudi Arabia, aligned with the goals of Vision 2030 and its related programs, including the Quality of Life and Health Sector Transformation initiatives.

Methods:

A qualitative, descriptive, and conceptual framework design was employed. A systematic literature review and document analysis were conducted across databases (PubMed, Scopus, ScienceDirect) and national reports (SRCA, Ministry of Tourism, Vision 2030 portal) from 2015 to 2025. Thematic analysis identified administrative, clinical, and technical domains that collectively define the core components of a sustainable tourist emergency response system.

Results:

Three interdependent pillars emerged: (1) Administrative and governance frameworks ensuring policy integration and inter-ministerial coordination; (2) Clinical excellence emphasizing multilingual, culturally

competent, and patient-centered care; and (3) Technical innovation integrating digital dispatch, GIS, ePCR, and telemedicine technologies. These elements collectively enhance response efficiency, safety, and the visitor experience.

Conclusion:

The proposed vision emphasizes that tourist ambulance management should be an integrated, data-driven, and visitor-focused system. Implementing this framework will strengthen Saudi Arabia's international reputation as a safe and reliable destination, directly supporting Vision 2030's goals of health sector transformation, service excellence, and quality of life.

Keywords: Tourist ambulance services, Vision 2030, Saudi Arabia, emergency medical services, visitor experience, healthcare transformation, prehospital care.

Introduction

In recent years, the Kingdom of Saudi Arabia has embarked on a transformative journey under the banner of its national strategy, known as Vision 2030. This ambitious framework seeks to diversify the economy, enhance the quality of life for residents and visitors, and position the Kingdom as a globally competitive destination for tourism, culture, and wellness (Saudi Vision 2030, n.d.). Tourism is central to this vision: Saudi Arabia aims to significantly increase visitor numbers, enrich the tourist experience, and develop world-class infrastructure and services to support this growth (Alshuwaikhat & Mohammed, 2017; Ministry of Tourism, 2024).

Concurrently, the healthcare and emergency service sectors are undergoing rapid modernization to align with the objectives of Vision 2030. The healthcare transformation agenda emphasises improved infrastructure, expanded service delivery, integration of digital health, and enhanced access to care for all segments of the population, including visitors (Global Health Saudi Arabia, 2024; Harshan, 2024). Crucially, the convergence of tourism and health services presents unique opportunities and challenges for the Kingdom: as visitor volumes rise and the complexity of tourism activities expands (including wellness-tourism, adventure tourism, cultural heritage tourism), the demand for responsive and specialised emergency (ambulance) services tailored to the tourist population grows accordingly (Arab News, 2024; EjManager, 2023).

Within this strategic context, there is a compelling case to develop a dedicated "Tourist Ambulance Service Management Vision" that is integrally aligned with the goals of Vision 2030. Such a vision would not only support the safety, well-being, and satisfaction of visitors, but also reinforce Saudi Arabia's reputation as a safe, reliable, and premium tourist destination. It would contribute to the Kingdom's ambition of delivering a vibrant society, a thriving economy, and an ambitious nation by ensuring that emergency medical response services are fully integrated into the visitor experience lifecycle.

This paper proposes a vision for managing tourist ambulance services in Saudi Arabia that is anchored in three core dimensions: administrative, clinical, and technical teams working collaboratively. The proposed vision emphasises seamless coordination among these teams to enhance response times, cultural/linguistic appropriateness of care, technology-enabled dispatch and care, cross-sector partnerships (tourism, health, transport), and data-driven continuous improvement. By embedding such a vision within the broader objectives of Vision 2030 — particularly within programmes such as the Quality of Life Programme and the Healthcare Transformation Programme — the proposed model seeks to support enriched visitor experience, sustain tourism growth, and promote health security and resilience (Quality of Life Programme, n.d.; Saudi Vision 2030, n.d.).

In the sections that follow, the paper will (1) situate the impetus for a tourist-focused ambulance service in the context of Saudi Arabia's tourism ambitions and healthcare transformation, (2) define the strategic vision and guiding principles for service management, (3) delineate the roles of administrative, clinical, and technical teams and how they interface, (4) propose implementation pathways and governance mechanisms,

and (5) identify key performance indicators (KPIs) and monitoring frameworks to align with Vision 2030 targets and deliver on visitor-centred outcomes.

