



THE REPUBLIC OF UGANDA

# THE STATE OF EMERGENCY MEDICAL SERVICES (EMS) IN UGANDA

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Government of Uganda

# THE STATE OF EMERGENCY MEDICAL SERVICES (EMS) IN UGANDA



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# ACRONYMS

AHSPR	Annual Health Sector Performance Report
ALS	Advanced Life Support
BLS	Basic Life Support
CHEW	Community Health Extension Worker
CSO	Civil Society Organization
DHIS 2	District Health Information Software Version 2
EDs	Emergency Departments
EMS	Emergency Medical Services
EU	Emergency Unit
GCS	Glasgow Coma Score
GoU	Government of Uganda
GIS	Geographic Information System
HR	Human Resource
KII	Key-Informant Interview
KPIs	Key Performance Indicator
LIC	Low-Income Countries
LMICs	Low- and Middle-Income Countries
MoH	Uganda Ministry of Health
Mol	Uganda Ministry of Internal Affairs
MoLGSD	Uganda Ministry of Labour, Gender, and Social Development
MoWT	Uganda Ministry of Works and Transport
PNFP	Private non-for-profit
PPP	Public-Private Partnership
QA	Quality Assurance
SOPs	Standard Operating Procedures
SSA	Sub-Saharan Africa
UCC	Uganda Communication Commission
UCREPP	Uganda COVID-19 Response and Emergency Preparedness Project
UPF	Uganda Police Force
UPFD	Uganda People's Defense Force
URCS	Uganda Red Cross Society
WBG	World Bank Group
WHO	World Health Organization



# FOREWORD

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I feel privileged to provide a foreword for the midterm review report of the Emergency Medical Services (EMS) Strategic Plan 2020/21-2024/25. The EMS midterm review follows the last three years of focused prioritization and moderate investment in the national EMS system.

The need for a well-structured, functional, and responsive EMS system was made more glaring during the Covid-19 pandemic of 2020 and the Sudan Ebola virus disease epidemic of 2022. It underscored the importance of establishing a first responder mechanism, building the National Ambulance Service, building the capacity of emergency care responders, and establishing Emergency Units. Seven of the top ten causes of mortality in Uganda are due to emergency conditions (obstetric emergencies, road traffic injuries, pediatric emergencies, and non-communicable disease emergencies).

The study was carefully conducted to bring out the successes, key lessons learned, challenges, and resources required for going forward.

The midterm review showed an average performance, with most (75%) of the activities of the EMS Strategic Plan initiated and 41 percent described as in advanced stages of implementation, while 34 percent were described as lagging in implementation and in meeting targets. I am impressed that we are making good use of the limited resources entrusted to us by government and development partners.

*EMS is the face of a functional health care system; it is crosscutting and as such our efforts should be focused on making it efficient and effective.*

Therefore, I recommend this EMS midterm review report as a practical guide to all government bodies, development partners, civil society organizations, academia, and nongovernmental organizations for planning and implementing EMS activities. Over the next two years, I look forward to improved performance, more EMS investments, and the development of the second EMS Strategic Plan 2025/26–2029/30.

I thank the World Bank group and look forward to further collaborations in improving the EMS in the country.

For God and my Country,



**Dr. Diana Atwine**

*Permanent Secretary*

Ministry of Health, Uganda



# ACKNOWLEDGMENTS

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This study of Uganda's Emergency Medical Services (EMS) was supported by UK Aid. It originated from a request submitted to the World Bank by the Ministry of Health (MoH) in Uganda through its Permanent Secretary, Dr. Diana Atwine.

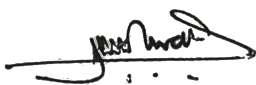
The study was conducted under the direction of the MoH, led by Dr. John Baptist Waniaye (Commissioner, Emergency Medical Services) and the World Bank.

The team is grateful for the insightful contribution and support of the EMS department of the MoH, particularly Dr. Marion Nakyeyune (Principal Medical Officer), Ms. Maria Nansasi Nkalubo (Principal Operations Officer), Mr. Takan Charles (Principal Logistics Officer), Mr. Andrew Kinene (Monitoring and Evaluation Specialist), Mr. William Byaruhanga (Senior Logistics Officer), and Dr. Joseph Oumo (Senior Medical Officer). Their collaboration and support throughout the study period was remarkable and helped promote the successful implementation of field data collection for the study.

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The World Bank team consisted of Julia Mensah (Senior Health Specialist), Rogers Ayiko (Senior Health Specialist), Kunsoan Noella Bajja (Lead Consultant), Elizabeth Asege Ekochu (Consultant), Christabel Ngwashi (Consultant), Julius Mukobe (Consultant), and Catherine Ajiku (Team Assistant). Special thanks to Said Dahdah (Lead Transport Specialist), Pedro Cerdan-Infantes (Program Leader), Peter Okwero (Senior Health Specialist), Christopher J. de Serio (Senior Transport Specialist), and Sudeshna Mitra (Transport Specialist) from the World Bank's Global Road Safety Facility for their technical support in enriching the study.

Finally, we thank all those who participated in the study to ensure its successful completion. We hope that the recommendations in this report will enhance the implementation of the EMS strategic plan during its remaining years and galvanize more EMS investments to improve the system countrywide.



**Dr. Henry G. Mwebesa**

*Director General of Health Services*  
Ministry of Health



# EXECUTIVE SUMMARY

## INTRODUCTION AND CONTEXT

The Government of Uganda embarked on improving access to quality emergency medical services (EMS) in 2018 and adopted an EMS Policy in 2021 that was scheduled to be implemented over the subsequent 20 years. The policy has 13 pillars and will be implemented in a series of five-year strategic plans. Conducting a midterm review of the first five-year Strategic Plan (2020/21–2024/25) was one of the specific objectives of this study. The Strategic Plan has four objectives: (1) to increase access to on-scene emergency medical care by 50 percent; (2) to increase the proportion of emergency patients receiving ambulance response within one hour by 50 percent; (3) to increase the availability of quality EMS hospital care in 19 national and regional referral hospitals, 147 district hospitals, and 193 level IV health centers; and (4) to continuously improve and sustain the operation of the national EMS system.

The Ministry of Health (MoH) commissioned this study to assess the status of the current EMS system. The study's three objectives were to carry out a mid-term review of achievement during the first part of the implementation, noting any emerging issues and gaps, and make recommendations for the remaining implementation period of the Strategic Plan; assess the effectiveness of EMS human resources training; and estimate the cost of the current EMS system and calculate the financing needed to ensure that it is adequately resourced.

## METHODOLOGY

**Midterm review of the EMS Strategic Plan (2020/21-2024/25).** This study uses both quantitative and qualitative methods within the overarching framework of the strategic plan. The team conducted a desk review of relevant documents to collect data on targets, status, and achievements, designed questionnaires to survey respondents for more data, and conducted key informant interviews (KIIs) and focus group discussions to identify the challenges experienced in delivering the EMS Strategic Plan.

**Assessment of human resource training models.** To determine effectiveness, the study first examined the existing curricula for training EMS staff in Uganda, using the Kirkpatrick evaluation approach together with Bloom's taxonomy of learning to discover the experiences of both learners and teachers. Interviews were conducted with instructors, learners, and EMS supervisors in a range of teaching and EMS institutions.

**Cost of scaling up EMS investments.** The team developed an excel-based model and activity-based costing techniques to estimate the current resource requirements of the EMS system. Data on the parameters and inputs were obtained from desk reviews and interviews with the key stakeholders and were also applied to a cost assessment of the additional resources needed to implement the rest of the EMS Strategic Plan.

## RESULTS

### Results Mid-Term Review of the EMS Strategic Plan (2020/21-2024/25)

The Mid-Term Review found the implementation status of planned activities specified in the EMS Strategic Plan to be as follows.

***Implementation status of planned activities for objective 1*** (Increase access to on-scene emergency medical care by 50 percent). Sixty-seven percent of the activities aimed at strengthening first aid capacity at the community level were at the advanced stages of implementation. This includes the procurement of training materials for first aid and the training of trainers. However, less progress has been made in strengthening the health workers' capacity as medical first responders and in integrating first aid curriculum into training, due to financial constraints.

***Implementation status of planned activities for objective 2*** (Increase the proportion of emergency patients receiving an ambulance response within one hour by 50 percent). Thirteen percent of planned activities were completed during the review period, including the training of ambulance crews, development of hospital delivery protocols, activation of inter-facility referrals, and production of an EMS referral directory. Thirty-one percent of the activities were at an advanced stage of implementation, including the purchase of ambulances and the establishment of ambulance oxygen refilling points. These activities were largely facilitated by financial support from development partners. About 50 percent of the activities have been started but completion is lagging due to financial constraints, including the establishment of medical emergency coordination centers and a nationwide call and dispatch system, as well as the mapping of landmarks and the development of an ambulance supply chain.

***Implementation status of planned activities for objective 3*** (Increase the availability of quality EMS care in 14 regional referral hospitals, 147 district hospitals, and 193 level IV health centers). Fifteen percent of the activities under this objective were completed, another 15 percent had been started and were at an advanced stage, 46 percent had been started but were lagging, and about 23 percent had not yet been started. The longest delays concerned the establishment of emergency departments. No regional trauma centers were constructed, nor had any mapping been performed on receiving health facilities. Renovations were carried out in the emergency departments in only 8 out of 19 referral hospitals.

***Implementation status of planned activities for objective 4*** (Continuously improve and sustain national EMS system operations). This objective involved the largest number of activities. As with the other objectives, 65 percent of the planned activities had either not started or were lagging in implementation. However, the activities related to setting up an EMS monitoring and evaluation system are at an advanced stage of implementation. This includes the incorporation of seven EMS indicators into version 2 of the District Health Information System (DHIS2), establishment of standardized clinical forms, initiation of regional data quality audits, production of quarterly EMS reports, and appointment of an EMS monitoring and evaluation (M&E) focal point at the MoH. The least progress was made in activities related to the financing of EMS, 80 percent of which had not been started or had been started but were lagging. There are still no clear alternative sources of financing for EMS beyond the Government of Uganda and development partners, which is the main reason why there are not enough financial resources to implement the strategy.

Only 13 percent of the activities specified in the EMS Strategic Plan were implemented. These activities included the training and deployment of ambulance crew; the development and printing of protocols for handing over patients; the activation of inter-facility referrals and the creation of an EMS referral directory; the development of standardized course units in emergency medicine; the development of an operational plan for emergency medical responses to mental illness; the establishment of emergency medicine governance structures in all

regions; the training of district EMS focal point persons; the establishment of a mechanism for the fast scale-up of innovations and good practices; the establishment of a dedicated funding stream for EMS within MoH; the development of EMS quarterly performance reports; and the appointment of an EMS monitoring and evaluation focal point at the MoH. An additional 22 percent of the activities had been initiated and were in advanced stages of implementation.

Furthermore, 51 percent of the activities had been started but were lagging, including the development of a legal and regulatory framework, identification of alternative financing mechanisms for EMS, and establishment of emergency departments in hospitals, all prerequisites for the implementation of the EMS Strategic Plan. Finally, 14 percent had yet to be started. The slow implementation of the planned activities has been largely due to funding constraints and, in some cases, to the impact of the COVID-19 pandemic.

### **Results: Progress in the Attainment of EMS Outcome Indicators**

The Strategic Plan specifies 18 outcome indicators. However, only seven were incorporated into DHIS2 at the time of this review. The number of facilities reporting these indicators has increased from 34 percent to 48 percent between 2020 and 2022, though it should be noted that there are regional inequalities in reporting rates.

***ER patient volume.*** The number of patients received at emergency units increased by 57 percent between 2019/20 and 2022/23. The South-Central region had the highest number of cases, while the Teso and Busoga regions had the lowest numbers.

***Traffic injuries.*** Road traffic injuries (RTIs) account for more than half of all emergency cases, with their share decreasing over time. Data quality issues are evident in measuring and reporting. The number of RTIs reported by the Uganda Police was less than a quarter of the number reported by health facilities. This underscores the need for an integrated data system.

***On-scene emergency care.*** The proportion of emergency patients receiving on-scene emergency care decreased from 59 percent to an average of 56 percent during the review period, falling far short of the Strategic Plan goal of increasing this proportion by 50 percent. This can be attributed to the limited resources available to handle a rising number of emergency cases. Some regions, such as South-Central, had a high number of cases but recorded the lowest rates of on-scene care, suggesting a maldistribution of resources.

***Ambulance use.*** The share of emergency patients arriving at health facilities by ambulance marginally dropped (by 2 percent) from the baseline value, which was 12 percent in 2019/20. The limited availability of ambulances, poor road infrastructure, and lack of public awareness of emergency numbers were cited as reasons for this declining trend. As with on-scene care, regions with a high number of emergency patients reported much lower rates of arrival by ambulance than other regions.

***Assessment of patient consciousness.*** The assessment of patients' consciousness at the health facility has improved significantly, the proportion of emergency patients assessed for consciousness having increased from 23 percent to 42 percent during the period assessed. This could be attributed to a sustained increase in the number of health workers trained in triage under the WHO Basic Emergency Care (BEC) course.

**Rapid treatment.** The percentage of emergency patients receiving care within one hour after arrival at the emergency unit has steadily increased at the national level, from 69 percent in 2019/20 (baseline year) to 83 percent in 2022/23. This progress can be viewed as one of the achievements of the EMS system in Uganda and can be attributed to an increase in the number of healthcare workers trained in basic emergency care. There was little variation across the regions.

**Complications.** There has been an upward trend in the percentage of patients who developed complications within 24 hours of treatment between 2019 and 2023. This may be related to overcrowding in emergency units, given that the number of emergencies has been increasing but there has been no significant increase in the units' capacity.

**Patient deaths.** Ultimately, the proportion of deaths recorded in emergency units declined from 1.95 percent in 2019/20 to 1.5 percent in the years 2020/21 and 2021/22. However, there were some regional variations, with Bugisu recording 7 percent compared with a national average of 1.5 percent. This indicates a need to conduct region-specific audits after annual monitoring reports to establish the reasons behind such patterns.

### **Results: Assessment of Human Resource Training Models**

The study found that standardized training models do exist for both emergency medical technicians and physicians, and that these are both generally effective. There are no standardized training models for bystanders; therefore, bystander training institutions employ their own standards. The challenges that persist in this area include a shortage of instructors, facilities, and equipment to facilitate learning.

### **Cost of Scaling Up EMS Investments**

After conducting a revised costing of the EMS system, the review team found that implementing the EMS Strategic Plan would cost US\$288.5 million for the five years, compared to an earlier estimate of US\$164 million. Implementing the remaining two years of the plan will require US\$155.7 million (divided between US\$66.6 million in 2023/24 and US\$89 million in 2024/25). During the last three years of the plan's implementation, only 45 percent of the required resources were raised, most of which came from development partners.

Under the revised cost, of the total financial resources needed to implement the remaining two years of the plan, 66 percent will be needed for human resources, 16 percent will be needed for ambulances and equipment, and 6 percent will be needed for infrastructure development. A budget impact analysis revealed that scaling up EMS capacity by 30 percent, 50 percent, and 75 percent would increase the current (baseline) budget resources by 5, 6, and 8 percent, respectively. A funding deficit amounting to US\$171 million was established, assuming full implementation of the full five years of the Strategic Plan.



## RECOMMENDATIONS

The report makes 14 recommendations to the Ministry of Health, grouped under three levels: short-term, medium-term, and long-term.

### Short-term Recommendations

**Strengthen the legal and regulatory framework for EMS.** Prioritize the development of laws and/or regulations that will make it easier to access EMS, such as the EMS Act, which mandates the short code of 9-1-2 for all telecom operators, and enactment of the Good Samaritan Law to complement the current ongoing efforts aimed at training bystanders in Uganda. This action can be led by the MoH and the Ministry of Works and Transport (MoWT) and supported by the Uganda Red Cross Society (URCS).

**Ensure timely collection of data to improve the EMS system.** Collect and synthesize data in a timely manner to support and drive performance improvement, decision-making, and accountability. Explore the possibility of using an electronic dashboard to monitor deliverables.

**Refine the monitoring and evaluation framework for the EMS strategy.** Sequence activities, considering activities that require preceding conditions to avoid unnecessary delays in the next implementation phase of the Strategic Plan. In addition, clearly define indicators of planned activities for ease of monitoring and evaluation.

**Reinforce deployment of EMS human resources.** Through the MoH and health professional councils, develop, approve, and implement the EMS Human Resources for Health scheme of services. This means extending in-service training to all regions, conducting a comprehensive needs assessment of the EMS workforce to determine requirements based on populations, geography, and emergency call volumes, collaborating with educational institutions to include EMS training in their programs, and using the media to raise awareness of EMS career opportunities. Make scholarships tenured on bonding terms to ensure the retention of trained physicians.

**Increase dedicated revenue streams for EMS.** Increase financing for EMS to fund and sustain EMS infrastructure development. This can be achieved through the development and implementation of a comprehensive resource mobilization strategy for EMS as a basis for engaging development and private-sector investment in EMS led by the MoH and supported by WHO and other development partners.

**Improve EMS communication (Call and Dispatch System).** Install tracking and communication system features in all ambulances to facilitate transfers and fleet management. Mandate and operationalize the “912” short code and support sustainable financing models for services in line with telecom regulations. These actions should be led by the MoH in collaboration with the Uganda Communication Commission (UCC) and telecom companies.

### Medium-term Recommendations

**Increase the knowledge and skills of bystanders.** Launch public awareness campaigns to educate the community on the relevance of bystander intervention during emergencies. Build bystanders’ knowledge and skills in recognizing medical emergencies, first aid, and EMS activation. The MoH should develop a standardized training manual to guide EMS partners in training bystanders at the grassroots level.

**Mainstream accountability in the EMS system.** The MoH-HMIS division should completely integrate all EMS indicators into the DHIS2 and enable visualization tools to capture regional inequalities. In addition, the MoH and MoI-UPF should integrate EMS in other national data frameworks, such as linking police crash data systems to hospital EMS to ensure the completeness of trauma records and adequately track fatalities from RTIs. Strengthen the M&E function and bolster the capacity of research institutions to facilitate sustained inquiry and generate new EMS knowledge.

**Greater coordination among key EMS stakeholders.** Improve interagency coordination among EMS stakeholders, including ministries, departments and agencies, academia, civil society, and the private sector. This could be achieved by establishing a dedicated interagency coordination structure led by the MoH or raised to the OPM with representatives from each sector to serve as a focal point for communication and collaboration.

**Operationalize the national health insurance schemes.** This should be approved by the Cabinet and Parliament and implemented by the MoH to facilitate a Pooled Resource Mechanism.

Integrate the EMS program with other interventions in the health sector. This should be done by the MoH EMS and Planning departments to take advantage of synergies and maximize resource utilization.

### **Long-term Recommendations**

**Engage partnerships.** The MoH-PS Office should engage strategic partners in providing additional resources, specifically for investments in infrastructure and other capital developments that would enhance EMS operations. The MoH should establish long-term partnerships with established institutions abroad to facilitate skill exchange and development.

**Optimize financial resources.** Sequence infrastructure development based on the burden of emergency cases to optimize limited financial resources.

**Integrate protocols.** The MoH should integrate the EMS protocols into Uganda's clinical guidelines.

# 1. INTRODUCTION

## BACKGROUND AND CONTEXT OF THE EMS STUDY

Emergency medical services (EMS) encompasses all stages of the emergency care continuum. It is defined as formalized pre-hospital and hospital-based emergency care delivered to patients experiencing life-threatening illness, injury, or trauma<sup>1</sup>. Emergency-related conditions are estimated to be responsible for more than half of the mortality cases in low- and middle-income countries (LMICs).<sup>2</sup> Owing to the critical nature of medical emergencies, the speed of response and quality of emergency medical services are critical factors in a patient's ultimate outcome. The World Health Organization (WHO), in its 72<sup>nd</sup> Health Assembly, recommended that member states embark on a series of activities to establish or strengthen EMS to reduce mortality from medical emergencies.

## EMS IN UGANDA

Like most LMIC's, Uganda has poor-quality emergency care, compounded by an under-resourced health system (human resources, infrastructure, medicines/supplies); weak patient referral and emergency care network; ineffective structures for EMS leadership and governance; inconsistent maintenance of available infrastructure and equipment; and poor monitoring and evaluation of EMS. Because of these shortfalls, Uganda faces high rates of preventable mortality associated with emergencies. Recognizing the burden of emergencies and the need for a better-resourced EMS system, in 2018 the government conducted the Uganda road safety performance review. The review showed that, on average, the country loses 10 people per day in road traffic crashes, the highest level in East Africa. The report estimated the overall annual cost of road crashes as approximately UGX 4.4 trillion (US\$1.2 billion), representing 5 percent of Uganda's gross domestic product (GDP)<sup>3</sup>.

Successive Annual Health Sector Performance reports (AHSPRs) continue to register emergency-related conditions among the 10 top causes of mortality. These conditions include trauma from road traffic crashes and other injuries, pneumonia, asthma, obstetric and neonatal conditions, hypertension, and diabetes. Obstetric and neonatal deaths in Uganda match the average rates in LMICs. Based on the Uganda Demographic Health Survey, the maternal mortality rate (189 per 100,000 live births)<sup>4</sup> is lower than the average in LMICs (232 per 100,000 live births). Nevertheless, a recent study attributes Uganda's maternal and neonatal deaths to a lack of the supplies and human resources in hospitals needed to handle emergency obstetrics and newborn care in the northern part of the country (Alobo et al., 2022).

<sup>1</sup> <http://library.health.go.ug/sites/default/files/resources/NATIONAL%20EMERGENCY%20MEDICAL%20SERVICES%20POLICY.pdf>

<sup>2</sup> Provisional agenda item no. 12.9 in the WHO (2019) report on the 72<sup>nd</sup> World Health Assembly.