Literature Review

1) Tourism Growth and Vision 2030 Imperatives

Tourism is a core pillar of Saudi Vision 2030, positioned to diversify the economy, enhance quality of life, and attract tens of millions of visitors annually through heritage, nature, culture, and mega-destination projects (e.g., AlUla, Red Sea) (Vision 2030, 2016/ongoing; VisitSaudi/Ministry of Tourism, 2024). Vision programs emphasize service excellence and safety across the end-to-end visitor journey, making health security and rapid emergency response an integral part of the “enriched visitor experience” agenda. As flagship destinations scale, authorities are mobilizing private investment and infrastructure to meet 2030 targets, reinforcing the need for mature, visitor-oriented EMS systems (Reuters, 2025; TIME, 2023).
TIME+4Saudi Vision 2030+4visitsaudi.com+4

2) Mass Gathering Medicine as a Knowledge Base

Saudi Arabia’s long experience with mass gatherings—particularly Hajj and Umrah—provides a robust evidence base for designing tourist-facing ambulance services. Research in mass-gathering medicine highlights stressors (heat, crowding, mobility constraints), demand surges, and the importance of coordinated multi-agency response, triage, and culturally/linguistically appropriate care (Shujaa & Alhamid, 2016; Yangon et al., 2016). Recent work shows that pilgrims’ awareness of how to access services and navigate the system affects utilization and outcomes—underscoring the value of multilingual wayfinding, pre-arrival information, and on-site guidance (Alsaleh et al., 2025). Operationally, SRCA’s Hajj deployments (ground and air ambulances, distributed posts, command-and-control) are routinely cited as foundational to reducing response times and managing peaks safely (Arab News, 2025). Arab News+3PMC+3Annals of Global Health+3

3) EMS Performance and Visitor-Centric Outcomes

International EMS literature consistently links timely response, equitable geographic coverage, and data-driven deployment with patient outcomes and user satisfaction. Contemporary models use machine learning and geospatial analytics to optimize station placement, anticipate demand, and mitigate traffic/time-of-day effects (Li et al., 2021; Hill et al., 2025). In tourism hubs—where temporal and spatial demand fluctuates with events, seasonality, and attractions—dynamic resource allocation and “surge-ready” configurations are particularly relevant (PoshtMashhadi et al., 2025). These insights align with Vision 2030’s emphasis on smart cities and quality-of-life metrics, suggesting that tourist ambulance services should publish transparent KPIs (e.g., response time fractiles, on-scene time, patient-reported experience) and integrate with destination management operations. jem-journal.com+3sciencedirect.com+3BioMed Central+3

4) Digital Health, Dispatch, and ePCR in Saudi EMS

Saudi Arabia’s health transformation has accelerated the adoption of digital health platforms—e.g., e-referrals, telemedicine, mHealth—which, when integrated with EMS dispatch, enable clinical consults en route, decision support, and continuity of care (Alghamdi et al., 2021). Within SRCA, initiatives around electronic patient care records (ePCR), control-room modernization, and air-ambulance coordination during peak seasons demonstrate the feasibility and impact of digitization on response efficiency and safety (SRCA, 2024; AJSP proposal, 2023; Arab News, 2025). However, literature on telemedicine in KSA also notes organizational and regulatory barriers (interoperability, training, governance), reinforcing the need for standardized protocols, workforce development, and robust data governance to realize system-wide benefits for tourists (JJOAS review, 2024). jjoas.asu.edu.jo+4PMC+4srca.org.sa+4

5) Geospatial and Multilingual Readiness for Tourist EMS

Vision 2030 foregrounds geospatial information systems (GIS) as an enabling layer for public services, including health and emergency response (GEOSA, n.d.). In tourist contexts, GIS-enabled dispatch and live occupancy/flow data from attractions and transport nodes can drive proactive staging, micro-zoning, and precision wayfinding for visitors. Evidence from EMS accessibility research supports accounting for time-varying demand and traffic dynamics—highly relevant to festival nights, heritage events, and coastal activity peaks (Li et al., 2021). Layering this with multilingual navigation (digital and physical signage), culturally sensitive triage scripts, and push notifications about access points can close the “knowledge of services” gaps documented among pilgrims and new visitors (Alsaleh et al., 2025).
geosa.gov.sa+2sciencedirect.com+2

6) Synthesis and Gap

The literature converges on five capabilities required for a tourist-oriented ambulance vision aligned with Vision 2030: (1) surge-ready mass-gathering operations transferable to everyday tourism peaks; (2) data-driven coverage using ML/GIS; (3) digitally enabled care pathways (dispatch-to-hospital with ePCR and teleconsultation); (4) multilingual, culturally competent access and visitor education; and (5) transparent KPIs linked to quality-of-life and visitor-experience outcomes. Empirical gaps remain in: (a) controlled evaluations of visitor-specific EMS models across multiple destinations (e.g., AlUla vs. Red Sea vs. urban hubs); (b) cost-effectiveness and staffing models for mixed air/ground coverage in tourism corridors; and (c) standardized PREMs/PROMs instruments tailored to international visitors. Addressing these gaps would allow Saudi stakeholders to translate Hajj/Umrah expertise into a scalable, year-round tourist EMS framework.

Methodology

1. Research Design

This study adopts a qualitative, descriptive, and conceptual framework design aimed at developing a proposed vision for tourist ambulance service management within the Saudi Arabian context. The design combines systematic literature synthesis with expert validation to construct an integrated model aligned with Saudi Vision 2030 goals. This approach is appropriate for conceptualizing new service frameworks where empirical data are limited but policy and strategic evidence are available (Creswell & Creswell, 2018).

2. Research Framework

The proposed vision was developed through a three-phase framework:

1. **Exploratory phase** – Review of national strategic documents (e.g., Vision 2030, Quality of Life Program, Health Sector Transformation Program) and international EMS/tourism literature to identify success factors and best practices.
2. **Analytical phase** – Thematic synthesis of findings to determine administrative, clinical, and technical dimensions essential for a tourist ambulance model.
3. **Integrative phase** – Development of a unified vision model supported by logical linkages between visitor satisfaction, emergency medical readiness, and health security indicators.

3. Data Sources and Search Strategy

A structured search was conducted between January 2015 and October 2025 across the following databases: PubMed, Scopus, Web of Science, ScienceDirect, and Google Scholar. Keywords included: “tourist ambulance,” “prehospital emergency care,” “mass gatherings,” “Vision 2030 healthcare,” “visitor experience,” and “Saudi Arabia EMS.” Boolean combinations (AND/OR) and MeSH terms were applied

to maximize relevance. Grey literature and government policy documents (e.g., Saudi Vision 2030 portal, SRCA annual reports, Ministry of Tourism bulletins) were also included to ensure contextual completeness.

Inclusion Criteria

- Studies and reports (2015–2025) addressing EMS, tourism safety, mass gatherings, or health transformation in Saudi Arabia or comparable contexts.
- Peer-reviewed journal articles, official reports, or conference proceedings available in English or Arabic.

Exclusion Criteria

- Studies not related to EMS, visitor care, or healthcare transformation.
- Editorials or opinion pieces lacking empirical or policy relevance.

4. Data Analysis

A thematic content analysis was conducted following Braun and Clarke's (2021) six-step framework: (1) familiarization, (2) coding, (3) theme generation, (4) theme review, (5) theme definition, and (6) synthesis into a conceptual model. Recurrent patterns were categorized under administrative, clinical, and technical themes—representing management governance, patient-care protocols, and technology enablement, respectively. Findings were validated through triangulation among multiple sources to ensure credibility and consistency.

5. Validation of the Proposed Vision

To refine the proposed model, expert consultation was planned with representatives from the Saudi Red Crescent Authority (SRCA), Ministry of Tourism, Health Cluster Jeddah, and academic specialists in emergency management. A Delphi-style validation process (two rounds) was proposed, where experts rated and commented on model components regarding feasibility, alignment with Vision 2030, and visitor-experience enhancement.

6. Ethical Considerations

This conceptual review used secondary data from published literature and public sources; therefore, no ethical approval or participant consent was required. However, all sources were acknowledged according to the APA 7th Edition referencing style.

7. Limitations

The main limitation lies in the scarcity of empirical studies on tourist-specific ambulance services within the Saudi context. Consequently, international and mass-gathering EMS studies were used as analogs. Future empirical research, including pilot implementation and visitor satisfaction surveys, is recommended to operationalize and validate the proposed model.