<sup>3</sup> [https://unece.org/DAM/road\\_Safety/Documents/RSPR\\_Uganda\\_February\\_2018/Uganda\\_Road\\_Safety\\_Performance\\_Review\\_Report\\_web\\_version.pdf](https://unece.org/DAM/road_Safety/Documents/RSPR_Uganda_February_2018/Uganda_Road_Safety_Performance_Review_Report_web_version.pdf)

<sup>4</sup> [https://www.ubos.org/wp-content/uploads/publications/09\\_2023UDHS\\_2022\\_Key\\_Findings\\_Presentation\\_B.pdf](https://www.ubos.org/wp-content/uploads/publications/09_2023UDHS_2022_Key_Findings_Presentation_B.pdf)

Fatalities due to road traffic injuries are also increasing in Uganda, despite measures to curb them. For instance, the period 2020–2021 registered a 14 percent increase in road traffic fatalities, which rose from 3,663 fatalities in 2020 to 4,159 in 2021 (Uganda Police Force, 2021). Fatalities due to road traffic injuries in Uganda were estimated at 29.4 per 100,000 persons in 2019, exceeding the averages for sub-Saharan Africa (27.4/100,000) and LMICs (16.9/100,000). Some road traffic fatalities in Uganda have been attributed to the lack of timely post-crash care and the general absence of EMS (Ningwa et al., 2020). The time that elapses between a road crash and provision of the first professional emergency care is crucial in determining the fatality rates of victims. Reducing this time interval is in line with target 12 of the Voluntary Global Performance Targets for Road Safety Risk Factors and Service Delivery Mechanisms.<sup>5</sup>

As part of the initial EMS reforms, in 2021 Uganda prepared its EMS Policy for implementation over a period of 20 years. The policy rests on 13 pillars and will be implemented in a series of five-year strategic plans. Conducting a mid-term review of the first five-year Strategic Plan (2020/21–2024/25) was one of the objectives of this study. The EMS Strategic Plan is structured around four strategic objectives: (1) increasing access to on-scene emergency medical care by 50 percent; (2) increasing the proportion of emergency patients receiving ambulance response within 1 hour by 50 percent; (3) increasing the availability of quality EMS hospital care in 19 national and regional referral hospitals, 147 district hospitals, and 193 level IV health centers; and (4) continuously improving and sustaining operations of the national EMS system.

## **PURPOSE AND OBJECTIVES OF THE EMS STUDY**

This study was commissioned at the request of the MoH to assess the status of the EMS system. Specifically, the three objectives of this study were as follows:

- Conduct a comprehensive mid-term review of the EMS Strategic Plan (2020/21–2024/25).
- Assess the effectiveness of EMS human resource training models.
- Assess the cost of scaling up EMS investments (i.e., cost of current EMS system, human resources, and infrastructure) to achieve 30%, 50%, and 75% increases in capacity in the next five years; and carry out a budget impact analysis.

The remaining sections of this report describe, in order, the assessment methodology used for all the objectives; the study findings highlighting the achievements and challenges of the current EMS system and limitations of the study; conclusions; and recommendations.

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<sup>5</sup> [https://cdn.who.int/media/docs/default-source/documents/un-road-safety-collaboration/targets-and-indicators-visual-clean.pdf?sfvrsn=29627bde\\_5](https://cdn.who.int/media/docs/default-source/documents/un-road-safety-collaboration/targets-and-indicators-visual-clean.pdf?sfvrsn=29627bde_5)

## 2. METHODOLOGY

This section outlines the methods applied to this EMS study, the specific objectives of which were presented in the preceding section.

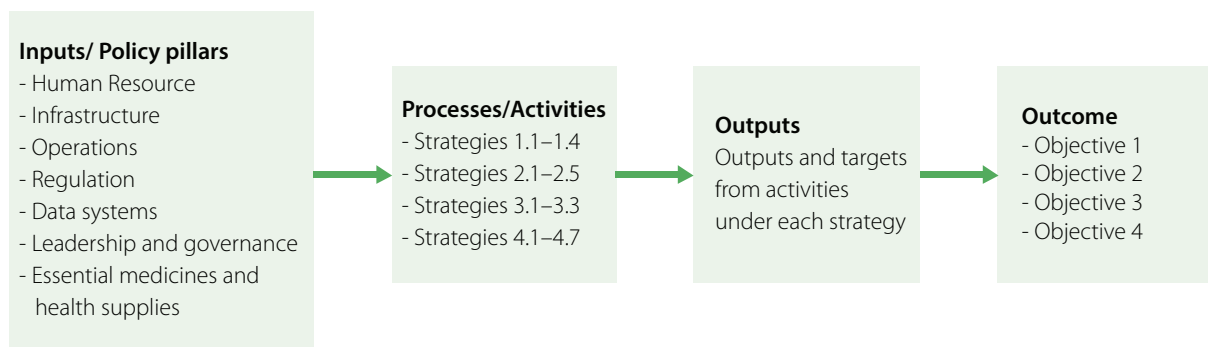
### MID-TERM REVIEW OF THE EMS STRATEGIC PLAN

The mid-term review was designed to investigate the overall achievements of the EMS policy and strategic plan in strengthening the EMS system in Uganda. It highlights the key issues that need to be addressed to strengthen the EMS system along with major learnings for future practice. The EMS study was guided by the WHO Emergency Care Assessment framework, which was adapted to the Uganda context by the pillars of the EMS policy. The priority actions in the EMS Strategic Plan reflect those of the EMS policy pillars. As such, the current mid-term review sought to assess how much progress has been made toward achieving the set objectives of the EMS Strategic Plan, with greater focus on those objectives that were set to be achieved within the first three years of the plan.

#### *EMS Conceptual Framework*

The conceptual framework (Figure 1) for the mid-term review is based on the study of the WHO health systems framework and the EMS framework for low-income countries designed by Mehmood et al.<sup>6</sup> This framework depicts inputs that fuel the processes and activities leading to outputs and, consequently, outcomes. The policy pillars are grouped into eight key areas. The implementation of the planned activities outlined under the strategies (indicated in the work plan of the EMS strategic plan) produces outputs that lead to the envisaged outcomes. The outcomes are the four strategic objectives of the EMS Strategic Plan discussed in the preceding section.

Figure 1: Conceptual framework

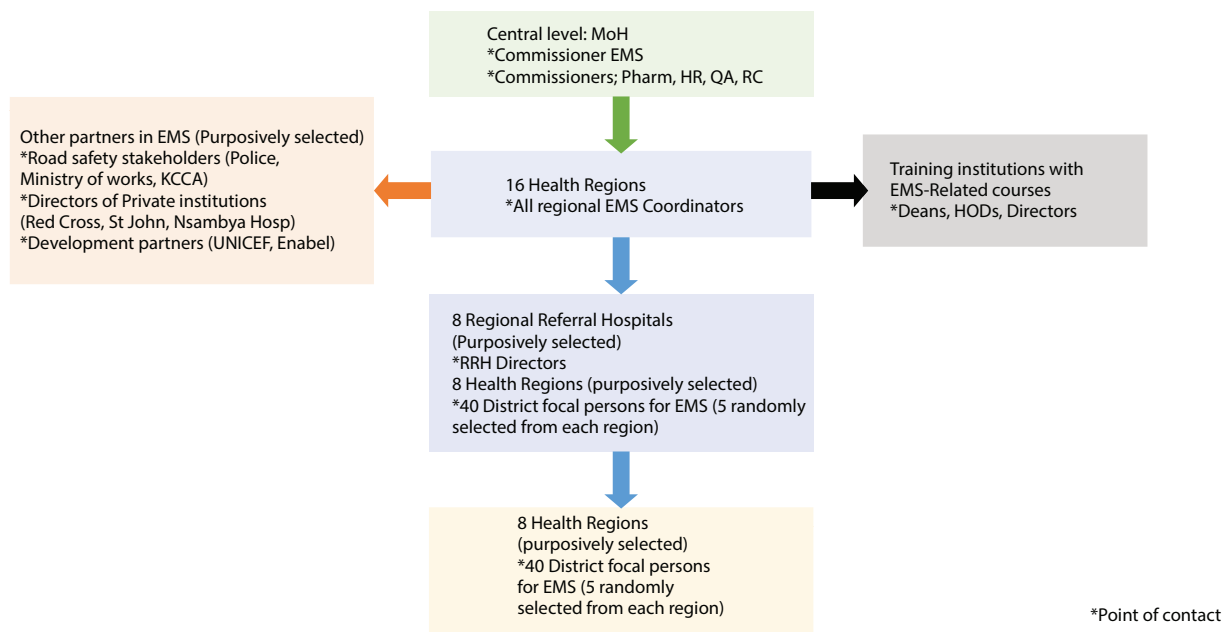


<sup>6</sup> [https://www.researchgate.net/publication/329139002\\_Assessment\\_of\\_pre-hospital\\_emergency\\_medical\\_services\\_in\\_low-income\\_settings\\_using\\_a\\_health\\_systems\\_approach](https://www.researchgate.net/publication/329139002_Assessment_of_pre-hospital_emergency_medical_services_in_low-income_settings_using_a_health_systems_approach)

## Mid-term Review Matrix, Data Sources, and Sampling

The review matrix provides the overarching framework that guided the review process. To achieve the first objective, data were collected from respondents, and a desk review of documents was conducted on the values of the identified performance indicators. These documents included EMS monitoring reports, District Health Information Software (DHIS) 2 data reports, and other documents furnished by the EMS department (see Appendix A). Second, questionnaires were designed and used to collect in-depth information through key informant interviews (KIIs) that could not be obtained through desk review. To obtain a sample of respondents, multi-stage (random and purposive) sampling was used to ensure the representativeness of the responses (see Figure 2).

**Figure 2: Illustration of sampling technique**



Some EMS activities and indicators are tracked at both national and regional levels. To ensure a national representation of the EMS situation for the mid-term review, the national EMS commissioner and other commissioners with functions assigned in the EMS strategic plan were included, along with all 14<sup>7</sup> regional EMS coordinators, who were also interviewed for the study.

Purposive sampling was used to obtain a representative sample of the directors of eight regional referral hospitals (RRHs) (in Greater Kampala, Masaka, Mbarara, Fort Portal, Lira, Mbale, Karamoja, and Arua). Finally, five districts were randomly selected from each of the eight regions, providing a sample of 40 (out of 135) districts in the country to deliver district-level aspects of evaluation.

## Data Analysis

This study used both quantitative and qualitative data-analysis techniques. The obtained values for the key performance indicators of the individual activities were coded into four categories: (1) *not started*; (2) *started*–

<sup>7</sup> 14 regions are considered for this study because 2 out of the existing 16 are new and not fully operational.

*lagging*; (3) *started–advanced*; and (4) *completed*, based on the value of the output against the target and timeline of activity. Summary statistics and frequencies for each status category were calculated and presented as percentages in the form of graphs and charts. Furthermore, bar charts were used to illustrate the trend of key outcome indicators from the base year (2019/2020) to 2022/23. To supplement the quantitative analysis, notes and recordings from the interviews were coded based on emerging key themes related to the review matrix. This information was used to moderate the findings, explain tendencies in the data, identify challenges, and provide conclusions and recommendations.

## **ASSESSMENT OF HUMAN RESOURCE (HR) TRAINING MODELS**

The assessment of the HR training models was based on Kirkpatrick's evaluation model.<sup>8</sup> This is a globally recognized approach for evaluating the effectiveness of training programs. It assesses both formal and informal training models and rates them according to four criteria: reaction, learning, behavior, and *results* (Heydari et al., 2019). Learning expectations for trainees from approved training curricula were compared to different aspects of evaluation in the model: reaction, learning, behavior, and results. Learning aspects were further classified according to Bloom's taxonomy<sup>9</sup> to assess cognitive activity.

## **SOURCES OF INFORMATION, SAMPLING AND DATA COLLECTION**

A desk review of existing training institutions and the curricula used was conducted to assess the course content and expected training competencies. Training institutions in Uganda offer courses for several categories of EMS staff. Information on this is summarized in Table 1. Questions were formulated to enable students to rate the delivery of course content, the learning environment, and perceived competency in performing specific tasks enumerated as learning outcomes. Instructors and supervisors were interviewed to collect related information in order to triangulate student perceptions. Information from students was collected through an online survey with Likert-scale questions sent through their emails.

The target population from which the sample was drawn comprised three strata: (1) students from all categories of EMS providers in all EMS training institutions or the most recent alumni of the same; (2) EMS trainers/instructors; and (3) EMS leaders/supervisors. A combination of three sampling techniques (stratified, random, and purposive sampling) was used to select a representative sample of respondents from the list of identified training institutions.<sup>10</sup> Within stratum 1, a random sampling was conducted from a list of all students who had undertaken the theoretical and practical aspects of the courses. A few students were selected to participate in the KIIs. Finally, a purposive sample of respondents was drawn from strata 2 and 3 and interviewed to offer insight and validate certain aspects of learning.

## **DATA ANALYSIS**

Descriptive statistics were conducted (modes and frequencies). The patterns in the quantitative data analysis were complemented by qualitative data collected through KIIs. The qualitative data were thematically coded against the assessment matrix. The results obtained from the quantitative and qualitative data analyses helped determine the existence of differences in training outcomes based on the curriculum applied, leading to a determination of the effectiveness of the EMS HR training models.

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<sup>8</sup> <https://onlinedegrees.sandiego.edu/kirkpatrick-training-evaluation-model/>

<sup>9</sup> <https://fctl.ucf.edu/teaching-resources/course-design/blooms-taxonomy/>

<sup>10</sup> A cut-off of 2 years' duration for the teaching of a course was used to obtain institutions that had some experience with teaching.

**Table 1: Training models for various categories of EMS staff**

Category of EMS staff	Training course	Training institution	Duration of training
Community (lay) first responders	First aid courses (several levels)	St. John Ambulance	3 days
	Emergency First Aid Responder (EFAR) course	The African Federation for Emergency Medicine (AFEM)	5 days
Ambulance drivers	First aid courses (several levels); defensive driving	St. John Ambulance	
Emergency medical technicians (EMTs)	EMT course	St. John Ambulance	3days
	Emergency <sup>11</sup> Medicine (certificate course)	Uganda Christian University	7 days to 1.5 months
Emergency care assistants (ECAs)	ECA Certificate course	St. Michael Lubaga Hospital training school	2 years
	Emergency Transport Attendant course	St. John Ambulance	6 days
Emergency medical nurses (and clinical officers)	Emergency Medicine Nurse Diploma course	St. Michael Lubaga Hospital training school	3 years
		Masaka Regional Referral Hospital	2 years
		Mbarara University of Science and Technology	2 years
Emergency physicians	Emergency <sup>10</sup> Medicine Certificate course	Uganda Christian University	7 days to 1.5 months
		Makerere University College of Health Sciences	3 years
	Master's course in Emergency Medicine	Uganda Martyrs University Nkozi	3 years
		Mbarara University of Science and Technology	3 years

*Negative values = pro poor; Positive values = pro rich*

*Source: Authors computations based on UNHS 2012/13, 2016/17 and 2019/20 datasets*

## ASSESSMENT OF THE COST OF SCALING UP EMS INVESTMENTS

To assess the cost of scaling up EMS investments, three steps of analysis were followed: (1) assessing the cost of the EMS system by computing the current cost of all existing EMS resources at the national and subnational levels; (2) evaluating the financial projections for human resources and infrastructure; and (3) conducting a budget impact analysis. Based on these findings, recommendations were made to allocate finances to achieve efficiency in existing systems and scale-up.

### COST OF THE EMS SYSTEM

In the first step of this assessment, the study took an Activity-Based Costing (ABC) approach, which entailed identifying all key inputs necessary in the provision of emergency medical goods and services. These inputs are based on the stages of the EMS and informed by the service providers' perspective, considering public versus private and urban versus rural dimensions, as well as national versus subnational perspectives. These were itemized and monetized to determine the cost of the interventions. Data on unit costs were collected

<sup>11</sup> According to the university's web page, this course is offered to doctors, nurses, and paramedics.



from various EMS service points, from the literature review, from KIs, and from expert opinions. Data were fed into an Excel model with modules to calculate the costs. A cost analysis was conducted with fixed and variable costs: pre-hospital, ambulatory, and inpatient costs, as well as the identification of the costs of enabling environments for providing EMS. To estimate the additional financing needed to ensure that the EMS system is adequately resourced and to identify options for meeting the financing gap, a cost assessment was conducted by introducing new elements and options into the model and recalculating the total costs and financing gap.

## **FINANCIAL PROJECTIONS FOR HUMAN RESOURCES AND INFRASTRUCTURE**

The financial projections were developed with the objective of estimating the resource needs for EMS operations, on the assumption that the stated constraints have been addressed to attain optimal operation levels of 30 percent, 50 percent, and 75 percent of the health facilities in the next five years.

The HR, infrastructural, and financial projections for the various levels of scale-up were guided by the estimated current costs and the proposed additional services and constraints of the EMS system. The projections of HR needs were informed and guided by the volume of health facilities undergoing refurbishments for emergency preparedness, the number of ambulances introduced into the EMS, and the volume of cadre completions from the various training institutions. These projections were moderated by the attrition rates of the various EMS cadres as well as the administrative transfers of the cadres across other disease programs. The infrastructure needs were informed by the level and number of health facilities targeted for remodeling to provide EMS services.

## **BUDGET IMPACT ANALYSIS**

Budget impact analysis was undertaken using a purpose-built Excel tool. The model inputs were the target population and its characteristics, the time horizon, and scenarios that were established from expert opinions of the technical working group. The proposed implementation scenarios were costed to establish the total resource needs. Incremental costs were estimated and the impact of additional costs on the current budget allocation was calculated. The results for each scenario were ranked to establish their suitability. An appropriate sensitivity parameter was built into the analysis to account for any eventualities that might occur during implementation.

## **LIMITATIONS OF THE STUDY**

The reliance on self-reports from KIs is a limitation of this study. This could cause measurement errors, which could have resulted in social desirability or recall bias. To mitigate such potential, the study triangulated the data sources, including reviews of EMS reports and relevant documents. Overall, data were not available for 12 activities in the EMS strategic plan workplan. For example, no information was available on all three indicators of Strategy 1.3, leading to its omission from the analysis. In some instances, there were no data for the indicators in the plan's implementation matrix, so proxies were adopted. Finally, owing to the short duration of the study, it was not possible to obtain detailed information at the district level. Instead, the representation of district matters was obtained through regional EMS coordinators and district focal points.

# 3. RESULTS

## MID-TERM REVIEW OF THE EMS STRATEGIC PLAN

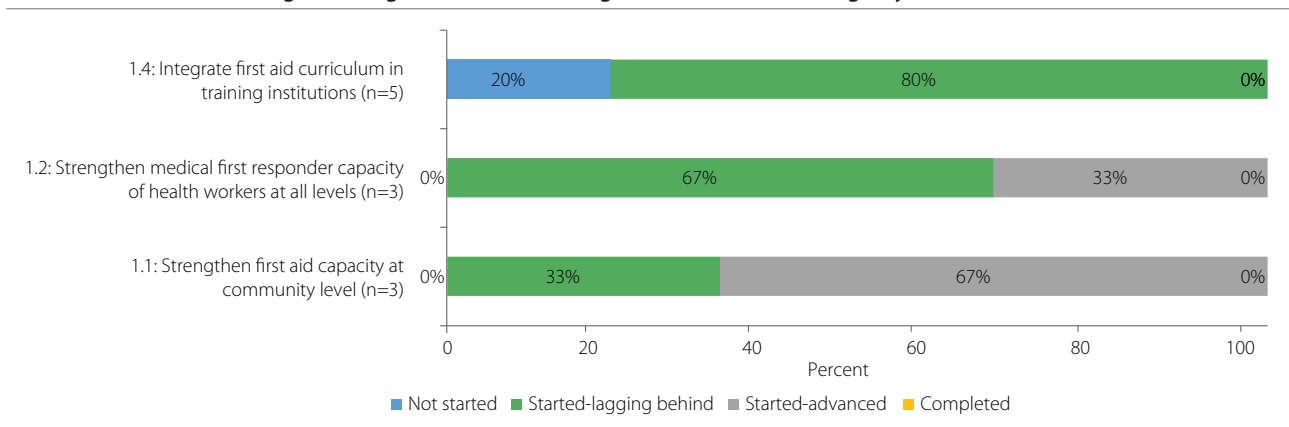
The results of the mid-term review of the EMS strategic plan (2020/21–2024/25) were synthesized at several levels following the conceptual framework: strategic plan activity/strategy level, strategic plan objective level, and policy pillar level.

### IMPLEMENTATION STATUS OF PLANNED ACTIVITIES

#### Objective 1: Increase access to on-scene emergency medical care by 50%.

Most of the activities in all three independent strategies (1.1, 1.2, and 1.4, as seen in Figure 3) have started, but none was completed at the time of this study. Most of the activities for strengthening first aid capacity at the community level were at advanced stages of implementation (67%), such as procurement of training materials for first aid training and training of trainers. However, activities for strengthening the medical first responder capacity of health workers and for integrating the first aid curriculum into training institutions were lagging in implementation because of financing constraints. These activities include training district first responders on basic life support and cascading the same at district and health center levels, printing and disseminating bystander manuals, and training trainers in Basic Life Support. Most activities related to the integration of the first aid curriculum in training institutions were slowed down by the COVID 19 pandemic, which led to rescheduling some activities.

Figure 3: Progress toward increasing access to on-scene emergency medical care



#### Objective 2: Increase proportion of emergency patients receiving ambulance response within one hour by 50%.

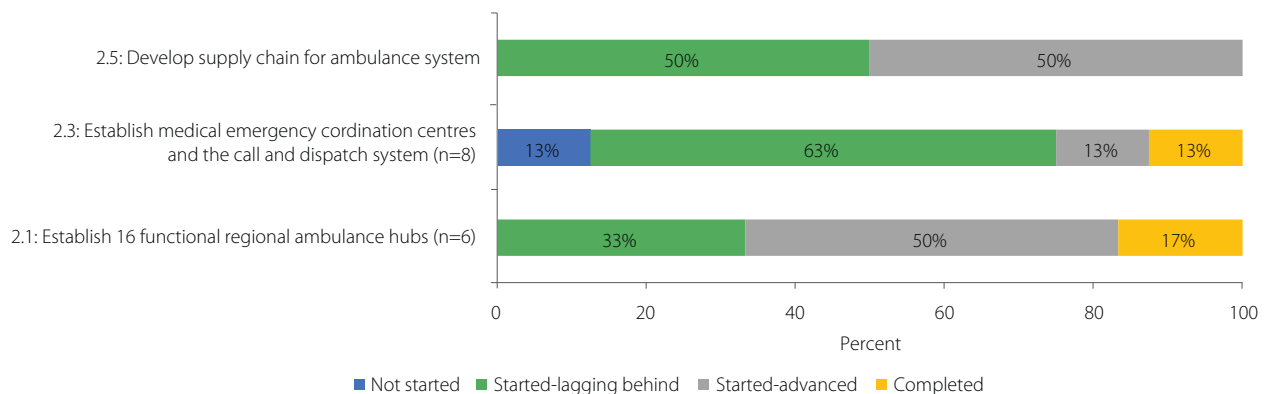
The achievement of this objective is pegged to three independent strategies, as illustrated in Figure 4. All the activities have been initiated except the development of protocols with the police, army, aviation, and marine evacuators. Protocols for patient handover and activation of interfacility referral, as well as the EMS directory, have been printed and distributed to all 14 regions. Other activities that are at advanced stages of implementation include the mapping of ambulance stand points in regions; regional ambulance capacity

assessment; procurement<sup>12</sup> of ambulances of various categories; and in-service training for initial ambulance crew. This progress was achieved in the implementation of these activities because they were prioritized for implementation during the first years of the plan and were adequately resourced.

Activities that are behind schedule include epidemiological mapping, which has only been done in 6 out of 14 regions, and assessment for ambulance capacity needs, which has been done in 9 out of 14 regions. Most activities to help establish emergency coordination and dispatch systems (Strategy 2.3) have started but are lagging as well. Installation of radio communication systems in ambulances, training of call and dispatch officers, operationalizing emergency number 912, and mapping of landmarks are all behind schedule as well (started but lagging). The lag in implementing these activities is largely related to financial constraints.

The development of a supply chain for ambulance systems (Strategy 2.5) has started, with half of them being almost complete and the other half lagging, again due to financial constraints. Establishment of a refill and supply-chain system for oxygen and EMS commodities for 16 ambulance stations is at an advanced level, while the development of essential Emergency Care Package for health facilities and ambulance crews is lagging, with few regions having established the package in their health facilities.

**Figure 4: Progress towards increasing the proportion of emergency patients receiving ambulance response within one hour**



**Objective 3: Increase availability of quality EMS hospital care in 14 regional referral hospitals, 147 district hospitals, and 193 level IV health centers.**

Most of the activities to help establish emergency units (Strategy 3.1) are lagging. In only 8 out of the 19 referral hospitals where renovation/construction was planned to occur within the first three years has it been carried out. Construction and equipping of regional trauma centers had not started, and only 2 out of 14 regions had emergency units where at least two trained and permanent staff were present in 80 percent of their level III and level IV health centers.

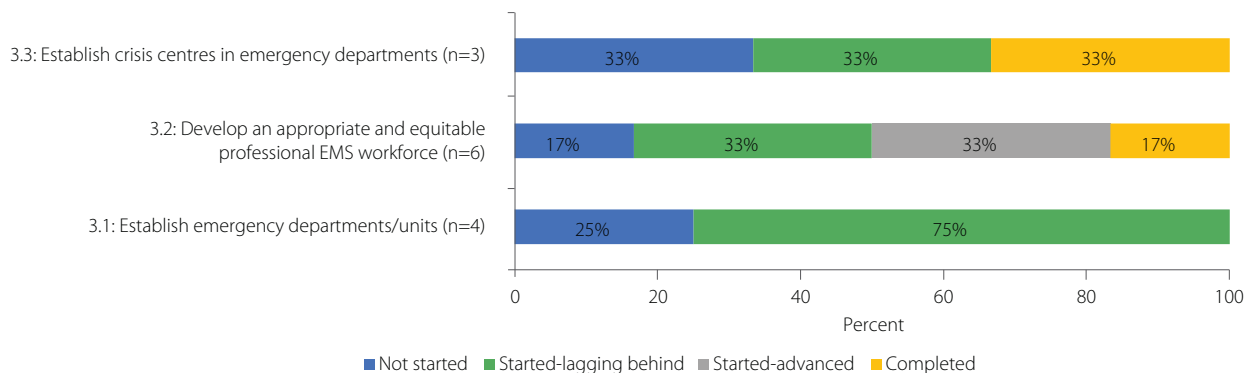
The development of a professional EMS workforce (Strategy 3.2) has started and advanced because of the continuous training of health workers in short emergency medicine courses (Advanced Emergency Life Support and Basic Emergency Care). However, long-term training is hampered by delays in establishing regional training hubs and financing of emergency medicine specialist education.

<sup>12</sup> Refurbishment of the old ambulances has since been abandoned as it was deemed more costly than purchasing new ones.

Only 20 out of the anticipated 80 scholarships had been secured and granted by the time of this study. The lack of financing for emergency medicine specialist studies (which is cited in the next section) may affect the development and retention of the professional emergency medicine workforce. This workforce suffers from an acute shortage in Uganda, given that the scheme of service for EMS cadres has not been established.

The third strategy sought to establish crisis centers in emergency departments through three activities. The development of an operational plan for emergency medical response to mental illness has been implemented, but there has been a delay in the development of technical guidance documents on crisis management and referral. Furthermore, mental health and crisis center partners and their capacities have not been mapped in these regions.

**Figure 5: Progress with increasing availability of quality EMS hospital care**



**Objective 4: Continuously improve and sustain operations of the national EMS system.**

This objective was to be achieved through six independent strategies (Figure 6). Most of the activities under Strategies 4.3 and 4.5 have started but are behind implementation schedules, while financing activities (Strategy 4.6) recorded little progress. Under Strategy 4.1, the orientation of the newly formed EMS structures has not been conducted, while the design of EMS accreditation, standards, service protocols, Standard Operating Procedures (SoPs), and standard agreements for public private partnerships (PPPs) has been delayed. The same applies to activities related to the development of EMS quality assurance and quality improvement mechanisms. On the other hand, development of guidelines and standard protocols for bystander response and dispatch as well as regional visits to guide EMS governance are on schedule. Job descriptions for district EMS focal points have been spelled out and their training has been implemented as planned.

Five out of the seven activities under Strategy 4.2 have started. The training of regional EMS coordinators on preparedness and management of major medical incidents and procurement of non-transporting advanced life support responders is at an advanced stage of implementation. Three activities (43%) were lagging: conducting regional workshops to develop disaster management and trauma center plans, training on disaster management, and establishment of national ambulance call and dispatch centers to oversee regional centers. However, the development of national and regional EMS mitigation plans and technical assistance for all-hazard hospital model plans has not been initiated.

The development and empowerment of EMS legal and regulatory framework (Strategy 4.3) is largely behind schedule. Although an EMS policy has been developed, the Act is still pending, implying an inadequate EMS regulatory framework in Uganda. Bystanders are still not legally protected in Uganda in the absence of a Good Samaritan Law. Mandating of a free and compulsory emergency number (912) and expansion of the EMS call and dispatch system within the 999 frameworks<sup>13</sup> have not been completed; both are awaiting the establishment of a national call and dispatch center.

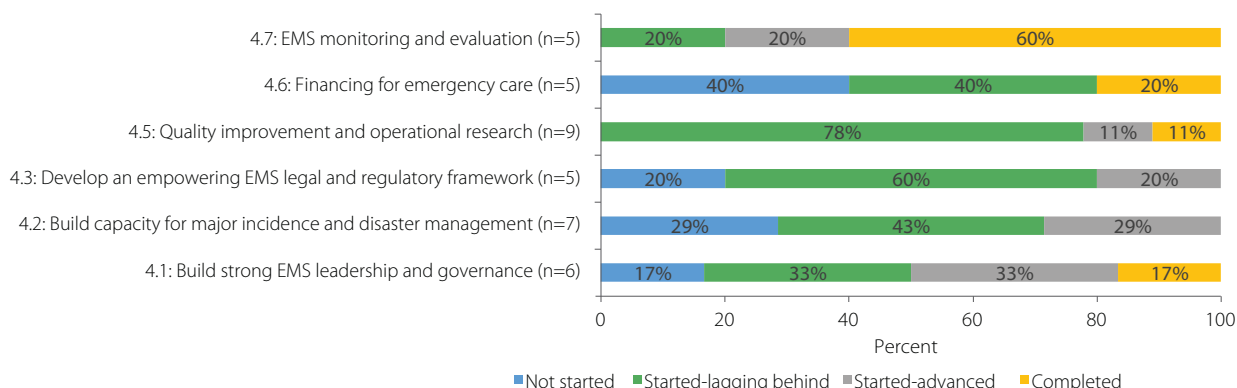
Activities under EMS quality improvement and operational research (Strategy 4.5) are also largely (78%) behind schedule, which could affect the quality of EMS M&E (Strategy 4.7). Most (12) regions do not hold national quarterly quality improvement collaborative meetings, while the MoH has only conducted very few (two out of an expected six) regional support supervision meetings in the last three years. Although most (10) regions hold regional coordination meetings, the equivalent national-level coordination meetings are not being executed, with only one out of the three planned meetings held in the last three years.

The development of testing procedures for protocols is in the preliminary stage, yet the same ought to have been completed by the second year. Analysis tools for cost and service delivery outcomes have not been developed, while the national research agenda has undergone only one out of three revisions planned for the mid-term.

Strategy 4.6 comprises activities for financing EMS, and most are lagging or not started, leading to undiversified sources of EMS financing. A dedicated funding stream for pre-hospital and health facility emergency medical care services has been incorporated within the MoH budget planning cycle. However, emergency care is yet to be incorporated in ongoing results-based financing mechanisms, while streamlining EMS funding into vehicle third-party insurance is in preliminary stages. Not yet initiated are the mapping of contributors to pre-hospital EMS funding and the development of EMS financing mechanisms.

M&E comprises the last strategy (4.7) and has the highest activity completion rate. Activities that have progressed to completion include conventions of data quality audits and analysis meetings, compilation of quarterly national status reports, and the establishment of an EMS M&E focal point at the MoH. Implementation of a standardized patient clinical form for pre-hospital and facility-based emergency medical care was initiated and is at an advanced level. Finally, the inclusion of key pre-hospital and health facility-based emergency medical

**Figure 6: Progress in strategies for continuous improvement and sustainability of the national EMS system**



<sup>13</sup> Emergency short code for police in Uganda

care data points in the existing DHIS2 data collection and reporting is incomplete, with 7 out of 18 indicators incorporated into the DHIS2 so far.

### Overall Assessment

As of 30<sup>th</sup> August 2023, 13 percent of the planned activities in the EMS Strategic Plan had been implemented. These activities include training and deployment of ambulance crews; development and printing of protocols for patient handover; activation of inter-facility referral and EMS referral directory; development of standardized Emergency Medicine (EM) course units for medical, paramedical, and nursing students; development of an operational plan for emergency medical response to mental illness; establishment of EM governance structures in all regions; training district EMS focal point persons; establishment of a mechanism for fast tracking scale-up of innovation and good practice; establishing a dedicated funding stream for pre-hospital and health facility emergency medical care services within the Ministry of Health (MoH) budget planning cycle; instituting development of national and regional EM quarterly performance reports and setting up of EM M&E focal point at MoH.

Twenty-two (22) percent of activities had been initiated and were in advanced stages of implementation. Further, another 51 percent of the activities were started but lagging, while 14 percent were yet to be started. The activities that were either lagging or not yet started include the development of a legal and regulatory framework; the establishment of alternative financing mechanisms for EMS; and the establishment of emergency departments. All three of these are key to the implementation of the EMS strategy.

The implementation of planned activities is generally slow because of funding constraints and, in some cases, the impact of the COVID-19 pandemic during the early years of strategic plan implementation.

### PROGRESS IN THE ATTAINMENT OF OUTCOME INDICATORS

The Strategic Plan identifies 18 EMS outcome indicators for monitoring EMS outcomes. However, at the time of this study, only 7 (39%) were tracked using DHIS2, the health information system used for reporting by healthcare facilities.

Nationally, the reporting rate of the seven tracked indicators has increased from an average of approximately 34 percent in 2020 to 48 percent in 2022, as shown in Figure 7. The reporting rate data for 2023 was incomplete at the time of this study. The improvement could have been a result of putting in place the data capturing system and the COVID 19–related reporting.

**Figure 7: Annual reporting rate, 2020–2022**

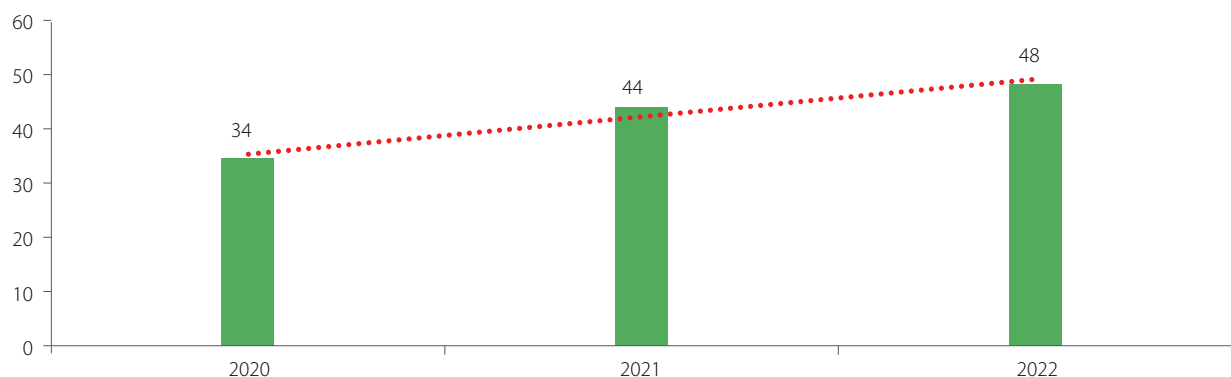


Table 2 shows that some regions have better reporting rates (West Nile, Kampala, and Karamoja) than others (Ankole and Busoga). These variations could be linked to region-specific capacity challenges, as regional EMS coordinators indicated the need for improvement in data reporting in their areas of jurisdiction.

**Indicator 1: Number of emergency cases received in the emergency units.**

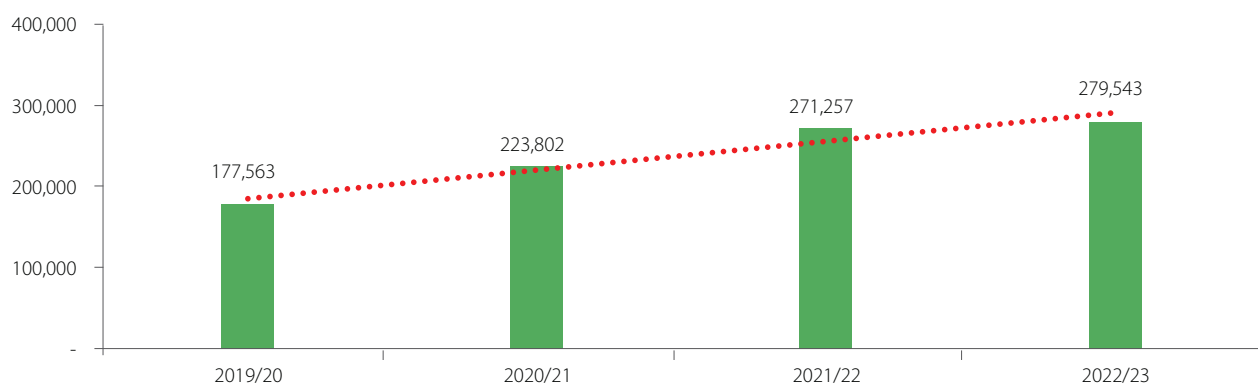
In general, there is an upward trend in the number of emergency cases received at emergency units between 2019 and 2023. This includes 57 percent growth between 2019/20 and 2022/23. The South-Central Region has the highest burden of emergency cases (above 15%), while the Karamoja, Teso, and Bugisu regions have the lowest (less than 2% each). A clear pattern of increase (Busoga region) or decrease (Karamoja region) in reported emergency cases was observed for all four years in these regions. This pattern needs to be investigated on a case-by-case basis, as it is beyond the scope of the current study.

The South-Central region recorded the highest number of emergency cases, while the Teso and Bugisu regions recorded the lowest number throughout the period analyzed (Figure 9).

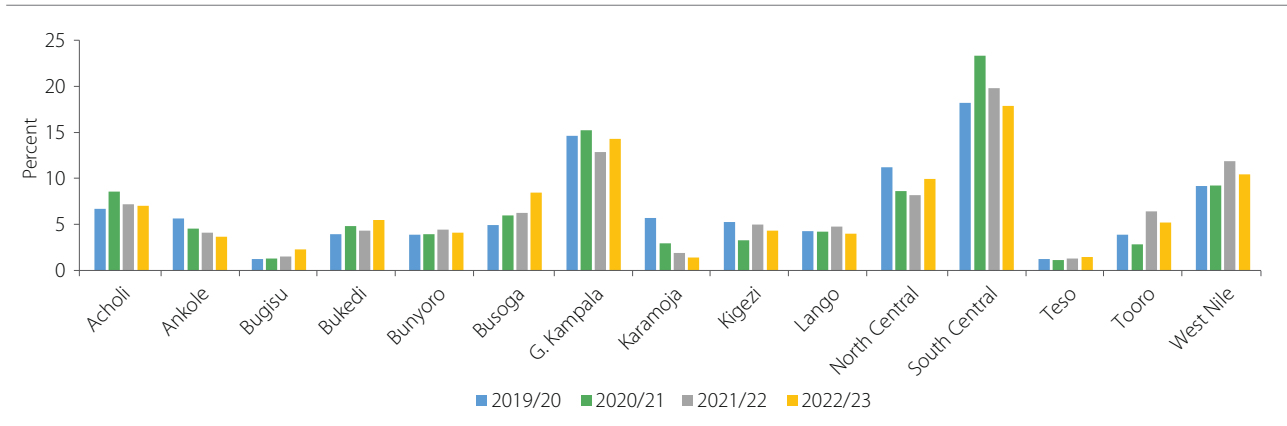
**Table 2: Regional cumulative reporting rates, 2020–2022**

Region	Annual reporting rate (%) for 2020–2022
West Nile	65.5
Kampala	64.3
Karamoja	59.6
Bugisu	45.7
Lango	44.5
Acholi	39.8
Teso	38.3
Bukedi	36.8
North Central	36.4
Kigezi	35.2
Bunyoro	34.8
Tooro	33.9
South Central	33.8
Busoga	32.8
Ankole	31.0
Average	42.2

**Figure 8: Total number of emergency cases between 2019/2020 and 2022/2023 received at emergency units**



**Figure 9: Percentage of emergency cases received at the emergency units by region, 2019–2023**



Road traffic injuries (RTIs) in Uganda accounted for more than half of all emergency cases during the period under review. As shown in Figure 10, panel a, the percentage of emergency cases due to RTIs witnessed a downward trend between 2019/20 and 2021/22<sup>14</sup>, as the total emergency cases (denominator) grew at a faster rate than the RTIs (numerator) over the same period (Figure 10, panel b). RTIs and fatalities increased during the same period, except for 2020<sup>15</sup> based on police crash data.<sup>16</sup>

It is also worth noting that hospitals consistently reported more RTIs than police data for the same period under review (Figure 10, panels b and c), suggesting the need for inter-agency collaboration in crash data reporting and accounting. The role of EMS interventions in reducing fatalities resulting from serious RTIs cannot be determined at this stage and requires further research.

There are several regions where the number of reported RTIs exceeds the number of reported emergency cases, resulting in percentages that are greater than 100 percent (Figure 10, panel d). These are clearly data issues that need to be investigated at the regional level as the problem is more pronounced in regions that registered lower proportions of emergency cases (Teso, Karamoja, and Bugisu).