Results and Discussion

1. Overview of Findings

Thematic synthesis of the reviewed literature, national strategy documents, and EMS operational frameworks yielded three interdependent domains crucial for establishing a sustainable Tourist Ambulance Service Management Vision:

1. Administrative and Governance Frameworks

2. Clinical and Service Delivery Excellence
3. Technical and Digital Transformation

Each domain interacts dynamically to promote both visitor satisfaction and national objectives under Vision 2030, particularly the Quality of Life Program and Health Sector Transformation Program.

2. Administrative Domain: Governance, Policy, and Coordination

2.1 Strategic Integration

Results indicate that administrative governance serves as the foundation for aligning ambulance services with tourism priorities. Under Vision 2030, Saudi Arabia's health and tourism ministries increasingly adopt intersectoral coordination through shared policy frameworks and performance indicators (Ministry of Health, 2024; Ministry of Tourism, 2024). Effective tourist ambulance management requires a national coordination mechanism linking:

- Saudi Red Crescent Authority (SRCA) for prehospital operations,
- Ministry of Tourism for destination-specific emergency preparedness,
- Ministry of Health for hospital integration, and
- Local municipalities for infrastructure and accessibility.

2.2 Workforce Planning and Training

Administrative capacity also extends to workforce development. The results highlight a lack of structured training programs specifically designed for tourist paramedics—professionals trained not only in emergency medicine but also in cross-cultural communication and multilingual patient engagement (Alshammari et al., 2023). Establishing specialized certification programs in Tourist Emergency Medicine could address this gap and align workforce readiness with Vision 2030's goal of enhancing service excellence across sectors.

2.3 Governance Indicators

From a policy perspective, transparent governance structures and measurable KPIs—such as average response time in tourist zones, incident resolution rate, and visitor satisfaction index—are critical. These should be reported through open dashboards in coordination with the Quality of Life initiative, reinforcing accountability and citizen trust (Quality of Life Program, n.d.).

3. Clinical Domain: Patient Care, Cultural Competence, and Safety

3.1 Evidence from Mass-Gathering Medicine

Clinical findings from Hajj and Umrah operations provide transferable insights for tourist ambulance systems. Saudi Red Crescent's annual reports (SRCA, 2024) demonstrate substantial improvements in field triage efficiency and fatality prevention through integrated prehospital and hospital coordination. This model can be adapted for tourism clusters like AIUla, NEOM, and The Red Sea Project, where diverse international visitors engage in high-risk outdoor activities.

3.2 Culturally Competent Care

A core discussion point is cultural and linguistic competence. Literature indicates that many foreign visitors face challenges in describing symptoms, navigating EMS channels, or understanding treatment protocols (Alsaleh et al., 2025). Hence, embedding multilingual communication tools—such as translation apps and

pre-arrival medical safety guides—within ambulance units can improve trust, adherence, and overall satisfaction.

3.3 Clinical Pathways and Continuous Training

Integrating clinical decision support systems (CDSS) into ambulance operations ensures standardized triage and evidence-based management. Continuous professional development modules (CPD) for paramedics on cross-cultural ethics, emergency pharmacology, and visitor safety enhance clinical outcomes and align with Vision 2030's focus on competency-based health education (Global Health KSA, 2024).

4. Technical Domain: Digital Transformation and Smart Health Systems

4.1 Electronic Patient Care Reporting (ePCR)

Digital integration emerged as the most transformative finding. The introduction of ePCR systems—already piloted in SRCA—has significantly reduced data-loss rates and improved patient handovers (AjSP, 2023). Extending these systems into tourism clusters allows real-time coordination between ambulance teams, hospitals, and destination management organizations (DMOs).

4.2 GIS and Predictive Analytics

Geospatial Information Systems (GIS) facilitate real-time tracking, route optimization, and demand forecasting based on visitor flow data. When combined with machine learning models, GIS enables predictive deployment of ambulances near event zones and heritage sites (Li et al., 2021). This technological alignment echoes the Smart City dimension of Vision 2030, ensuring efficiency and readiness across expanding tourism corridors.

4.3 Telemedicine and AI-Assisted Dispatch

Emerging evidence from Saudi telehealth projects suggests that AI-enhanced dispatch and video triage systems can reduce average response times and improve decision accuracy (Alghamdi et al., 2021). For remote destinations like the Red Sea Islands or mountain resorts, teleconsultation links between paramedics and hospital physicians can bridge critical gaps in advanced care availability.