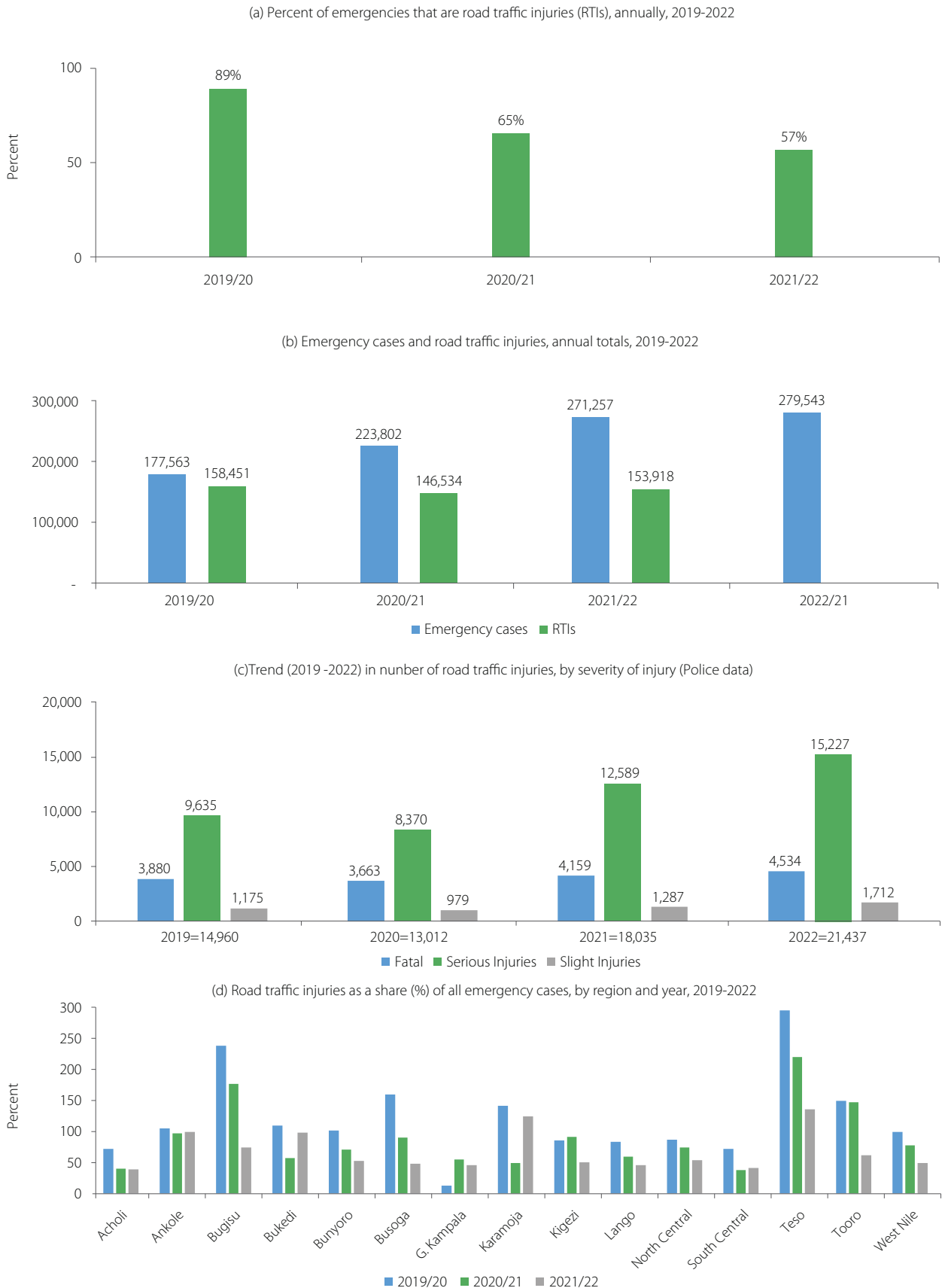
<sup>14</sup> RTIs data for the 2<sup>nd</sup> quarter of the FY 2022/23 was missing from the EMS reports availed for the study.

<sup>15</sup> This is attributable to Covid-19 movement restrictions.

<sup>16</sup> <https://www.upf.go.ug/download/the-2022-annual-crime-report/>



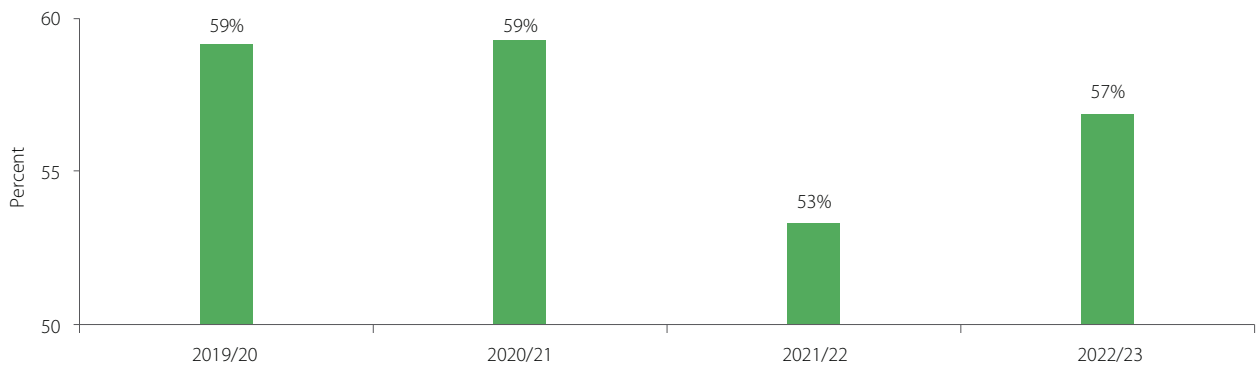
**Figure 10: Percentage of emergency cases due to road traffic injuries and patterns of road traffic injuries and fatalities based on police data, 2019–2022**



**Indicator 2: Percentage of emergency patients who received care at the scene of emergency.**

This indicator tracks the share of emergency patients who received care at the scene of emergency. The percentage ranged from 53 percent to 59 percent, averaging 56 percent over the last three years (Figure 11). This is below the share in the baseline year and is contrary to the anticipated increase of the share by 50 percent set in the strategic plan. Limited availability of pre-hospital-care providers, lack of standardized protocols for on-scene care, and logistical challenges such as difficult terrain or adverse weather conditions have been reported as reasons for the decline in the percentage of patients receiving care at the scene of an emergency.

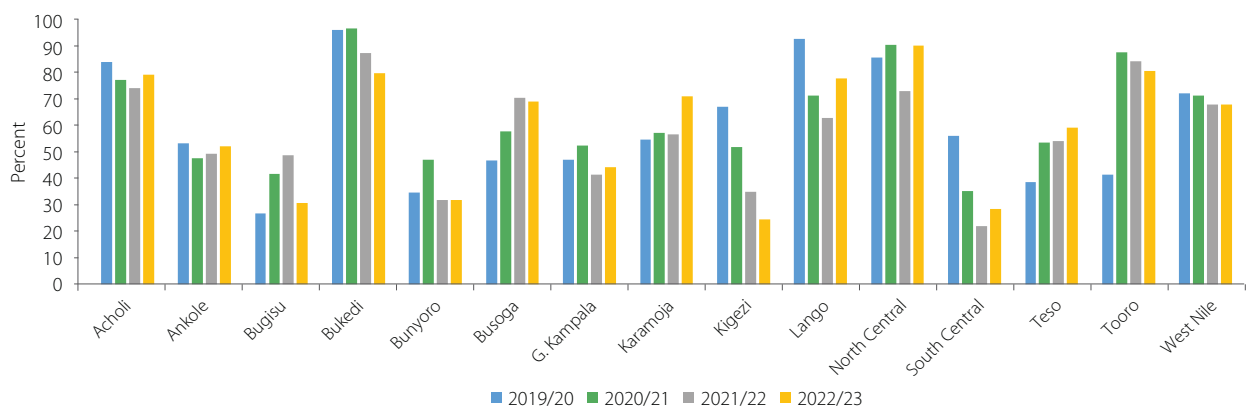
**Figure 11: Percentage of emergency cases that received on-scene care, annually, 2019–2023**



Regional analysis showed that Bukedi had the highest percentage of emergency cases that received on-scene care, while South Central, which also has the largest burden of emergency cases, had the lowest percentage. Bukedi has a relatively small number of emergency cases, yet most of them receive on-scene care before arriving at the emergency unit, possibly because available ambulances sufficiently meet the low demand for on-scene EMS.

Tooro had the highest *increase* in the percentage of cases receiving on-scene care, doubling from about 40 percent to above 80 percent in three years, despite sustaining a growth in the number of emergency cases. This has implications for the allocation of EMS facilities based on emergency medical burden.

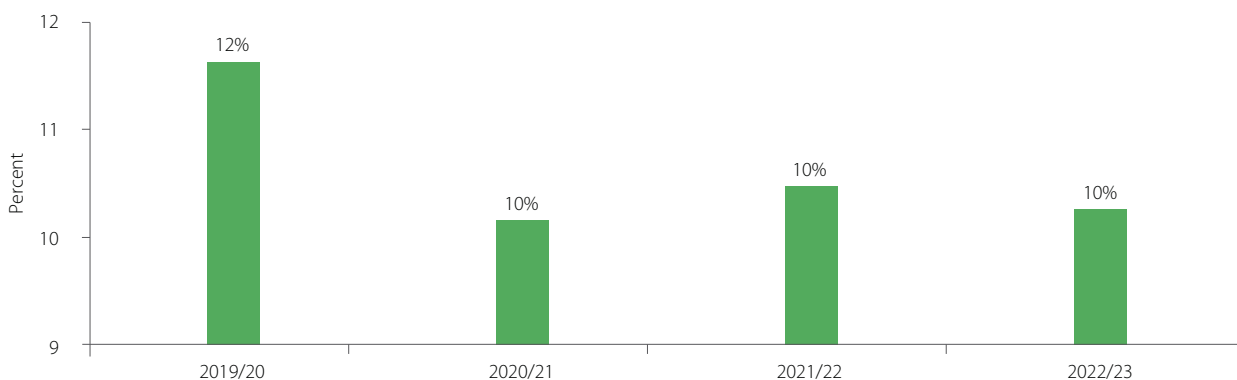
**Figure 12: Percentage of patients receiving on-scene care, annually by region, 2019–2023**



**Indicator 3: Percentage of emergency cases arriving at the emergency unit (EU) by ambulance.**

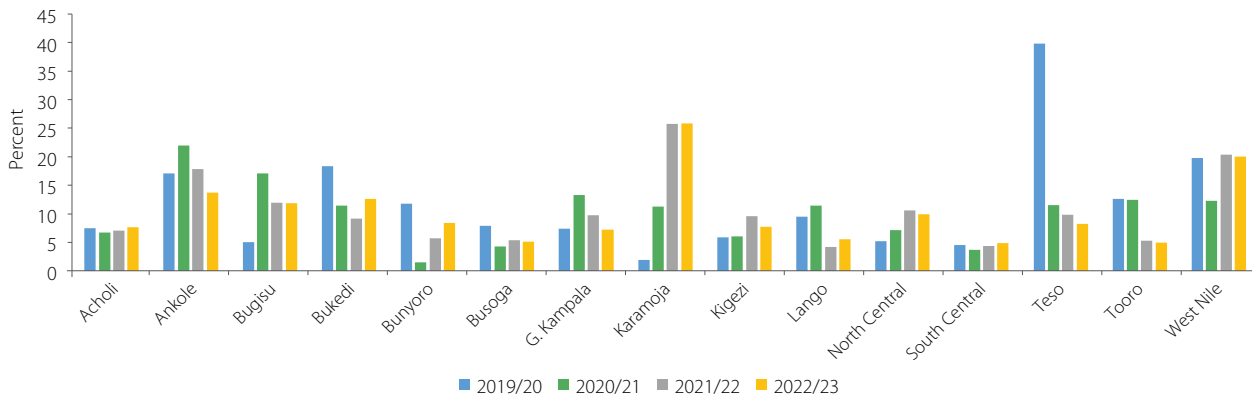
This indicator measures the number of emergency cases that arrive at a health facility by ambulance compared to other modes of transport. The numerator is the number of emergency cases that arrive at a health facility using an ambulance and the denominator is the total number of emergency cases that arrive at the health facility. Figure 13 shows that the percentage of these emergency cases arriving by ambulance has dropped compared to the baseline value (12%) rather than growing by the strategic plan’s anticipated increase of 50 percent. Limited access to ambulances, poor road infrastructure, and lack of public awareness were the reasons for this declining trend. If at mid-term the proportion is 10 percent, then achieving the targeted increase of 50 percent within the remaining years of the strategic plan will require more effort than has been made in the past three years.

**Figure 13: Percentage of emergency cases arriving at the emergency unit in an ambulance, annually, 2019–2023**



Regional analysis reveals that regions with a low burden of emergency cases have the highest rates of arrivals by ambulance (Karamoja, Ankole, West Nile), while those with a high burden have very low rates (South Central). The Karamoja region recorded a steep increase over the period, while the Tooro and Teso regions recorded a persistent decline in arrival by ambulance. This finding could be linked to the regional distribution of ambulances.

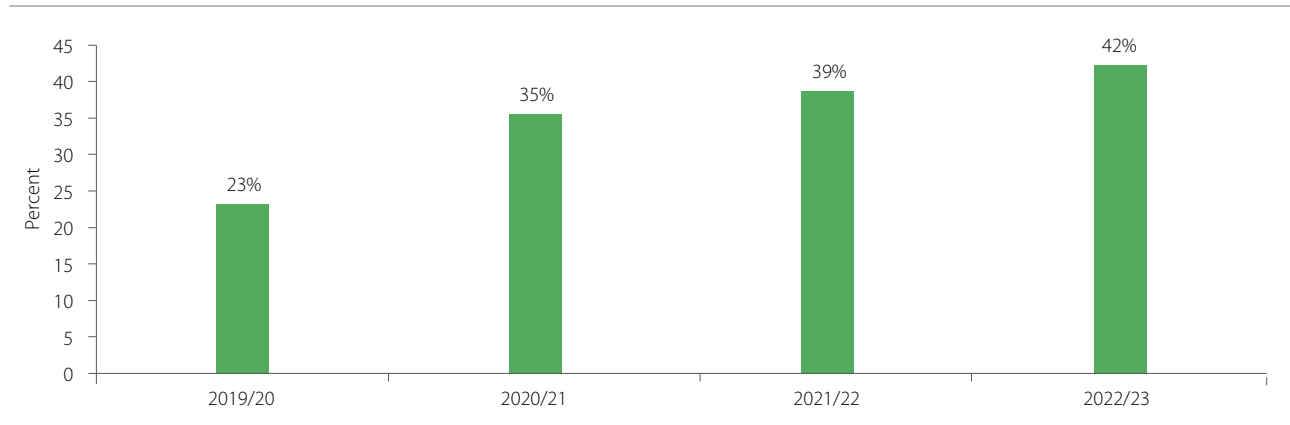
**Figure 14: Percentage of patients arriving at emergency units by ambulance, annually by region, 2019–2023**



**Indicator 4: Percentage of patients assessed for level of consciousness using the GCS score.**

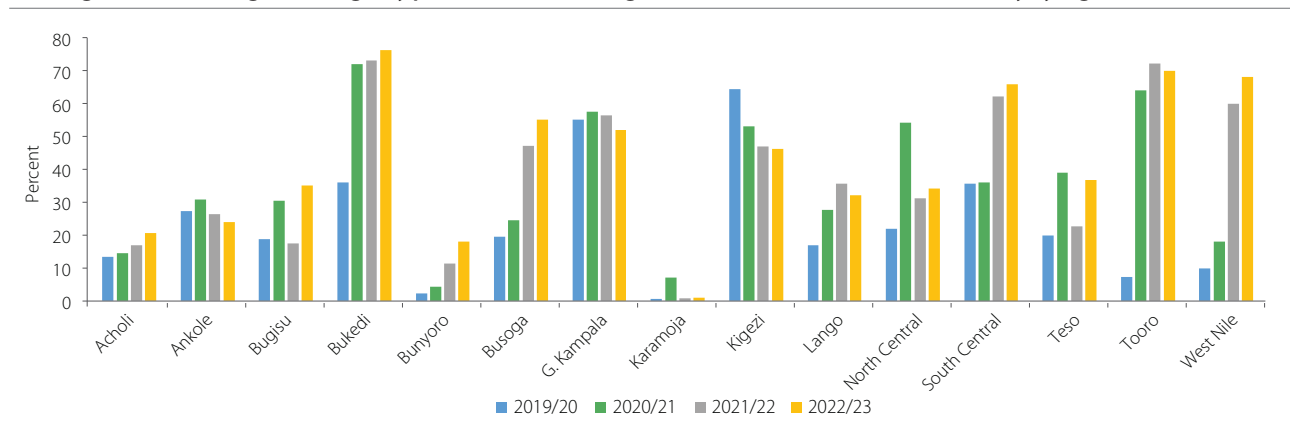
This indicator measures the proportion of emergency patients assessed for their level of consciousness using the Glasgow Coma Scale (GCS)<sup>17</sup> score and other coma scores (Jain & Iverson, 2023). Figure 15 shows that the proportion of patients assessed increased during the study period. In addition to other possible reasons, this could be attributed to the increased training of medical workers on triage under the BEC course.

**Figure 15: Percentage of patients presenting at the emergency unit assessed for level of consciousness using the GCS or other coma scales, 2019–2023**



Regional analysis showed that Busoga, Tooro, and West Nile have greatly improved and maintained a national lead in GCS consciousness scoring. By contrast, the Karamoja and Bunyoro regions consistently remained below the average rate. There are regions with a low burden of cases that record assessment rates of less than 50 percent (Karamoja, Bunyoro, Bugisu, Ankole, and Acholi). This could point to inequalities in staff awareness or to capacity to conduct the procedure.

**Figure 16: Percentage of emergency patients assessed using the GCS and other coma scales, annually by region, 2019–2023**

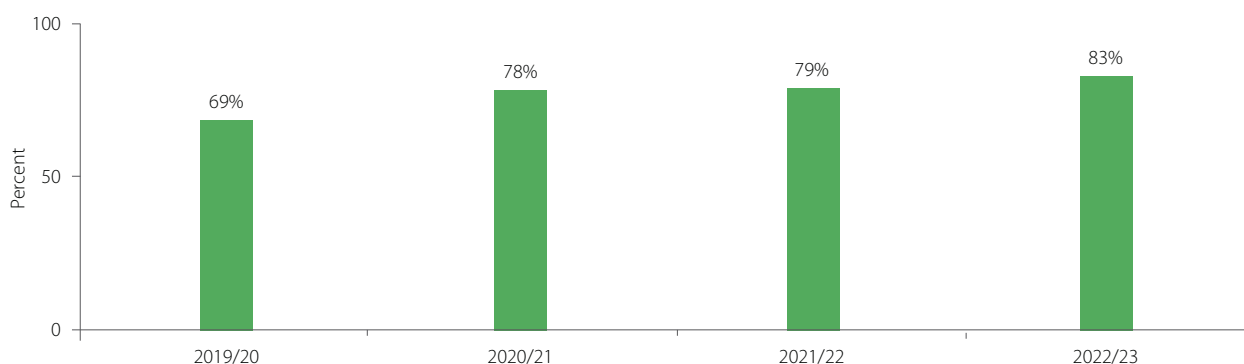


**Indicator 5: Percentage of patients accessing care within 1 hour in an emergency unit (EU).**

This indicator measures the share of emergency patients who have access to care within one hour of arriving at an EU. This is an important metric for post-crash care that indicates timeliness in attending to road traffic crash victims, which has great potential in reducing fatalities, thereby contributing to the attainment of SDG Target 3.6. The percentage of patients accessing care within one hour in the EU has gradually increased from 69 percent in 2019/20 to 83 percent in 2022/23 at the national level (Figure 17). This progress can be viewed as one of the achievements of the EMS system in Uganda.

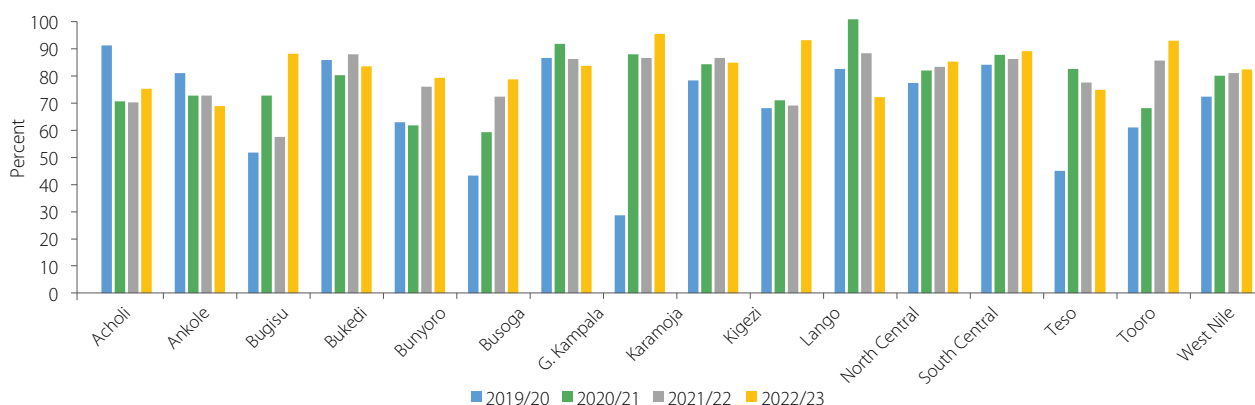
<sup>17</sup> The Glasgow Coma Scale is a clinical scale used to reliably measure a person’s level of consciousness after a brain injury.

**Figure 17: Percentage of patients accessing care within 1 hour in an EU, annually 2019–2023**



Regional analysis (Figure 18) revealed impressive achievements in all regions, above 70 percent. There were also great improvements in Karamoja, Bagisu, Busoga, and Tooro over the review period. Karamoja had the greatest improvement, from a low percentage (29%) in 2019/20 to a high percentage (95%) in 2022/23. The Greater Kampala, Teso, and North Central regions lead the nation in the percentage of patients accessing care in the EU within 1 hour.