5. Integration with Vision 2030 Pillars

5.1 Quality of Life and Visitor Experience

By embedding emergency services within the tourism ecosystem, the proposed vision directly supports Vision 2030's Quality of Life Program. Ensuring that every tourist has reliable, safe, and technologically advanced access to emergency medical care enhances trust and contributes to Saudi Arabia's global competitiveness as a tourism destination (Vision 2030, n.d.).

5.2 Economic Sustainability and Investment Potential

Efficient tourist ambulance management can reduce preventable fatalities and injuries, strengthen destination reputation, and attract private investment in health infrastructure. Furthermore, PPP models (public-private partnerships) can optimize operational costs and service scalability—aligning with Vision 2030's economic diversification strategy (Harshan, 2024).

6. Synthesis and Implications

The integrated model positions tourist ambulance management as a multi-sectoral innovation combining governance, healthcare excellence, and digital transformation. Results highlight that administrative and technical readiness are strong drivers of visitor satisfaction, but sustained success depends on cross-agency collaboration and cultural competence at the clinical level.

Future research should pilot the proposed framework in key destinations such as AlUla and NEOM, measuring key outcomes including:

- Response time improvement,
- Visitor satisfaction (PREMs),
- Safety incident reduction, and
- Operational efficiency indices.

Such empirical validation will transform this conceptual model into a scalable, evidence-based policy instrument within Saudi Arabia's evolving healthcare and tourism systems.

Proposed Model / Conceptual Framework

1. Overview

Building on the results and thematic synthesis, this study proposes a Conceptual Framework for Managing Tourist Ambulance Services in Saudi Arabia in alignment with the Vision 2030 transformation agenda. The model integrates three core domains — Administrative, Clinical, and Technical — supported by cross-cutting enablers such as policy governance, digital transformation, and visitor-experience outcomes. The framework provides a holistic approach to ensure that every visitor receives safe, efficient, and culturally competent prehospital emergency care while contributing to the Quality of Life and Health Sector Transformation programs under Vision 2030.

2. Conceptual Model Structure

2.1 Administrative Domain

The Administrative Domain represents the strategic and managerial foundation of the tourist ambulance system. It ensures coherent governance across sectors and promotes transparency, sustainability, and policy alignment.

Key Components:

- Inter-agency coordination between SRCA, Ministry of Health, Ministry of Tourism, and local municipalities.
- Strategic planning for destination-specific coverage (e.g., heritage, coastal, or desert zones).
- Workforce planning and accreditation for tourist paramedics.
- Public-private partnerships (PPPs) to finance advanced fleet and air-ambulance units.
- Performance indicators (e.g., average response time, satisfaction index, and system reliability).

This domain aligns with Vision 2030's pillar of "A Vibrant Society" and emphasizes service governance and transparency to build global trust.

2.2 Clinical Domain

The Clinical Domain focuses on patient-centered emergency care emphasizing cultural competence, multilingual communication, and evidence-based practice.

Key Components:

- Tourist-specific triage protocols adapted from Hajj/Umrah experience.
- Multilingual communication tools (English, Arabic, Chinese, French, Urdu, etc.) for field interactions.
- Culturally sensitive treatment guidelines ensuring respect for diverse backgrounds.

- Continuous professional development (CPD) for paramedics on advanced life support, crisis ethics, and intercultural care.
 - Integration of telemedicine to connect paramedics with physicians during en-route interventions.
- This domain operationalizes Vision 2030’s principle of “Improving Health and Safety for All” and reinforces patient satisfaction as a key tourism metric.

2.3 Technical Domain

The Technical Domain provides the digital backbone of the tourist ambulance vision. It ensures that prehospital care is intelligent, data-driven, and integrated across systems.

Key Components:

- Electronic Patient Care Reporting (ePCR) for seamless data sharing between ambulances and hospitals.
- GIS-based fleet management and dynamic resource allocation using AI and predictive analytics.
- Smart dispatch systems for route optimization and real-time monitoring.
- Teleconsultation hubs for remote tourist destinations (Red Sea, AIUla, NEOM).
- Visitor-facing mobile applications offering emergency request, live tracking, and satisfaction feedback.

This domain aligns with the Digital Health Strategy under Vision 2030 and Saudi Arabia’s ambition to lead regional innovation in smart healthcare.

3. Cross-Cutting Enablers

Enabler	Description	Vision 2030 Alignment
Policy and Regulation	Development of national policy for Tourist EMS and safety standards.	Health Sector Transformation, Tourism Growth Framework
Human Capital Development	Training programs, licensing, and leadership development.	Human Capability Development Program
Technology and Data Integration	National EMS data hub, real-time analytics dashboards.	Smart Health and e-Government Programs
Visitor Experience Monitoring	PREMs/PROMs surveys, multilingual satisfaction portals.	Quality of Life Program
Sustainability and Resilience	Eco-efficient fleet, renewable energy ambulance stations.	Environmental Sustainability and Green Saudi Initiatives

4. Conceptual Model Diagram (Textual Description)

Central Core:

- “Tourist Ambulance Service Management Vision (TASMV)”

Three Interconnected Pillars:

1. Administrative – governance, workforce, coordination.
2. Clinical – patient care, communication, ethics.
3. Technical – digital systems, GIS, telemedicine.

Flow:

- Arrows from each pillar converge toward Visitor Experience & Safety Outcomes at the top.
- Surrounding ring: Vision 2030 Strategic Pillars (Quality of Life, Health Sector Transformation, Economic Diversification).
- Feedback loop from Visitor Satisfaction back to Administrative Learning and Policy Revision ensures continuous improvement.

5. Expected Outcomes

Outcome	Indicator	Measurement Tool
Reduced response time	< 8 minutes in urban tourist zones	SRCA operational dashboard
Higher visitor satisfaction	≥ 90 % satisfaction in PREMs	Visitor survey data
Improved coordination	Unified dispatch across agencies	Integration index
Digital coverage expansion	100 % tourist zones on GIS map	Ministry of Health reports
Workforce readiness	> 80 % paramedics trained in tourism protocols	CPD certification rate

6. Theoretical Underpinning

The model draws conceptually from:

- Systems Theory – emphasizing interdependence among components (Von Bertalanffy, 1968).
- SERVQUAL Model – linking service quality to satisfaction and loyalty (Parasuraman et al., 1988).
- Resilience Framework in Emergency Management – promoting flexibility, preparedness, and recovery capacity (Paton & Johnston, 2017).

These theoretical bases ensure that the model remains adaptive, scalable, and empirically testable within Saudi Arabia's evolving tourism and healthcare systems.



Conclusion

This study developed a conceptual framework for managing tourist ambulance services within the transformative context of Saudi Vision 2030. By integrating administrative governance, clinical excellence, and digital transformation, the proposed model offers a comprehensive roadmap to enhance visitor experience, safety, and trust in Saudi Arabia's expanding tourism landscape.

The findings confirm that a sustainable tourist ambulance vision must rest on three coordinated pillars:

1. Administrative readiness, ensuring cross-sectoral coordination, transparent performance measurement, and professional workforce development.
2. Clinical preparedness, focusing on culturally competent, patient-centered care through continuous education and multilingual communication.
3. Technical innovation, using digital platforms, GIS, and telemedicine to achieve rapid, data-driven emergency responses.

Together, these dimensions embody the synergy between the Health Sector Transformation Program and the Quality of Life Program—both integral components of Vision 2030. Implementing this vision would not only reduce emergency response times and improve clinical outcomes for visitors but also strengthen the Kingdom's international reputation as a safe, world-class tourist destination.

In practical terms, the model urges policymakers to establish a national Tourist EMS Policy, develop specialized training programs for tourist paramedics, and invest in AI-enabled dispatch and ePCR systems for real-time coordination. Public-private partnerships can further sustain the system financially while driving innovation in emergency mobility and health safety infrastructure.

Future research should empirically evaluate this conceptual model through pilot projects in key destinations such as AIUla, NEOM, and the Red Sea Project, measuring key outcomes including response efficiency, visitor satisfaction, and health-system integration. Long-term, such evidence will transform this conceptual framework into an operational blueprint that supports Saudi Arabia's global tourism leadership while ensuring that every visitor experiences safety, compassion, and excellence in care.

Recommendations

Based on the findings and conceptual framework proposed in this study, several strategic and operational recommendations are presented to guide policymakers, healthcare leaders, and tourism authorities in implementing a sustainable Tourist Ambulance Service Management Vision aligned with Saudi Vision 2030.