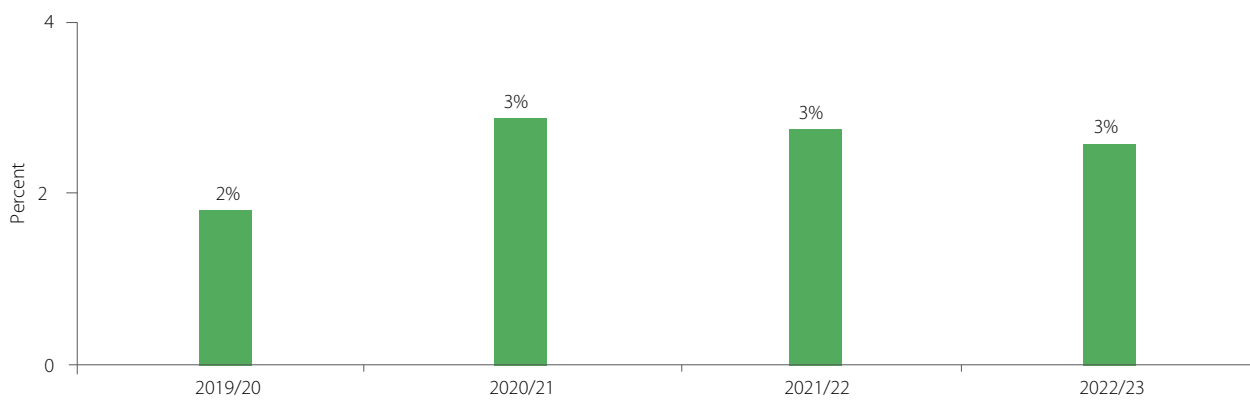
**Figure 18: Percentage of patients accessing care in the emergency unit within one hour, annually by region, 2019–2023**



**Indicator 6: Percentage of patients who develop complications within 24 hours after management.**

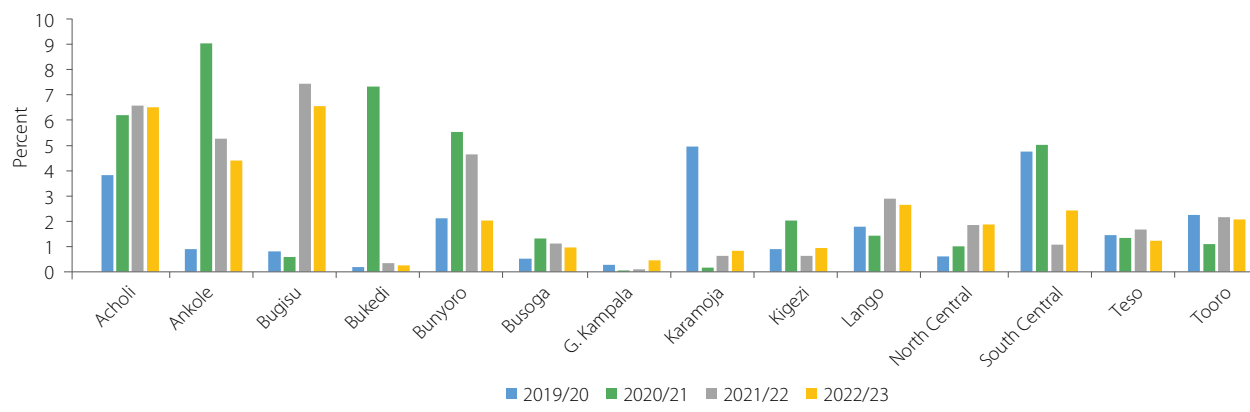
This indicator measures the share of emergency patients who develop complications within 24 hours after management. There has been an upward trend in this percentage between 2019 and 2023. This can be linked to the overcrowding of EUs by patients, considering that the number of emergency cases has been increasing. There has not been a significant increase in the capacity of EUs across the country. As noted above, only 8 out of 19 EUs in regional referral hospitals have been renovated. Also, there is a shortage of trained health personnel in health facilities. These gaps and challenges could account for the poor management of cases in EUs, resulting in the recorded increase in complications thereafter. In addition, it is possible that health facilities receive cases that are too severe for them to manage, and delayed referral may contribute to the development of complications. However, more data and further analyses are needed to confirm or refute these conjectures.

**Figure 19: Percentage of emergency patients who develop complications within 24 hours after management, annually 2019–2023**



The Ankole, Acholi, and Bugisu regions registered an increase in the proportion of patients developing complications within 24 hours of management, yet they have a smaller share of emergency cases. Karamoja and Bukedi recorded and sustained the largest reductions in share of complications after management. Greater Kampala, with a high burden of emergency cases, has a smaller share of complications than South Central. Region-specific investigations would establish the reasons for the observed individual trends.

**Figure 20: Percentage of emergency patients developing complications within 24 hours after management, annually by region, 2021–2023**

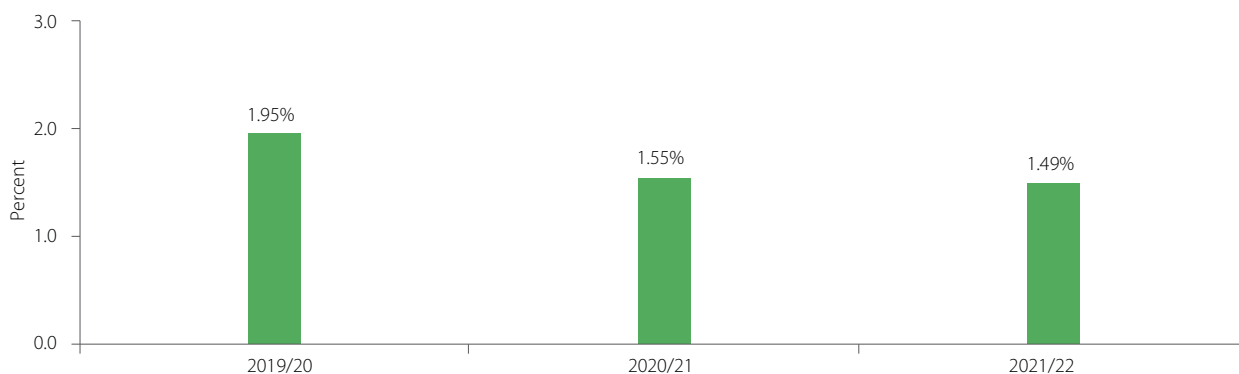


### Indicator 7: Percentage of deaths at the emergency unit (EUs)

This indicator measures the share of deaths among patients in EUs. The percentage of deaths in the EU has slightly decreased from approximately 2 percent to 1.5 percent in the review period 2019 to 2022 (Figure 21).<sup>18</sup> However, an even greater reduction in the percentage of deaths in the EU could be expected if reported challenges—such as lack of essential equipment and supplies, delays in the arrival of patients at the EU in critical condition, and staffing shortages—could be addressed.

<sup>18</sup> Data for the first quarter of the FY 2022/23 were missing from the submissions.

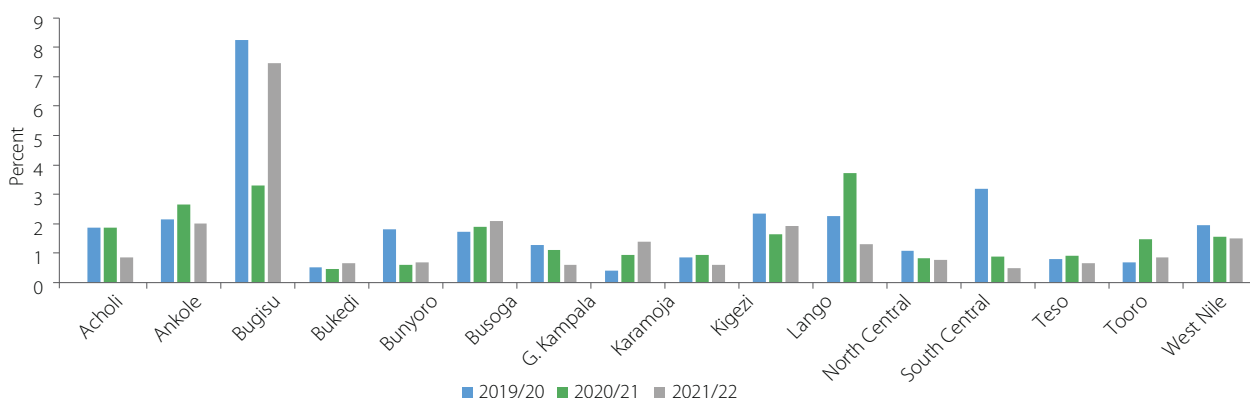
**Figure 21: Percentage of deaths among emergency unit patients, annually 2019–2022**



The analysis across regions reveals that Bukedi had the lowest percentage of deaths. This region also had the lowest rate of complication development after case management (Figure 22). The Bugisu region has consistently recorded the highest number of deaths in the EU, with a low percentage of on-scene care, a low rate of GCS assessment, a high rate of complications within 24 hours of management, and a high percentage of RTIs in emergency cases. This implies a need in Bugisu for multiple interventions to ensure that the death rate at EUs (6% death rate) drops toward that of the national average (1.7%).

The South-Central and Teso regions registered the largest drop in the percentage of deaths during this period. However, the proportion of deaths in EUs is marginally rising in the Karamoja region, while marginally dropping in Greater Kampala region.

**Figure 22: Mortality rates (percentage) among emergency unit patients, by region, annually 2019–2022**



## STATUS OF PROGRESS ON EMS POLICY PRIORITY PILLARS

The EMS strategic plan operationalizes the EMS policy, whose implementation is achieved through policy priority pillars. Eight of these policy pillars have been mapped to the EMS strategic plan and are discussed below.

### *Human Resources for EMS*

Human resources for EMS are still inadequate in terms of the number of personnel and their level of training, even though training of physicians in emergency medicine and of emergency medical technicians (EMTs) is ongoing. More efforts are still required in an integrated manner to achieve a strong EMS workforce in Uganda.

### ***Infrastructure***

The government has made important strides in procuring and deploying ambulance vehicles and boats. Since 2019, it has procured a total of 225 Type B and 10 Type C ambulances, which is close to the target of 270 ambulance vehicles and 15 ambulance boats. However, the development of EUs infrastructure in hospitals are yet to be conducted. The infrastructure of call and dispatch systems also remains weak. Only 2 of the 14 regions had functional call and dispatch communication systems. The other regions either use personal phones or do not have a defined way of activating the emergency system. In addition, although the “912” toll-free short code has been procured it has still not been mandated across all telecommunication operators, and the central coordination center is still being constructed. Also, only two out of 14 regions had well-functioning emergency units with medical responders in at least 80 percent of their facilities. Despite these advancements, there is still much to be done to improve the EMS infrastructure for EMS in Uganda.

### ***Community Education and Promotion of Emergency Care Response***

The training of community bystanders in basic first aid and the dissemination of standard training manuals for community bystander responders are lagging activities, though they have been initiated. Despite this lag, there has been some progress in integrating EMS into the training curricula of community health extension workers (CHEWs), the police, and fire brigade officers. However, further interventions are required to strengthen community education and promote emergency care responses.

### ***Emergency Referral and Disaster Response Services***

The operational plan for emergency medical response to mental illness was completed, and 10 out of 14 regional EMS coordinators were trained in the preparedness and management of major medical incidents. However, EMS mitigation plans and all-hazard hospital disaster model plans have not yet been developed. In general, emergency referrals must be strengthened as a key component of an EMS system.

### ***Emergency Care Data, Research, Monitoring, Evaluation, and Quality Improvement***

The M&E focal point for EMS has been established in the MoH, and quarterly reports on the status of EMS indicators are being published consistently. Emergency care tools, guidelines, and protocols have been developed, deployed, and tested for EMS systems. Despite this progress, more effort is required to ensure a robust M&E system for continuous quality development of Uganda’s EMS system.

### ***Financing for EMS***

The incorporation of a funding stream for EMS in MoH budget planning has significantly helped to attain some objectives. The EMS has been funded to a greater extent (68%) by development partners and to a lesser extent (32%) by the government through the MoH. At the regional level, 8 of the 14 regions included a dedicated government budget line for EMS in their local government budgets. However, no region has developed a mapped profile of financial contributors, and EMS funding has not been incorporated into private insurance schemes. In addition, the incorporation of EMS into results-based financing (RBF) and national insurance schemes, as well as the streamlining of EMS funding into vehicle third-party insurance for road traffic trauma patients, are still in the planning phase.



### *Governance and Leadership of Emergency Medical Services*

The EMS department was created in 2017 as a lead agency to foster EMS within the national healthcare system of the country. All regions have regional EMS coordinators and hospital committees that govern EMS. Standardized protocols for bystander response, dispatch, and receiving facilities have been developed. However, the development of vital governance documents, such as various EMS accreditations, agreements for PPP in EMS, and guidelines for local governments to develop and enforce bylaws and regulations that fuel EMS and impact responses, are still in the planning phase. Interagency coordination among key stakeholders is reportedly weak. Key agencies involved in EMS provision operate in silos with minimal coordination, resulting in duplicated efforts.

### *Essential Emergency Medicines and Health Supplies*

Essential emergency medicines are being incorporated into Uganda's essential medicines and health supplies list. Currently, access to essential emergency medicine and health supplies has improved. An estimated 71 percent of the regions now have at least one oxygen and EMS commodity refill system in an ambulance station. However, there are frequent stockouts of essential emergency medicines and supplies in the EUs. Only 36 percent of the regions have at least 50 percent of their facilities, with essential emergency care packages approved, as reported by the regional coordinators. The availability of essential emergency medicines and health supplies is crucial to the quality of EMS in the country.

## **EFFECTIVENESS OF THE EMS HUMAN RESOURCE (HR) TRAINING MODELS**

Uganda is undertaking training for several levels of emergency medical service HR staff, summarized in two categories: pre-hospital and hospital.

### **PRE-HOSPITAL EMS HR TRAINING MODELS**

There are several courses for pre-hospital EMS HR offered by different institutions in Uganda. These range from short courses, such as a one-day course on basic first aid, to academic programs, like a two-year-long certificate course for Emergency Medical Technicians

There are no standard training requirements for pre-hospital EMS human resources in Uganda, and information regarding who qualifies to study what course is lacking. In the absence of such regulations, short courses have been used as entry points for EMS careers. Moreover, some training institutions have designed career paths for pre-hospital EMS staff based on short courses. A distinction between EMS HR cadres is required for effective training in Uganda.

### *First/Lay Responders*

First responder training is not guided by a minimum set of requirements, and training durations vary among institutions. For instance, one institution offers a one-day basic first responder course for commercial purposes, with no evidence of a transition plan to an advanced course, while another institution offers the same for three days. There are commonalities between the curricula of the two institutions pertaining to coverage of trauma and breathing difficulties, but the three-day course obviously covers more content, such as psychiatric emergencies. The transition paths and scope of practice for individuals in both models are uncertain. The sequencing of the content of study differs between the two curricula, yet it is essential for short courses that are expected to have an impact.

### *Emergency Care Assistants (ECAs)*

The training for ECAs in Uganda is offered by St Michael Lubaga Hospital Training School. The school authorities disclosed having a pioneer class for certificate-level qualification in ECA under the approved curriculum. The class had only covered one semester of the two-year certificate course in emergency care and was recessed at the time of the interview. However, the curriculum that this pioneer class uses appears to be the same as that used for training EMT students at the certificate level in the same institution.

### *Emergency Medical Technicians (EMTs)*

From the desk review, this study identified three institutions that offer EMT training. St. Michael Lubaga Hospital Training School offers a two-year certificate course, First Aid International–Uganda offers a one-year course, and St. John Ambulance listed a five-day certificate course for EMTs. The EMT curriculum was obtained from St. Micheal Lubaga Hospital Training School and St. John Ambulance. As with the case of the first responder course, there are differences in the study periods and scope between the two courses that are geared towards the training of the same category of EMS HR. This situation underscores the need for standardization in EMS HR training in Uganda.

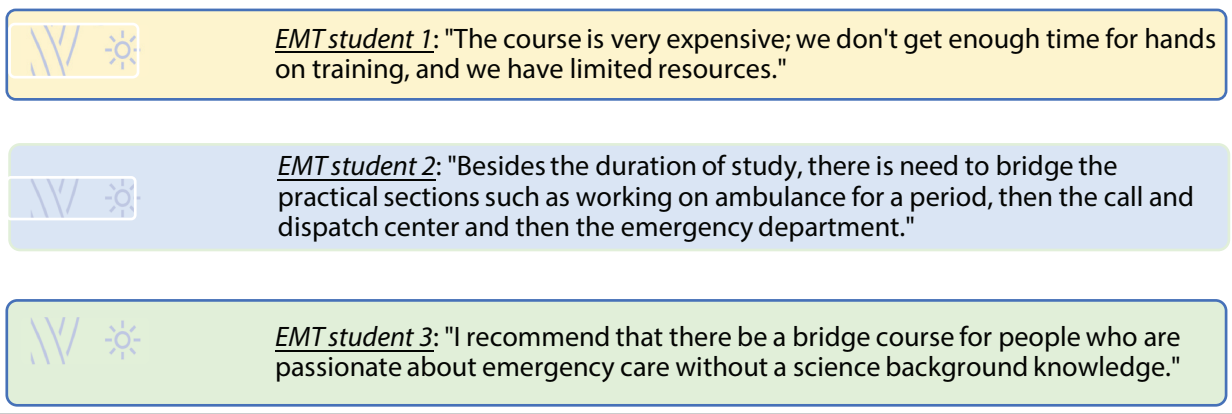
The curriculum used for training EMT students at St. Michael Lubaga Hospital Training School was developed through partnership with the Ministry of Education, MoH, and other stakeholders. Given the development process of the curriculum and its approval by the MoH, it appears to be a reasonable national benchmark against which other institutions can standardize their curricula. The curriculum focuses on pre-hospital emergency services, which is consistent with the description of EMT training in countries such as South Africa and Britain. The career map for a student starting at the certificate level and all the way to the doctorate level is also clear. Effectiveness of EMT training. To assess the effectiveness of the training model for EMTs, the study collected views from 20 EMT students registered at St. Michael Lubaga Hospital Training School, the pioneer class of the nationally approved training model (curriculum).

The trainees self-financed their training. Out of 16 students who provided information regarding the financing of their studies, 12 (81%) were self-sponsored; one student had a full scholarship, while two of them reported that they had partial scholarships. Most students (18 or 94.8%) described the overall learning environment as favorable. However, there seems to be a discrepancy between the number of hours spent on practical lessons recommended in the curriculum and those reported by students. Most students were satisfied with the mode of instruction and generally labelled the curriculum as relevant to job expectations.

Students cited the following problems: (1) insufficient time allocated for practical lessons; (2) exposure to practical lessons that are meant for other cadres at the expense of those prescribed in the EMT curricula; (3) a dearth of instructors; and (4) irregular attendance at classes by instructors. It is essential to bridge the gap between the provisions of the curriculum and actual teaching through monitoring or surveillance to safeguard the quality of the training, especially during the pilot phases of the curriculum. The major challenges reported by the students are summarized in Figure 23.

Prior to joining the course, eight (42.1%) of the students did not have any working knowledge of medical emergencies. However, 18 (94.7%) acknowledged that the course enhanced their knowledge of the domain. This indicates that learning took place and the course covered all the elements that were supposed to be taught, as indicated by most of the students (79%). The few available instructors were described as resourceful by the students during training.

**Figure 23: Major challenges in EMT training and suggestions for improvement as reported by students**



All five students who completed the course indicated that they were able to handle 31 of the 35 tasks identified in the curriculum. This implies that the training model is generally effective in delivering most of the learning outcomes from a student perspective. The finalists in the training program did express reservations regarding the implementation of some tasks. Two of the five students could not prepare budgets, and one could not procure resources and supplies for an emergency unit. One of the five students indicated they could not administer EpiPen, and another expressed reservations regarding their ability to manage a crowd in an emergency scene.

To counter a possible positive bias emanating from self-reporting of competencies, EMS leaders/supervisors from hospitals, who are EMS service providers, were asked to rate the level of competency demonstrated by EMT students on rotation. The competencies claimed by students but disputed by the EMS supervisor (see Appendix E) were preparation of emergency care reports, accounting for resources used in emergency care, handing over deceased patients from emergency care, and routine maintenance of tools and equipment in emergencies.

When asked to explain how the above-mentioned shortcomings in competencies could be overcome, two themes emerged. One points to the importance of career guidance and counselling, while the other suggests having more robust practical exposure to emergency scenes during training. A bridging course toward the main course was recommended to ensure that all the students had a similar ability to successfully undertake the training.

## HOSPITAL EMS HR TRAINING

Emergency medicine physicians and nurses are considered in this study as hospital EMS HR. Their training is currently offered by Makerere University, Mbarara University of Science and Technology (MUST), Massaka Regional Referral Hospital (affiliated with Mbarara University) and Massaka School of Comprehensive Nursing. Massaka RRH was training EMTs and nurses at the diploma level, but the course was suspended until approval is granted by the Ministry of Education.

### *Emergency Medicine Physicians*

Emergency medicine physicians are the highest cadre of EMS staff in Uganda, and only two institutions in the country offer training for this cadre at the master's level. Makerere University and Mbarara University of Science and Technology (MUST) both offer a three-year structured residency program in emergency medicine, with the cost of the full course estimated at US\$14,285 and US\$8,045, respectively. The curriculum used by Makerere University was made available to the consultants on time while that for MUST was made available after the timeline for the survey had elapsed and was therefore not used for the study.

The curriculum used for emergency physician training in Makerere was developed in partnership with the Africa Federation for Emergency Medicine (AFEM). Admittedly, the program is intense, considering the bulk of course content to be covered within a limited time frame. The rotations of emergency medicine residents outside the emergency department were cited by students and instructors as a drawback to learning. This drawback was attributed to the lack of specialists, facilities, and medical supplies in the EUs of public hospitals. Overall, all students reacted positively, as they expressed their satisfaction with both residency programs. Half the students had prior experience working in the EU before enrolling in the residency program, and all unanimously indicated that the program was relevant to the expected duties of emergency medicine physicians.

Students and instructors cited inadequate instructional materials for learning as envisaged in the curriculum. Further, the financing model of the training does not appear to be sustainable given that Uganda is still building its emergency medicine physicians' workforce. There are few scholarships, with 56 percent of residents self-sponsoring their studies. In the mid-term review, the scholarships target was not met, which explains the lack of financing for students. The students reported an improved ability to perform tasks, as expected in the curricula learning outcomes. Some difficult areas of learning were highlighted, such as pathology and pharmacology, infectious diseases, anesthesia, and imaging, including Magnetic Resonance Imaging (MRI). Some of the reasons provided for these difficulties were the lack of guidance by EM specialists with specific reference to pathology and pharmacology. Another shortcoming cited in the delivery of the course was too little focus on clinical teaching, with anatomy cited as an example. Residents also cited a lack of resources at the hospital, leading to missed opportunities to engage with practical aspects of emergency imaging, such as MRI.

When asked for their opinion regarding the adequacy of their self-reported apprenticeship duration, one acknowledged that they did not meet the basic minimum. Another cited a bias of the program toward non-clinical aspects as the reason for the unsatisfactory hours of apprenticeship. It is important to review the provisions of apprenticeship to ensure that they are reasonable and compatible with the entire residency program, given the current resources and duration of the program.

Lastly, one resident attributed difficulty in learning some subjects, such as pathology and pharmacology, to the endemic lack of emergency medicine specialists, which makes the emergency medicine residents take these courses under the guidance of non-specialists. A separate resident indicated that some EUs in hospital settings were controlled by non-emergency medical specialists. Although these limitations are not drawn from the entire sample of residents, they could serve as a pointer to areas where effective learning may not occur and need to be addressed alongside identified recommendations.

### ***Basic Emergency Care Training***

The Basic Emergency Care (BEC) course was implemented by the MoH for clinical staff to improve the critical mass of emergency care providers. The five-day course has been offered in Uganda since 2015 and uses a comprehensive package of materials for learners with clinical qualifications (nurses, clinical officers, and doctors). All respondents reacted positively to the training and generally indicated that the course was essential and relevant to their work in handling medical emergencies. These results are consistent with those of Friedman et al. (2022), who found that a BEC course can increase the knowledge and self-efficacy of emergency medical staff in Uganda.

General satisfaction was reported with the instructors' delivery of content and the conduct of practical demonstration sessions. The trainees (80%) also reported learning new concepts of medical emergencies, and most (92.3%) reported having gained confidence in addressing medical emergencies at work. Other models of delivering the BEC course have been previously assessed in Uganda, such as the use of open education resources in blended short-training models (Friedman et al., 2022).

Friedman et al. (2022) warn that although blended training is potentially useful in increasing emergency medicine knowledge of health workers, the retention of that knowledge differs between cadres (e.g., nurses and doctors). It is important to establish separate and customized short-term training models for lower-ranking cadres, such as nurses.

## **ASSESSMENT OF THE COST OF SCALING UP EMS INVESTMENTS**

### **COSTING OF THE EMS**

The EMS plan was initially estimated to cost US\$164.34 million over a period of five years. At mid-term, the plan would cost US\$112.28 million. A review of reports showed that about US\$57.7 million was raised for EMS services, representing 45 percent of the resource requirements. A large proportion of the resources were utilized for pre-hospital investments, which included the procurement of ambulances, ambulance operations, training of health and community workers in basic and advanced life support skills, and functionalizing call and dispatch centers. Pre-hospital interventions accounted for more than 65 percent of the available resources.

Overall, contributions from GoU were estimated at US\$18.7 million while the development partners' contributions were around US\$39.1 million. However, it should be noted that GoU contributions to the EMS programs were much higher than the current value, given the fact that the costs of facility-based human resources and the health supplies utilized are integrated into service provision, yet one cannot easily disaggregate the proportion of inputs related to EMS care. These resources were not included in the EMS resource analysis.

### ***Resource Estimates for the Revised EMS Strategies***

The full cost of the plan would require US\$288.5 million over five years. The three later years of the plan (2022/23–2024/25) would have required an estimated US\$132.8 million for full EMS implementation. The revised costing was cognizant of the fact that some of the interventions were rescheduled, as their implementation was affected partly by the COVID-19 pandemic and partly due to resource constraints. Considering this, an estimated US\$155.6 million would be required for the implementation of the remaining strategic plan period (2023/24 to 2024/25).

The resources estimate for the remaining period of the plan shows an allocation of 66 percent of resources toward human resource needs and 16 percent of resources allocated to closing the gap for ambulances, which is estimated at 262 Type B ambulances, five helicopters, and six marine ambulance boats. Approximately 6 percent of the resources were allocated to infrastructure developments at the regional referrals, general hospitals, and selected high-volume level II health centers along the major highways.

Considering resource constraints, inadequate infrastructure, and human resource shortfalls, a set of scenarios was developed with varying alternative input mixes. This is critical for guiding policy and decision-making processes. Detailed scenarios are discussed in the following sections.

## **FINANCING MECHANISMS FOR THE EMS**

### ***GoU Support at the Central and Decentralized Levels***

The support from the GoU was about 32 percent, notwithstanding that EMS services may have been underestimated at the facility and subnational levels. The contribution of development partners to the EMS program was estimated to be 68 percent of the total resources. At the time of the review, contributions from the private sector were not fully quantified and therefore were not reflected in the analysis.

The GoU support to Uganda Red Cross emergency medical services. The Uganda Red Cross was one of the active stakeholders in the provision of emergency medical services in the country and received a total of Ugx 16.3 billion for emergency operations during the period 2020/21 to 2022/23. This supported the training of health workers and community volunteers in emergency medicine. GoU funding was allocated to the procurement and distribution of ambulances and related accessories, operational cost support for ambulances, establishment and operating of the EMS call center and regional ambulance hubs, and training of EMS cadres. Table 3 shows the indicative allocation from the GoU for the period under review.

GoU support to the Uganda Police Forces. The Uganda Police Force runs 29 emergency service centers in 24 police regions. Emergency centers have health facilities and ambulances. During the period under review, emergency services were funded with Ugx 2.193 billion as GoU support to the police force medical services. These funds were mostly utilized in ambulance operations and in the training of health workers.

### ***Support from Development Partners***

Support from development partners has been provided through grants, aid, and loans, which have been channelled through budget support and project-based funding. In addition, the partners have extended support in the event of a humanitarian crisis. Notable among these are the COVID-19 pandemic of 2020, the EBOLA outbreak in the Mubenda district in 2022, and floods in western Uganda in 2020.

### *The Private Sector*

The private sector has been a key player in EMS services, particularly ambulatory services. As of July 2022, approximately 177 ambulances are owned and managed by private individuals and health facilities. Apart from the private not-for-profit facility ambulances, the private sector players were operated on a purely commercial basis, and as such, the extent to which EMS operations were in practice could not be fully ascertained.

### **FINANCIAL PROJECTION FOR HUMAN RESOURCES AND INFRASTRUCTURE**

Financial projections for the various scenarios were constructed based on what could feasibly be undertaken within a restricted resource envelope.

Currently, only about 11 percent of emergency victims arrive at health facilities in an ambulance, which is an indicator of the scope and scale of EMS functionality. This low coverage is partly attributed to a lack of awareness among the community, inadequate ambulances, and related human resources. (Table 4 lists the projected number of health facilities that would be affected under each scenario.)

#### *Status Quo*

The status quo relates to the current situation, in which only 11 percent of the accident victims arrive at the facilities in an ambulance. Currently, emergency units are present at one national and one regional hospital, while just 25 percent (or less) of general hospitals and level IV health centers have access to an ambulance. This informed the status-quo scenario.

#### *Scenario 1*

The scale-up to attain 30 percent coverage was defined to include equipping and operationalizing health facilities to cover at least 30 percent of the general hospitals and 30 percent of high-volume level IV health centers, in addition to the 16 regional referral hospitals (RRHs).

#### *Scenario 2*

This scenario envisages a scale-up to attain 50 percent coverage of the private not-for-profit hospitals and 50 percent of level IV health centers, in addition to the 16 regional referral and the 65 general hospitals.

#### *Scenario 3*

Scale up to 75 percent of the level IV health centers and selected high-volume level III health centers in addition to all regional referral hospitals and general hospitals.

**Table 3: Projected number of health facilities targeted under various scenarios**

Level	Status Quo	Scenario 1	Scenario 2	Scenario 3
		30%	50%	75%
National hospitals	5	5	5	5
Regional referral hospitals	16	16	16	16
General hospitals	50	65	100	135
Level IV health centers	20	61	102	152
<b>Totals</b>	<b>91</b>	<b>147</b>	<b>223</b>	<b>308</b>

## Resource Estimates

An estimated US\$105.3 million would be needed for the implementation of Scenario 1, which targeted a scale-up to 30 percent. Under this scenario, resources would increase from US\$33.3 million in the third year of the plan to US\$46.85 million in the fifth year. The major drivers of cost are human resources and the need to close the ambulance gap. This represents an average annual growth of 8 percent in resources.

Scenario 2, with its 50 percent targets, would require a total of US\$ 135.7 million with US\$ 42.9 million in the third year, growing to US\$46.8 million in the fifth year of the plan, with an annual average growth of 9.5 percent in resources.

Scenario 3, with a 75 percent target, would require a total of US\$ 164.09 million for three years of implementation, translating into a 23 percent growth in resources over the projected period.

A full-scale scenario was developed assuming that resources would be mobilized to meet EMS needs. This scenario was included to show the extent of the gaps that need to be filled. This scenario was estimated to cost US\$196.89 million over the three years of implementation. This translates into a 44 percent growth in resources.

**Table 4: Resource estimates under various scenarios, 2022/23–2024/25 (in US\$1,000s)**

	2022/23	2023/24	2024/25	Total	Average growth
Scenario 1	33,379	35,782	36,144	105,305	8.0%
Scenario 2	42,967	45,934	46,858	135,759	9.5%
Scenario 3	48,930	54,983	60,184	164,097	23.0%
Full Coverage	53,851	65,429	77,611	196,891	44.1%

## BUDGET IMPACT ANALYSIS

The results from the scenario estimates show that each scenario would impact the current sector allocation in varying proportions. Scenario 1 would result in a nominal increase in the budget by 5%, whereas scenarios 2 and 3 would impact the budget allocation by an increase of 6 percent and 8 percent, respectively, over the period of the EMS strategic plan.

**Table 5: Projected incremental GoU budget allocations, by scenario, FY 2021/22 to FY 2023/24 (in US\$1,000s)**

Years	Projected GoU Allocations	Scenario 1 Projection	Scenario 2 projection	Scenario 3 projections
FY 2021/22	691,233			
FY 2022/23	725,795	759,173	768,762	774,725
FY 2023/24	762,084	797,867	808,018	817,067
FY 2024/25	800,188	836,333	847,047	860,373
Percent change	-	5%	6%	8%



The budget impacts above are mitigated by the following:

- Increasing program integration, which will be the key to improving both the operational and financial efficiencies associated with the EMS and other programs;

Improving efficiency in program implementation and resource utilization to minimize duplications of services and, hence, optimal resource utilization;

Improvements in the supply chain management system across health supplies, as this is a key source of resource waste and inefficiency;

Leadership and governance, being critical for translating specific, clear, and coordinated support for efficiency improvement initiatives at a systemwide level; and

Periodic assessments using tools such as the Value for Money assessments and cost- benefit analysis, among others, which will be key in identifying the input mix that would provide maximum outputs for any given set of inputs. The perceived increasing demand for services may not necessarily translate into a proportional increase in resources.

## FUNDING GAP ANALYSIS

A funding gap analysis was conducted based on the revised EMS strategic plan cost estimates. These resource estimates match the projected commitments from available sources. The resulting funding gap widens continuously, because the projected commitments could not be ascertained fully by the time of the review. Commitments beyond the year 2022–2023 were based on an informed guess of the resource trends of the recent past. A revised costing of the EMS reveals that implementing the strategic plan totals US\$288.5 million for the five years against an earlier estimate of US\$164 million. The remaining two years of the plan will require US\$155.7 million consisting of US\$66.6 million and US\$89 million for the financial years 2023/24 and 2024/25, respectively.

**Table 6: Funding gap analysis for the EMS strategic plan, by funding source and year, 2020–2025 (in US\$ 1,000s)**

	2020 -2021	2021 -2022	2022 -2023	2023 -2024	2024 -2025	Totals
Resource estimates	37,733	41,404	53,706	66,595	89,084	288,521.8
GoU	12,032	4,605	6,293	4,979	5,040	32,949.2
Development partners	16,753	16,559	13,324	13,338	13,352	73,326.8
Private sector	1,203	1,263	1,327	1,393	1,462	6,648.4
Projected commitments	29,988	22,427	20,944	19,710	19,855	112,924.4
Funding (gap)/surplus	(7,744.35)	(18,977.09)	(32,761.97)	(46,885.22)	(69,228.71)	(175,597.3)

The funding gap for the revised plan would increase from US\$7.7 million in the first year to about US\$69.2 million in the last year, resulting in a cumulative gap of US\$175.59 million.

## 4. DISCUSSION AND CONCLUSION

The results are discussed in this section, and conclusions are reached in line with the specific objectives of the study. Those objectives were to conduct a mid-term review of the EMS strategic plan, assess the effectiveness of the HR training models, and assess the cost of scaling up EMS investments.

### MID-TERM REVIEW OF THE EMS STRATEGIC PLAN

There has been impressive but limited progress toward achieving the targets set for the implementation of planned activities during the first half of the EMS Strategic Plan. Most activities were initiated, but only 13 percent were completed during the study period. The mid-term period comprises a formative stage of the EMS system, characterized by challenges ranging from coordination and human resource development to legal issues.

Increasing access to on-scene emergency medical care by 50 percent (Objective 1) is a critical component that could mean the difference between life and death for victims in emergency situations. However, the results (Figure 11) indicate that the average share of emergency patients who received care at the emergency scene within the past three years (56%) was lower than that during the baseline year (59%). Rather than increasing this percentage by 50%, as anticipated in the strategic plan, a decreasing trend is observed. This could be partly attributed to the impact of the COVID 19 pandemic on the utilization of emergency medical services (Guo et al., 2020). Additionally, the availability and accessibility of emergency care facilities may have contributed to the reduced percentage. Furthermore, the weak health workforce, inadequate numbers of Type A and Type B ambulances, poor infrastructure of call and dispatch centers, and funding gaps for EMS could all be contributing factors to the observed results. An integrated approach is required to develop strategies to increase the proportion of patients receiving care at the scene.

The strategic objective of increasing the proportion of emergency patients receiving an ambulance response within one hour by 50 percent (Objective 2) is closely linked to accessing on-scene care. In the absence of an indicator tracking the proportion of emergency patients receiving ambulance response within one hour, a proxy such as the percentage of emergency patients who arrive at the health facility using an ambulance could provide an indication of the trend. Similar declining trends were observed for both objectives, contrary to the target of increasing the percentage by 50 percent. This is of great concern because the implemented activities did not produce the anticipated results. Despite the implementation of planned activities to attain this objective, such as the purchase of new ambulances, training of existing ambulance crew, and development of protocols, a slight decrease in the percentage of emergency cases arriving at the health facility using an ambulance was observed (Figure 13) from 12 percent in the baseline year (2019/2020) to 10 percent within the last three years. This result could be explained by the lag in the implementation of complementary activities, such as the operationalization of emergency and ambulance communication facilities, which need to be accelerated. About 50 percent of the planned activities toward attaining this objective had started, but their implementation was lagging due to financial constraints and other challenges linked to poor infrastructure and inadequate human resources. This could potentially hinder the utilization of ambulances in emergencies.

Progress toward Objective 3—increasing the availability of quality EMS hospital care in 14 regional referral hospitals, 147 district hospitals, and 193 level IV health centers—was generally slow. The highest delay was recorded for activities pertaining to the establishment or renovation of emergency units in health facilities. This suggests a lack of infrastructure improvement, which can have significant implications for the quality of care provided in these facilities (Mousavi et al., 2020). Financial and resource limitations were cited as the underlying factors for the lag in related activities. The lack of funding and resources can impede the development of necessary infrastructure improvements and establishment of specialized emergency units. Prioritizing targets based on facilities along major highways, increasing investment in infrastructure improvement, and expediting the establishment of regional trauma centers can help improve the availability of high-quality EMS hospital care.

Objective 4—continuously improving and sustaining the operations of the national EMS system—was anchored to six strategies. These include building strong EMS leadership and governance structures, building capacity for major incidents and disaster management, developing and empowering an EMS legal and regulatory framework, quality improvement and operational research, financing for emergency care, and EMS monitoring and evaluation. As with the other objectives, 65 percent of the planned activities had either not started or had started but were lagging in implementation. The least progress was recorded in activities concerning EMS financing, with 80 percent of these activities yet to start or lag in implementation. This highlights the significant challenge in securing adequate financial resources for EMS systems. The lack of clarity regarding alternative financing strategies outside traditional government and development partner sources further exacerbates this issue. Without sufficient financial resources, it is difficult to sustain and improve the operations of the EMS system, hindering its ability to provide timely and effective emergency medical care.

To address this situation, it is crucial to explore and develop alternative financing strategies for EMS. This may involve seeking partnerships with private sector entities, engaging in public-private collaborations, and exploring innovative funding mechanisms such as insurance schemes or user fees. By diversifying sources of funding, the EMS system can become less reliant on limited government and development partner sources, thereby enhancing its financial sustainability. In addition, a systemwide approach for improving the EMS should be envisaged. This involves considering the interactions and interdependencies between the different components of the system and developing strategies that optimize the overall performance of the EMS system. The absence of an EMS act in Uganda creates a gap in the legal framework for EMS, which could be a bottleneck in the implementation of EMS-related activities. The lack of a specific legislative framework for EMS may hinder the establishment of clear guidelines, regulations, and standards for emergency medical services in the country. This could lead to challenges in coordinating and regulating EMS activities and in ensuring the quality and safety of emergency care.

## **EFFECTIVENESS OF THE EMS HR TRAINING MODELS**

There are established training models for the EMS workforce in Uganda, and their level of sophistication follows the level of specialization. However, a national standard for training bystanders is yet to be developed, and training institutions are using self-made materials. This lack of a standardized training model for bystanders may result in varying skill levels among responders who have undergone formal training. However, there are effective, established, and approved training models for emergency physicians and EMTs. In-service training through short courses has been implemented and serves as a backup measure to build an EMS workforce. It provides targeted and focused training to address specific skill gaps and enhance the knowledge and competencies of

the EMS staff. However, emerging patterns of attrition among trained health workers are key challenges that can have detrimental effects on the EMS workforce. Providing opportunities for professional development and creating an enabling environment for career growth are proven measures to address the factors contributing to attrition (Verma et al., 2016).

The study also highlights the need for close monitoring of the implementation of training models to ensure that training follows the prescribed and approved model, as there were a few instances of deviation from the same that could compromise the quality. It also emphasizes the importance of developing a minimum training standard for first responders in Uganda to sharpen their skills. Additionally, there is a need for a clear strategy to retain graduating emergency physicians in the teaching and practice of EMS to address the issue of weak human resources. By implementing effective strategies for training, retention, and career development, the EMS system can enhance the capacity to provide high-quality emergency medical care and improve patient outcomes.

### **COST OF SCALING UP EMS INVESTMENTS**

The cost of EMS services in Uganda during the first period of the strategic plan was largely provided by the development partners, accounting for 68 percent of the funding. However, with the operationalization of EMS at the regional referral hospital level, the GoU has increasingly provided funds. The need for adequate funding to support EMS operations, including the availability of human resources, equipment, and infrastructure, cannot be overemphasized. Additional funding is required to meet the operational needs of EMS in Uganda. In addition to government funding, there is a need to engage the private sector to improve its operations and meet EMS standards, particularly for pre-hospital operations (Akulayi et al., 2017). It is important to note that financing EMS services in Uganda still relies heavily on external donors. This finding highlights the need for sustainable and diversified funding sources to ensure the long-term viability of EMS services.

The budget impact analysis of scaling up EMS in Uganda indicates that additional resources are required, which would have implications for the budget. The increase in the budget ranges from 5 percent to 8 percent over the current levels, depending on the adopted scale-up scenario. To accommodate this increase, there is a need for various measures, such as increasing program integration, improving program efficiency, and enhancing the supply chain management system across health supplies. These measures are crucial for reducing resource wastage and inefficiency. Additionally, improvements in leadership and governance across the EMS spectrum are necessary to ensure its effective implementation.

As discussed above, the revised costing of the EMS strategic plan in Uganda reveals that the total cost for the five years is estimated to be US\$288.5 million. The remaining two years of the plan would require US\$155.7 million, with US\$66.6 million and US\$89 million allocated for the financial years 2023/24 and 2024/25, respectively. However, there is a wide financing gap in the last three years of implementing the plan, with only 45 percent of the required resources raised, most of that contributed by development partners.

Various measures can be considered to address the financing gap and ensure the successful implementation of the strategic plan. These include diverting funds from existing health funds or introducing nominal fees for users (Bhandari & Yadav, 2020). These measures could help generate the necessary resources to bridge the financing gap and support the implementation of the EMS Strategic Plan. Collaborating with development partners and seeking more external funding opportunities could also be explored to secure required resources.

## 5. RECOMMENDATIONS

The report makes three levels of 14 recommendations to the Ministry of Health: short-term, medium-term, and long-term.