1. Policy and Governance Recommendations

1. **Develop a National Tourist Emergency Medical Services (T-EMS) Policy:**

Establish a unified national policy framework that integrates the Saudi Red Crescent Authority (SRCA), Ministry of Health, and Ministry of Tourism under a shared governance structure. This policy should define response standards, training requirements, quality indicators, and reporting systems for tourist-related medical emergencies.

2. **Create an Inter-Ministerial Coordination Committee:**

Form a Tourism Health and Safety Steering Committee responsible for synchronizing emergency preparedness across major destinations (e.g., NEOM, AIUla, Red Sea Project). This body would monitor performance metrics and ensure policy compliance with Vision 2030's Quality of Life and Health Sector Transformation programs.

3. **Introduce Public–Private Partnerships (PPPs):**

Encourage collaboration with private hospitals, telemedicine providers, and transport firms to expand capacity, modernize fleets, and sustain long-term financial viability.

2. Operational and Administrative Recommendations

1. **Establish Destination-Based EMS Units:**
Set up specialized ambulance units in tourist hotspots with multilingual staff and tailored triage protocols to ensure rapid, culturally competent responses.
2. **Implement Standardized Key Performance Indicators (KPIs):**
Develop KPIs to monitor efficiency, including average response times, on-scene times, incident resolution rates, and visitor satisfaction indices. These indicators should be published periodically in open dashboards.
3. **Enhance Crisis Preparedness for Mass Gatherings:**
Adapt lessons learned from Hajj and Umrah operations—such as crowd-flow prediction, zonal response teams, and real-time surveillance—to regular tourism events and large-scale festivals.

3. Clinical and Workforce Development Recommendations

1. **Create a “Tourist Paramedic” Certification Program:**
Design a national training curriculum that equips paramedics with linguistic, intercultural, and tourism-specific competencies, alongside advanced life support and trauma management skills.
2. **Implement Continuous Professional Development (CPD):**
Mandate annual CPD programs covering ethical communication, visitor relations, and updated emergency protocols consistent with World Health Organization (WHO) standards.
3. **Promote Cultural and Linguistic Competence:**

Ensure every EMS team includes members proficient in English and key visitor languages (e.g., Chinese, Urdu, French). Provide access to digital translation devices and cultural awareness training.

4. Technical and Digital Transformation Recommendations

1. **Expand the Electronic Patient Care Reporting (ePCR) System:**
Fully integrate ePCR across all tourist zones to enable real-time data exchange between field units, hospitals, and SRCA headquarters.
2. **Implement GIS-Based Smart Dispatch:**
Utilize geospatial and AI-driven analytics to optimize ambulance positioning, reduce response times, and anticipate demand surges during seasonal tourism peaks.
3. **Establish Telemedicine-Enabled Ambulances:**
Equip ambulance fleets with teleconsultation capabilities to allow on-site paramedics to connect instantly with physicians in tertiary hospitals, especially in remote or coastal destinations.
4. **Launch a Visitor Emergency Mobile Application:**
Develop a bilingual mobile app that allows tourists to request emergency assistance, track ambulance arrival, access safety information, and provide feedback after service delivery.

5. Research and Evaluation Recommendations

1. **Pilot the Proposed Model in Key Tourism Regions:**
Conduct pilot studies in AlUla, the Red Sea Project, and Taif to evaluate the model's feasibility, response efficiency, and visitor satisfaction outcomes.
2. **Establish a National Research Program on Tourist Health:**
Support academic–government partnerships to collect data on tourist emergency incidents, patient outcomes, and satisfaction trends for continuous improvement.
3. **Regular Impact Assessment:**
Perform annual evaluations of tourist ambulance performance against Vision 2030 benchmarks to ensure ongoing system improvement and accountability.

6. Strategic Alignment with Vision 2030

All the above recommendations directly contribute to Vision 2030's overarching goals:

- **Enhancing Quality of Life** through safe and enjoyable visitor experiences.
 - **Supporting Health Sector Transformation** via integrated digital EMS systems.
 - **Advancing Economic Diversification** by making health and tourism sectors jointly competitive.
 - **Promoting Global Image and Trust** in Saudi Arabia as a premier, safe destination for visitors from around the world.
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