### SHORT-TERM RECOMMENDATIONS

#### *Strengthen the legal and regulatory framework for EMS.*

Prioritize the development of laws and/or regulations that will make it easier to access EMS, such as the EMS Act that mandates system establishment, that is, the Short Code “912” for all telecom operators, and enactment of the Good Samaritan Law to complement ongoing efforts of training bystanders in Uganda. This action can be led by the MoH and the Ministry of Works and Transport (MoWT) and be supported by a partner, such as the Uganda Red Cross Society.

#### *Ensure timely collection of data to improve the EMS M&E system.*

Collect and synthesize data in a timely manner to support and drive performance improvement, decision-making, and accountability. Establishing data collection protocols that clearly outline what data should be collected, when, and by whom. Ensure that data collection is consistent across all EMS providers and agencies. Electronic data entry systems should be implemented in ambulances and health facilities to facilitate efficiency and effectiveness at the service delivery points. Conduct comprehensive training of health workers on data collection procedures, including the use of electronic data entry systems. Explore the use of an electronic dashboard to monitor deliverables of the strategic plan. This can be led by the MoH and Uganda Police Force (traffic police), the MoWT, and the Ministry of Works and Environment (MoWE).

#### *Refine the monitoring and evaluation framework for the EMS strategy.*

Sequence activities, considering activities that require preceding conditions to avoid unnecessary delays in the next implementation phase of the Strategic Plan. In addition, indicators of planned activities need to be clearly defined for ease of monitoring and evaluation at the end of the plan.

#### *Reinforce the deployment of EMS human resources.*

Through the MoH and health professional councils, develop, approve, and implement the EMS human resource scheme of services. This illustrates all EMS job cadres and associated salaries, duties of the cadres, ways to enter each cadre, and ways to advance within and beyond the cadre. Therefore, in-service training should be extended to all regions. Conduct a comprehensive needs assessment of the EMS workforce to determine current and future workforce requirements based on the population, geography, and emergency call volume. The MoH, Ministry of Education and Sports (MoES), and academic institutions should collaborate to include EMS training in their programs. Use the media to raise awareness about EMS career opportunities. Make scholarships tenured on bonding terms to ensure the retention of trained physicians. Additionally, opportunities for online and blended learning options should be encouraged to make EMS training more accessible to all interested parties (Friedman et al., 2022). Led by the MoH and the Health Service Commission, key EMS providers in pre-hospital

and hospital settings who are volunteers should be placed on a payroll to enhance quality services offered to the population. This would require a dedicated budget or increased EMS financing at various call centers. Increase dedicated revenue stream for EMS.

Increase financing for EMS to fund and sustain EMS infrastructure development. This can be achieved through the development and implementation of a comprehensive resource mobilization strategy for EMS as a basis for engaging development and private sector investment in EMS, led by the MoH and supported by WHO and other development partners. The MoH should formalize public-private partnerships (PPPs) by developing models for program implementation, designing results-based financing models for EMS, and developing estimates of third-party insurance resources.

***Improve EMS communication (call and dispatch system).***

Install tracking and communication system features in all ambulances to facilitate transfers and fleet management. Mandate and operationalize the “912” short code and support sustainable financing models for services in line with telecom regulations. These actions should be led by the MoH in collaboration with the Uganda Communication Commission (UCC) and telecom companies. Employ dedicated staff for call and dispatch centers and use modern technology, such as a computer-aided dispatch CAD system with automated vehicle location technology, to precisely detect and dispatch ambulances. This presupposes that addresses should be geo-coded.

## **MEDIUM-TERM RECOMMENDATIONS**

***Increase the knowledge and skills of bystanders.***

Launch public awareness campaigns to educate the community on the relevance of bystander intervention during emergencies. This can be led by the MoH, involving the Ministry of Labor, Gender, and Social Development (MoHLGSD), civil society organizations, and nongovernmental organizations. Build knowledge and skills of the community (bystanders) regarding the recognition of medical emergencies, first aid, and EMS activation. The MoH should develop a standardized training manual to guide EMS partners in training bystanders at the grassroots level (Nicholson et al. 2017). Guidelines should also be developed for the recruitment and training of individuals and groups who often encounter emergencies in their communities and work, such as public transportation operators, police, fire officers, and community volunteers, to enhance the distribution of first responders on the scene for EMS. The MoH should embark on public campaigns to build confidence in the government and partner efforts towards EMS.

***Mainstream accountability in the EMS system.***

The MoH HMIS division should completely integrate all EMS indicators into the DHIS2 and enable visualization tools to capture regional inequalities. In addition, the MoH and Ministry of Internal Affairs' Uganda Police Force should integrate EMS into other national data frameworks, such as linking police crash data systems to hospital EMS, to ensure the completeness of trauma records to adequately track fatalities from RTIs. The M&E function should be strengthened beyond the preliminary targets for office setup (data quality, capacity building, quality assurance, and equipment). The MoH should adopt GIS-based platforms to monitor progress and resource allocation to increase accountability for the results. Bolster research capacity through formal MoUs with research institutions.

*Develop greater coordination among key EMS stakeholders.*

Improve interagency coordination among EMS stakeholders, including ministries, departments, agencies, academia, civil society, and the private sector. This could be achieved by establishing a dedicated interagency coordination structure led by the MoH or raised to the Office of the Prime Minister (OPM) with representatives from each sector to serve as a focal point for communication and collaboration. The roles, responsibilities, and mandates of each sector representative of the structure should be clearly defined in the established MoUs.

*Operationalize the national health insurance schemes.*

This should be approved by the Cabinet and Parliament and implemented by the MoH to facilitate a Pooled Resource Mechanism.

*Integrate the EMS program with other interventions in the health sector.*

This should be done by the MoH EMS and Planning departments to take advantage of synergies and maximize resource utilization.

**LONG-TERM RECOMMENDATIONS**

The MoH Permanent Secretary's office should engage strategic partners in providing additional resources, specifically for investments in infrastructure and other capital developments that would enhance EMS operations. Also, it should sequence infrastructure development based on the burden of emergency cases to optimize limited financial resources.

The MoH should establish long-term partnerships with established institutions abroad to facilitate skill exchange and development.

Finally, the MoH should integrate the EMS protocols into Uganda's clinical guidelines.

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## APPENDICES

## Appendix A: Documents Reviewed

- The EMS Policy
- The EMS Strategic Plan (2020/21–24/25)
- The MoH Strategic Plan
- The National Development Plan
- EMS Progress Monitoring (quarterly and annual) Reports
- Harmonized Health Facility Assessment Final Report of 2022
- DHIS2 data reports
- Annual Health Sector Performance Reports 2020/2021, 2021/2022
- Training Curricula for EMS courses
- Training-of-trainer Training Reports
- Disaster Response Reports (Mbale, Mt Elgon and Teso regions)
- National Survey on State of EMS in Uganda report (2018)
- EMS Funding Partners Compilation Report

## Appendix B: Sources of Qualitative Data

Level	Question category	Respondent
Pre-hospital	About Call and dispatch system, Challenges, Progress, Recommendations	Regional EMS Coordinator District EMS focal point
	Care at scene: Challenges, Progress, Recommendations	
	Transport, state of resources: Needs, Challenges, Recommendations	
Facility	Arrival of emergency patients: Reasons for not using ambulance	EMS Commissioner Regional EMS coordinator Regional Referral Hospital Director EU coordinator
	Handover from ambulance staff	
	State of resources	
Management	Governance issues	EMS Commissioner Regional EMS coordinator
	Data management	
Training	Curriculum, Challenges, Recommendations	Deans, heads of departments
	Effectiveness of training methods	Alumni and current students

## Appendix C: Quantitative Output Indicators (18)

Indicator	Data needed
<b>All data were collected from DHIS via the quarterly M&amp;E report</b>	
Proportion of patients that receive care at the scene of emergency	# of emergency patients who receive care at the scene
	Total number of emergency patients
Percentage of emergency cases that arrive at the facility using an ambulance by injury type	Number of patients by injury type who arrive at current facility using an ambulance
	Total number of patients by injury type who arrive at current facility using any means of transport
Average waiting time to receive care in hours	Total waiting time taken for emergency patient to receive care by triage
	Total number of patients that receive care by triage
Percentage of patients with head, skull, face, or spine injury who had an assessment using GCS Score	Number of patients who had GCS score with head, skull, face or spine injuries
	Total number of patients with head, skull, face, or spine injuries
% of cases accessing care within 1 hour in an emergency unit	Number of cases that receive care within 1 hour in the emergency unit
	Total number of cases that were received in the emergency unit
Number of complications after management/care	Total number of patients who develop complications after care
	Total number of patients managed
% of patients with initial RR with <8 in adults that receive breathing intervention	Number of adult patients with initial RR<8 that receive breathing intervention
	Total number of adult patients with RR<8
IV Treatment given to patients with shock	Number of pts presented with shock given fluids
	Total number of pts presented with shock
Proportion of patients with hypoxemia administered with oxygen.	Number of patients presented with Hypoxemia, given oxygen
	Total number of patients presented with Hypoxemia
External haemorrhage control for patients with open wounds	Number of patients with external Hemorrhages controlled
	Number of patients with external Haemorrhages
Average length of stay	Total number of hours in ED
	Total number of patients admitted

Indicator	Data needed
Severity-adjusted survival (validated score) to 24 hours among those severely injured in RTIs	Number of patients with severe RTIs that survived 24 hrs (Triage Category-Red, Mechanism-RTI, survival 24 hrs)
	Total number of patients with Severe RTIs (Triage Category-Red, RTI)
Emergency unit LOS	Number of patients LOS<24hrs at ED Arrival time & Date, Disposition
	Total number of patients at ED
Annual turnover rate for EMS providers?	For each level, the count of staff presents in year 1 that are absent in year 2
	For each level, the total number of staff present in Year 1
Percentage of patients who meet triage criteria for transfer to Emergency Department that are transferred to the Emergency Department	Number of patients who meet field triage criteria for transfer by type who are transferred from scene to hospital
	Patients meeting field triage criteria for emergency transfer in quarter
Mean emergency response interval	Number of ambulance dispatch trips that meet the set standard for call to arrival at scene for out-of-hospital care
	Total number of ambulance dispatch trips
Ambulance vehicle availability	Number of days the vehicle spends in maintenance each month according to logbook data
	Total number of days in time period of interest
Vehicle utilization	Number of days a vehicle is used in a month
	Number of days vehicle is available

## Appendix D: Matrix for Assessing the Training Models

Kirkpatrick's level of evaluation	Key questions/variables	Possible source of data or category of respondents	Data collection method
Level 1: Reaction to the training  Was the learning model a facilitator or an impediment for learning?	To what extent was the training module relevant to the participants' needs?	Sampled students (respondents)	KIIs
		Training curriculum	Document review
	How did the teaching/learning approach influence participants' learning during the training?  Probes: Balance between theory sessions and practical sessions; Relevance of practical sessions to your work	Sampled students (respondents)	- KIIs - Likert type survey questions
	- What were the strengths of the training? - What were the challenges encountered by the participants during the training	Sampled students (respondents)	- KIIs
Level 2: Learning from the training change in the knowledge and attitude of participants	- Reported change in knowledge and attitude of participants for understanding the content of training modules - Reported change in knowledge and attitude of participants ..... - Reported change in knowledge and attitude of participants for decision making that does not necessarily reflect the past ways of doing things - Reported change in knowledge and attitude of participants to innovate and ensure increased productivity and creativity	Sampled students (respondents)	- KIIs - Likert type survey questions
		EMS trainers/instructors	- KIIs
		Post trained EMS providers	- KIIs
Level 3: Behavior change (micro level) as a result of the training	- To what extent have the participants conducted training/mentoring initiatives to increase understanding of the EMS delivery? - To what extent have the participants set up processes to transform policy frameworks into operational models? - To what extent have the participants instituted changes in decision making processes in the EMS department?	Sampled students (respondents)	- KIIs - Semi-structured survey questions
		Relevant policy and decision makers	- KIIs
Level 4: Observed Results: What changes have occurred at the EMS system?	- Is there evidence of increased understanding of the delivery of EMS. - Is there evidence of changes in decision making processes as a result of the EMS HR' training? - Is there evidence of innovative initiatives in key priority areas like leadership and governance, HR for EMS, information management and research aimed at increasing productivity and creativity in the entire EMS system?	Sampled students (respondents)	- KIIs - Semi-structured survey questions
		Relevant policy and decision makers	- KIIs

## Appendix E: Student Self-reported Competencies vs. Supervisor Comment

Competence as stated in the curriculum (for five students)	Student self-rating			Supervisor rating of competence level from observations in facility during rotations		
	YES	No	Not sure	St Michael Lubaga Hospital School	St. John Ambulance (EMS provider)	Jinja regional referral hospitals
I can comfortably fill in patient ambulance forms	5	0	0	Expected level	Expected level	Expected level
I can comfortably fill in referral notes	5	0	0	Expected level	Requires further development	Expected Level
I can comfortably prepare emergency care reports	5	0	0	Requires further development	Requires further development	Expected Level
I can comfortably develop workplans	5	0	0	Expected level	Requires further development	Expected Level
I can comfortably prepare work schedules	5	0	0	Expected level	Requires further development	Expected Level
I can comfortably prepare budgets for the emergency unit	3	1	1			
I can comfortably make an official request for supplies and resources for emergency unit	4	1	0	Expected level	Above Expected level	Expected level
I can officially account for resources used for emergency care	5	0	0	Requires further development	Expected level	Expected level
I am able to receive and make emergency calls	5	0	0	Expected level	Requires further development	Expected level
I am able to reassure a patient, family and responders of emergency scene	5	0	0	Expected level	Requires further development	Expected level
I am able to send an alert to a receiving health facility about an emergency	5	0	0	Expected level	Requires further development	Expected level
I am able to hand over patients requiring emergency care	5	0	0	Expected level	Expected level	Expected level
I am able to hand over the dead from emergency care	5	0	0	Requires further development	Below Expectations	Expected level
I am able to prepare tools and equipment for emergencies	5	0	0	Above Expected levels	Requires further development	Expected level
I am able to conduct routine maintenance of tools and equipment in emergency care	5	0	0	Requires further development	Requires further development	Expected level
I am able to conduct a stock-take and restocking of ambulance supplies	5	0	0	Expected level	Requires further development	Expected level
I can safely dispose tools and equipment that have been used in emergency care	5	0	0			
I am able to manage crowd in emergency scene	4	1	0	Requires further development	Requires further development	Expected level
I am able to independently perform triage on patients at scene	5	0	0	Expected level		
I can ensure patient safety at the scene and during transportation to the hospital	5	0	0	Expected level	Expected level	Expected level
I am able to competently monitor and control patient vitals	5	0	0	Expected level	Requires further development	Expected level

Competence as stated in the curriculum (for five students)	Student self-rating			Supervisor rating of competence level from observations in facility during rotations		
	YES	No	Not sure	St Michael Lubaga Hospital School	St. John Ambulance (EMS provider)	Jinja regional referral hospitals
I am able to manage wounds at the scene	5	0	0	Expected level	Expected level	Expected level
I can load and transport patient	5	0	0	Expected level	Requires further development	Expected level
I can offload the patient	5	0	0	Expected level	Requires further development	Expected level
I can assess the circulation on a patient	5	0	0			
I can perform cardiopulmonary resuscitation (CPR)	5	0	0	Expected level	Expected level	Expected level
I can control patients bleeding	5	0	0	Expected level	Expected level	Expected level
I can administer oxygen	5	0	0	Expected level	Above expected level	Expected level
I can administer EpiPen	4	0	1	Requires further development	Expected level	Expected level
I can administer IV fluids	5	0	0	Expected level	Requires further development	Expected level
I can perform C-spine immobilization	5	0	0	Never observed	Requires further development	Expected level
I can assess glucose levels	5	0	0			
I can assess verbal response, pain stimuli	5	0	0	Expected level	Above expected level	Expected level
I can check for physical deformities	5	0	0			
I can immobilize and demobilize deformities on a patient	5	0	0	Expected level	Expected level	Expected level



## Appendix F: Selected Unit Costs

Particulars	Indicative Unit Costs (US\$)
<b>Ambulances</b>	
Type C ambulances	201,000.0
Type B ambulances	80,000.0
Marine boat ambulances	201,000.0
Helicopter ambulance	3,715,000.0
<b>Equipment</b>	
Stethoscope general practise adults	379.3
Stethoscope foetal wooden	138.2
Glucometer tester	1,167.6
Finger pulse oximeter	943.4
Ultrasound machine	7,150.0
X-ray machine	13,218.8
<b>Program costs</b>	
Allowances	21.9
Conference package	21.9
Consultants fee	500.0
Fuel costs	1.6
Per diem	43.8
Per diem for driver	20.6
SDA	3.3
Technical assistance	400.0
Technical resource persons	54.8
Community training workshop	1,092.6
Workshop materials	123.3
Committee meeting	1,019.2
Facility based training	659.9
Workshop meeting	9,535.9
Mentorship	889.3
Trainer of trainers workshop	26,536.2
<b>Advocacy</b>	
Radio talk shows	493.0
Radio spots	69.0
Tv talk shows	1,233.0
Tv spots	233.0
Media press	671.0
Field costs	38.0

## Appendix G: Proposed Human Resources

Emergency Medicine at Regional Referral Hospitals	Salary Scale	Ugx
Consultant (emergency medicine)	UISE	12,321,555
MoSG (emergency medicine)	U2 (Med-I)	6,071,555
Medical officer	U4(Med-I)	5,408,476
Principal nursing officer (emergency)	U2 (Med-2)	4,921,555
Senior nursing officer emergency	U3(Med-2)	4,658,476
Nursing officer emergency	U4(Med-2)	4,408,476
Assistant nursing officer	U5(Med)	2,608,476
Emergency care assistant	U7	343,792
<b>Call and Dispatch Centre</b>		
Regional EMS officer/PMO	U2	6,071,555
Senior medical officer	U3(Med-I)	5,884,476
Medical officer	U4(Med-I)	5,408,476
IT officer	U4SC	4,000,000
Technician (ICT)	U 5	2,200,000
Supervisor, call centre	U 6	528,588
Medical dispatcher	U5	528,588
Call agent	U6	426,265
Assistant secretary (logistics)	U4	723,868
Driver	U8	221,988
<b>Operating Theatre (OT)</b>		
Principal nursing officer	U2 (Med-2)	4,921,555
Senior nursing officer	U3 (Med-2)	4,658,476
Nursing officer	U4 (Med-2)	4,408,476
Assistant nursing officer	U5 (Med-2)	2,608,476
Senior theatre assistant	U5 (Med-2)	2,608,476
Theatre assistant	U6 (Med-2)	1,558,476
Theatre attendant	U8(Med-2)	596,000

Emergency Medicine at Regional Referral Hospitals	Salary Scale	Ugx
<b>Emergency Medicine – General Hospitals</b>		
Mosg (emergency medicine)	U2 (Med-I)	6,071,555
Medical officer	U4(Med-I)	5,408,476
Principal nursing officer (emergency)	U2 (Med-2)	4,921,555
Senior nursing officer emergency	U3 (Med-2)	4,658,476
Nursing officer emergency	U4 (Med-2)	4,408,476
Assistant nursing officer	U5 (Med)	2,608,476
Emergency care assistant	U7	343,792
<b>Emergency Medicine- HC IVS</b>		
Medical officer	U4(Med-I)	5,408,476
Senior nursing officer emergency	U3(Med-2)	4,658,476
Nursing officer emergency	U4(Med-2)	4,408,476
Assistant nursing officer	U5(Med)	2,608,476
Emergency care assistant	U7	343,792
<b>Aeromedical Service</b>		
Aeromedical pilot	U4 (Med-2)	8,195,607
Aeromedical physician	U4 (Med-2)	6,071,555
Boat paramedic	U4 (Med-2)	4,408,476
Aeromedical paramedic	U4(Med)	5,408,476
<b>Marine Ambulance Service (14)</b>		
Ambulance boat navigator	U5 (Med-2)	2,608,476
Ambulance boat mechanic	U7(Med)	1,558,476
Ambulance boat coxswain	U8(Med)	1,558,476

## Appendix H: Health Facilities Coded for Reporting Through the DHIS

Health facilities coded for reporting through the DHIS-2				
Level	Number registered in DHIS2 (June 2020)			
	Public	PNFP	Private	Total
National (NRH)	5	0	0	5
Regional referral hospitals	16	0	0	16
General hospitals	65	70	51	186
HC-IVs	180	23	25	228
HC-IIIs	1,041	338	213	1592
HC-IIs	1,816	717	1,126	3659
Clinics	86	81	394	561
Total	3,209	1,229	1,809	6,247

## Appendix I: Workplan Colour Coded Showing Level of Implementation of Planned Activities

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
<b>Objective 1: Increase access to on-scene emergency Medicare care by 50%</b>								
<b>Strategy 1.1. Strengthen first aid capacity at household and community level for medical emergencies</b>								
1.1.1: Develop, print and disseminate 3,000 copies of standard training manuals for bystander responders	Standard Manual developed and copies disseminated to all districts	EMS program report	Commissioner reports	Community Health Education and Promotion on Emergency care Response	Number of copies of standard training manuals for bystander responders disseminated nationally between 2020 - 2023	3000	1000	33%
1.1.2. Training 14 Regional teams of 35 participants each as trainers of trainers/supervisors	Number of people trained as trainers per district	Training reports	Regional EMS Coordinator	Community Health Education and Promotion on Emergency care Response	Number of regions with teams having at least 2 ToTs trained	14	7	50%
1.1.3. Conducting 10 cascaded training of community-based bystander responders per district	Number of people trained as community-based bystander responders per parish	Training reports	District/ urban EMS focal point	Community Health Education and Promotion on Emergency care Response	Average number of cascaded trainings done for community-based bystander responders per region	10	-	-
1.1.4. Conducting 5 Training of Trainers in the corporate sector to cascade workplace emergency medical care training for 30 participants each	Number of private sector ToTs	Training reports	District/ urban EMS focal point	Community Health Education and Promotion on Emergency care Response	Number of ToTs trained nationally in the corporate sector to cascade workplace emergency medical care	150	-	-
1.1.5. Procurement of training, IEC materials and simplified learning aids for first aid	Number and type of materials/aids procured	Procurement records	Commissioner EMS	Community Health Education and Promotion on Emergency care Response	Number of types of training materials for first aid procured between 2020 and 2023	3	2	67%
<b>Strategy 1.2: Strengthen Medical first responder Capacity of health workers at all levels</b>								
1.2.1. Procure training aids for general hospitals as training hubs for medical first responders	Number and type of materials/aids procured	Procurement records	Commissioner EMS	Human Resource for Emergency Medical Services	Number of training aids procured for general Hospitals as training hubs for medical first responders (target 150 per region)+N10:N122	2100	1973	94%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
1.2.2 Conduct 14 regional trainings of district level trainers (3 participants per district) of medical first responders in basic life support	Number of districts with at least 3 TOT trained	Training reports	Regional EMS Coordinator	Human Resource for Emergency Medical Services	Number of regions with at least 50% of districts having at least 1 ToT trained in basic life support for medical first response	14	5	36%
1.2.3 Conduct cascaded training of at least 2 medical first responders per Health Center in basic life support	Number of HCs with at least 1 medical first responder trained	Training reports	Regional EMS Coordinator	Human Resource for Emergency Medical Services	Number of regions with at least 50% of health facilities having at least 1 medical first responder trained.	14	3	21%
<b>Strategy 1.3: Public Education and integrating EMS in other prevention resources</b>								
1.3.1 Conducting annual community-based first aid and prehospital care promotion campaigns countrywide	Number of national campaigns completed	EMS program report	Commissioner EMS	Community Health Education and Promotion on Emergency care Response	Number of national campaigns completed between 2020 and 2023	14 (1 per region)	-	-
1.3.2 Develop IEC content and materials on prevention of emergency medical conditions based on annual epidemiological reports	Number and type of IEC content and materials developed	EMS program report	Commissioner EMS	Community Health Education and Promotion on Emergency care Response	Number of IEC content and materials on prevention of emergency medical conditions have been developed between 2020 and 2023	-	-	-
1.3.3 Placements to publicize community-based first aid and prehospital care as well as responsible activation on EMS system in electronic and print media	Number of placements made	EMS program report	Commissioner EMS	Community Health Education and Promotion on Emergency care Response	Number of placements made in electronic and print media to publicize community-based first aid and prehospital care, and detailing how to responsibly activate the EMS system	100 per region	-	-
<b>Strategy 1.4: Integrating first aid curriculum in training institutions</b>								
1.4.1 2-week retreat for 20 experts (from Ministry of Education and training institutions) to develop content for standardized curriculum for first aid emergency medical response	Number and levels of curriculum	EMS program report	Commissioner EMS	Community Health Education and Promotion on Emergency care Response	Level of development and circulation of standardized curriculum for first aid emergency medical response	4	2	50%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
1.4.2 Conduct 5 meetings to integrate basic EMS in CHEW, police, fire, marine, aviation authorities training programs	First aid incorporated in pre-service training of key emergency responders	EMS program report	Commissioner EMS	Community Health Education and Promotion on Emergency care Response	Number of training programs with full integration of basic EMS	5	3	60%
1.4.3 Conduct 1 training of trainers (ToT) per district for school teachers	Number of districts with ToT for school teachers trained	EMS program report	Regional EMS Coordinator	Community Health Education and Promotion on Emergency care Response	Number of regions with at least 2 teacher trained as ToT per region	14	1	7%
1.4.4 Conduct 10 cascaded training of teachers in secondary and tertiary level schools per district	Number of schools with at least 2 teachers trained	EMS program report	Regional EMS Coordinator	Community Health Education and Promotion on Emergency care Response	Number of regions with at least 50% of schools having at least 2 teachers trained in basic first aid	14	0	0%
1.4.5 Conduct 20 training of trainers with critical institutions (taxi and bus operators' associations, driver and vehicle licensing authorities, industries, corporates, etc.)	Number of training teams set up	EMS program report	Regional EMS Coordinator	Community Health Education and Promotion on Emergency care Response	Number of trainings of trainers effectively done with critical institutions (taxi and bus operators' associations, driver and vehicle licensing authorities, industries, corporates, etc.)	20	4	20%
<b>Objective 2: Increase proportion of emergency patients receiving ambulance response within 1 hour to 50%</b>								
<b>Strategy 2.1 Establish 16 functional regional ambulance hubs</b>								
2.1.1 Conduct regional (14) epidemiological mapping every 3 years	Demand analysis and mapped profile of the potential workload based on time and day	Epidemiological mapping report	Regional EMS Coordinator	Emergency Care Health Infrastructure	Number of regions with mapping done in the past three years (between 2020 and 2023)	14	6	43%
2.1.2 Technical Assistance to conduct detailed situation analysis and mapping of existing fleet of ambulances vehicles/ motorcycles/boats and capacity needs for each region	Ambulance capacity gaps by district and region	Capacity report	Regional EMS Coordinator	Emergency Care Health Infrastructure	Number of regions with capacity assessments done for ambulances within the last three years (2020 and 2023)	14	10	71%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
2.1.3. Identify "black spots" and population-based geospatial access gaps for each region	Ambulance stand points for each region identified	EMS program report	Regional EMS Coordinator	Emergency Care Health Infrastructure	Number of regions with identified ambulance stand points for easy accessibility	14	9	64%
2.1.4 Procure and deploy 350 ambulance vehicles, 15 boats	Number and type of ambulance vehicles/ motorcycles/ boats procured	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Total number of ambulance vehicles and boats bought in the last three years	350 vehicles 15 boats	235 vehicles 14 boats	94%
2.1.5 Repair, upgrade and equip 173 existing Type B ambulance vehicles	Number and type of ambulances repaired, upgraded, and equipped	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of existing Type B ambulances upgraded	173	31	18%
2.1.6 Establish HRH scheme EMS in-service and on-job training for initial ambulance crew	Number of ambulance crew trained and deployed for each ambulance by region	EMS program report	Commissioner EMS	Human Resource for Emergency Medical Services	Number of ambulance crew trained and deployed for each ambulance by region	2 per ambulance	2 per ambulance	100%
2.1.7 In-service training of 40 regional ambulance teams and 1200 ambulance crew in basic emergency care conducted	Number of ambulances with at least 3 trained ambulance crew	EMS program report	Commissioner EMS	Human Resource for Emergency Medical Services	Number of ambulance crew trained in past three years	1200	-	-
<b>Strategy 2.2 Establish differentiated urban and rural EMS systems</b>								
<b>(Activities under this strategy are embedded in 1.1 - 1.3, 2.1.2, 2.1.4, 2.3.6 and 4.2.6)</b>								
2.3.1 Procure equipment and install ambulance call and dispatch communication systems	Number of regions with functional call and dispatch communication system	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of regions with functional call and dispatch communication system	14	2	14%
2.3.2 Procurement of ambulances vehicles (250 Type B and 20 Type C), ambulance boats (10 Type B and 5 type C)	Number and type of ambulances procured	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of ambulances vehicles and boats procured	270 vehicles 15 boats	235 vehicles (225 type B and 10C) 14 boats (11B and 3C)	94%
2.3.3 Procure and install ambulance-medical direction-hospital radio communication system in 400 ambulances	Number of ambulance-medical direction-hospital radio communication system installed	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of ambulances with ambulance-medical direction-hospital radio communication system fully installed	400	52	13%



Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
2.3.4 Conduct 2 months training and eventual deployment of 50 call and dispatch officers	Number of trained call and dispatch officers deployed	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of call and dispatch officers trained and deployed nationally	50	10	20%
2.3.5 Conduct 3 meetings with police and OPM to operationalize 912 as common emergency number	Short code 912 functional and linked to regional EMS call centers	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Level of operationalization of common emergency number	4	1	25%
2.3.6 Work with district and urban authorities to ensure adequate mapping of landmarks and houses to facilitate early incident scene identification	Number of districts and urban authorities with geospatial mapping of landmarks/houses	EMS program report	District/urban EMS focal point	Emergency Care Health Infrastructure	Number of regions with at least 80% of districts having adequate mapping of landmarks	14	2	14%
2.3.7 Develop and print 3,000 protocols for patient hand-over, activation of inter-facility referral and EMS referral directory	Protocols for patient hand-off developed and disseminated	EMS program report	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Number of regions with protocols printed and distributed for patient handover, activation of interfacility referral and EMS referral	14	14	100%
2.3.8 Develop and print 1,000 protocols with the UPDF, UPF, Ministry of Works, and private aviation providers to provide aero-medical and marine evacuation	Protocols linking aero-medical and marine evacuation to EMS developed and disseminated	EMS program report	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Number of protocols developed and printed for UPDF, UPF, Ministry of Works, and private aviation providers to provide aero-medical and marine evacuation	1000	0	0%
2.3.9 Recruit and train at least 3 call and dispatch staff for each of the 14 regions	Number of call and dispatch sites with at least 3 trained staff	EMS program report	Commissioner EMS	Human Resource for Emergency Medical Services	Number of regions with at least 3 call and dispatch officers	14	1	7%
<b>Strategy 2.4 Strengthen inter-facility transfers</b>								
<b>(Activities under this strategy are embedded in 2.3.4.1.4 &amp; 4.1.5)</b>								
<b>Strategy 2.5 Develop supply chain for ambulance system</b>								
2.5.1 Establish oxygen and EMS commodity refill and supply chain system for 15 ambulance systems	Number of ambulance stations with oxygen and commodity refill	EMS program report	Commissioner EMS	Essential Emergency Medicines and Health Supplies	Number of regions with at least 1 oxygen and EMS commodity refill and supply chain system	14	10	71%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
2.5.2 Develop an essential Emergency Care Package for health facilities and Ambulance crews based on the WHO Emergency Care Package recommendations	Essential Emergency Care Package approved by MOH	EMS program report	Commissioner Pharmacy	Essential Emergency Medicines and Health Supplies	Number of regions with atleast 50% of facilities with essential emergency care package	14	5	36%
2.5.3 Develop and specify level appropriate essential emergency medicines for incorporation into the Uganda Essential medicines and Health supplies list	Proportion of EMS commodities integrated in the national EML	EMS program report	Commissioner clinical	Essential Emergency Medicines and Health Supplies	Level of incorporation of essential emergency medicines into the Uganda	Level 4	-	-
<b>Objective 3: Increase availability of quality EMS hospital care in 14 regional referral hospitals,147 district hospitals, and 193 HC IVs</b>								
<b>Strategy 3.1 Establish emergency departments/units</b>								
3.1.1 Conduct annual mapping of “receiving” facilities and what medical care they are capable of providing for each region.	Updated receiving directory developed annually	EMS program report	Regional EMS Coordinator	Emergency Care Health Infrastructure	Number of regions with at least one annual mapping of receiving facilities done	14	2	14%
3.1.2 Renovate/construct emergency departments in 19 referrals Hospitals	Number of emergency departments renovated/constructed at referral hospital	EMS program report	Hospital Directors	Emergency Care Health Infrastructure	Number of regions with referral hospital(s) was recently built or renovated in the past three years	19	8	42%
3.1.3 Renovate/construct emergency departments in 170 general hospitals	Number of Emergency Departments at Hospitals renovated	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of general hospitals which were recently constructed or renovated in the past three years	170	-	-
3.1.4 Establish emergency units with a core team of permanently assigned staff (medical officers/clinical officers/nursing officers) and acuity-based triage in 193 HC IVs and IIIs	Number of Emergency units at HC IV established	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of regions with at least 80% of combined HC III and HC IV facilities having an emergency unit with at least 2 trained permanently assigned staff.	14	2	14%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
3.1.5 Procure and deploy equipment for emergency units/departments	Number and type of equipment procured and deployed in emergency units/ departments	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of regions with equipment procured for its regional referral hospital (s) in the past three years	14	-	-
3.1.6 Construction and equipping of 5 regional trauma centers	Number of trauma centers established	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Number of regional trauma centers set - up	5	0	0%
<b>Strategy 3.2 Develop an appropriate and equitable professional EMS workforce</b>								
3.2.1 Technical assistance to establish HRH scheme EMS cadre and job description	EMS cadre established in civil service structure	EMS program report	Commissioner EMS	Human Resource for Emergency Medical Services	Level of establishment of the EMS job cadre and description	4 of 4	0	0%
3.2.2 Offer scholarships for EM specialists, i.e. 20 Emergency Medical physicians and 60 emergency & critical care nurses/ offices.	Number of scholarships secured for Emergency Medical Physicians/ Emergency care professionals	EMS program reports	Commissioner EMS	Human Resource for Emergency Medical Services	Number of scholarships given to EMP and critical care nurses	80	20	25%
3.2.3 Conduct 5-day workshop to share experiences and develop standardised Emergency Medicine course units for medical, paramedical and nursing students	Proportion of health professionals curricula with incorporated Basic emergency care course units	Assessment reports	C/EMS	Human Resource for Emergency Medical Services	Number of standardised EM course units developed	5	5	100%
3.2.4 Conduct continuous basic emergency care training for health workers at regional referral hospitals	Number of BLS sessions	EMS program reports	Regional EMS Coordinator	Human Resource for Emergency Medical Services	Number of regions with at least 1 BLS training done	14	8	57%
3.2.5 Conduct continuous advanced emergency life support training for health workers	Number of BLS sessions	EMS program reports	Regional EMS Coordinator	Human Resource for Emergency Medical Services	Number of regions with at least 1 ALS training done	14	7	50%
3.2.6 Establish EMS training hubs at regional referral hospitals	Number of regional training hubs established			Human Resource for Emergency Medical Services	Number of regions with at least 1 EMS training hubs	14	6	43%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
<b>Strategy 3.3 Establish crisis centers in emergency departments</b>								
3.3.1 Technical Assistance to map out mental health and crisis centre partners and their capacities with each region	Partners mapped and referral directory developed	Mapping reports	Regional EMS Coordinator	Emergency Referral and Disaster response Services	Number of regions with mental crisis center partners mapped out in the last three years	14	0	0%
3.3.2 Technical assistance to engage with policy-makers, key institutions, and wider society to write technical guidance documents on crisis management and referral	Technical guidance documents on crisis management and referral completed	Mapping reports	Regional EMS Coordinator	Emergency Referral and Disaster response Services	Level of development of technical guidance document on crisis management and referral	4	1	25%
3.3.3 Technical assistance to operational emergency medical response to mental illness and survivors of violence and sexual abuse	Operational plan developed	EMS program reports	Commissioner EMS	Emergency Referral and Disaster response Services	Level of development of the operational plan for emergency medical response to mental illness	4	4	100%
<b>Objective 4: Continuously improve and sustain operations of national EMS system</b>								
<b>Strategy 4.1 Build strong EMS leadership and governance structures</b>								
4.1.1 Develop guidelines and conduct field visits to guide composition of the EMS governance structures in each regional context	National EMS technical Working Group, national EMS advisory committee, 14 regional EMS committees and hospital EMS committees	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Number of regions with regional EMS and Hospital committees Number of regions with RECs Level of development of National Advisory Committee	14 14 4 of 4	14 14 1	100% 100% 25%
4.1.2 Conduct 16 orientation workshops for the newly formed EMS structures on their roles, responsibilities, and linkages	Number of structures oriented	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Number of orientation workshops held for newly formed structures	16	0	0%
4.1.3 Technical assistance to design various EMS accreditation, standards, service protocols, SOPs and standard agreements for PPP in EMS	Number and type of protocols developed	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Level of design of various EMS accreditation, service protocols and agreement for PPP in EMS	4	1	25%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
4.1.4 Conduct three 4-day workshops to develop clinical and management EMS standardised protocols covering bystander response, dispatch, EMS provider and receiving facility	Number and type of protocols developed	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Level of development of standardised protocols covering bystander response, dispatch, EMS provider and receiving facility	4	3	75%
4.1.5 Print and disseminate 2,000 EMS standardized clinical and procedural protocols	Number and type of protocols developed	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	How many standardised clinical and procedural protocols have been disseminated	2000	-	-
4.1.6 Technical Assistance to develop EMS quality assurance (QA) and quality improvement (QI) mechanisms within the MoH QA/QI guidelines	EMS QA/QI protocols developed	EMS program reports	Commissioner QA	Leadership & Governance of Emergency Medical Services	Level of development of QA and QI mechanisms within MoH guidelines	4	1	25%
4.1.7 Write job descriptions and train district EMS focal point persons	Job descriptions	EMS program reports	Commissioner HRH	Human Resource for Emergency Medical Services	Number of regions with at least 80% of districts having focal persons trained and assigned job responsibilities	14	14	100%
<b>Strategy 4.2: Build capacity for major medical incidence and disaster management and for emergency medical coverage for mass gatherings and major events</b>								
4.2.1 Conduct 3-day regional workshops to develop national and regional EMS mitigation plan in each of the regions	Workshop reports	EMS program reports	Commissioner EMS	Emergency Referral and Disaster response Services	Number of regions with an EMS mitigation plan developed	14	0	0%
4.2.2 Technical Assistance to develop all-hazard hospital disaster model plan	All-hazard hospital disaster model plan	EMS program reports	Commissioner EMS	Emergency Referral and Disaster response Services	Level of development of the all-hazard hospital disaster model plan	4	0	0%
4.2.3. Training regional EMS coordinators for 4 days in preparedness and management of major medical incidents	Number of regional EMS coordinators trained	EMS program reports	Commissioner EMS	Emergency Referral and Disaster response Services	Number of regional coordinators trained in preparedness and management of major medical incidents	14	10	71%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
4.2.4 Conduct 3-day regional workshops to develop medical incidence and disaster management hospital and trauma centre plans	Number of regional workshops held	EMS program reports	Commissioner EMS	Emergency Referral and Disaster response Services	Average regional Level of development of medical incidence and disaster management hospital and trauma centre plans	4	1	25%
4.2.5 Conduct 20 continuous EMS capacity building training sessions for disaster management in disaster prone areas in the country	Number of EMS training sessions for disaster management in disaster prone areas in the country conducted	EMS program reports	Commissioner EMS	Emergency Referral and Disaster response Services	Number of EMS training sessions for disaster management in disaster prone areas in the country conducted	20	2	10%
4.2.6 Procure non-transporting advanced life support responders, i.e. 10 vans for emergency physicians which transport advanced life support equipment but not patients and 50 motorcycles with EMR in areas with high traffic flow	Number of vehicles and motorcycles procured	EMS program reports	Commissioner EMS	Emergency Care Health Infrastructure	Number of vehicles and motorcycles procured for equipment not patients	10 vans 50 motor-cycles	6 medi-cal com-mand vehicles	60%
4.2.7 Establish and equip a central national coordination center to oversee the functionality of all the regional ambulance call and dispatch centres	National coordination center established	EMS program reports	Commissioner EMS	Emergency Care Health Infrastructure	Level of development of central national coordination center to oversee functionality	4	1	25%
<b>Strategy 4.3: Develop an empowering EMS legal and regulatory framework</b>								
4.3.1 Technical assistance to draft a national EMS Policy, Act, Regulations and by-stander protection (Good Samaritan Law)	Enabling legal documents drafted	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Level of development of policy, act and law	4	2	50%
4.3.2 Conduct 2-day workshop with Professional Councils to develop regulation for registration of emergency care health professionals	Regulations for registration of emergency care health professionals drafted	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Number of bodies currently registering EMS health professionals	5	2	40%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
4.3.3 Conduct discussions with Uganda Communication Commission on mandating free and compulsory emergency 912 service for all telecom providers	Toll-free short code emergency	EMS program report	Commissioner EMS	Emergency Care Health Infrastructure	Level of mandating emergency 912 service across all telecom providers	4	1	25%
4.3.4 Technical assistance to expand EMS call and dispatch system within the 999 framework	EMS call and dispatch system integrated within 999 framework	EMS program reports	Commissioner EMS	Emergency Care Health Infrastructure	Level of expanding call and dispatch system within 999 framework	4	0	0%
4.3.5 Technical assistance to develop guidelines for local governments to develop and enforce by-laws and regulations that fuel medical emergencies and impact on response	Guidelines for local governments to develop and enforce by-laws and regulations	EMS program reports	Commissioner EMS	Leadership & Governance of Emergency Medical Services	Level of development of guidelines and enforcement of laws.	4	1	25%
<b>Strategy 4.4: Integrate national emergency management guidelines</b>								
(Activities for this strategy are embedded in 4.1.3, 4.1.4 and 4.1.5)								
<b>Strategy 4.5: Quality improvement and operational research</b>								
4.5.1 Conduct national quarterly quality improvement collaborative meetings between regions to improve access, clinical outcomes, sustainability and cost effectiveness will be priority	Number of collaboratives held	EMS program reports	Regional EMS Coordinator	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of quarterly inter-regional collaborative meeting held in past three years	12	2	17%
4.5.2 Technical assistance in developing EMS system cost analysis and service delivery outcomes, including death or near- miss reviews tools	Analysis tools developed	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Level of development of analysis tools for cost analysis and service delivery outcomes	4	1	25%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
4.5.3 Technical assistance to establish mechanism for fast-tracking scale-up of innovation and good practices, QI projects in emergency care service provision	Mechanism for dissemination and fast-tracking scale-up/replication established	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Level of establishment of mechanism for fast tracking scale up of innovation and good practices, QI practices ?	4	4	100%
4.5.4 Conduct a 2-day workshop to develop and review research agenda on improving regional and national EMS system annually	Updated national EMS research agenda	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of times the national EMS research agenda has been revised and updated	2	1	50%
4.5.6 Conduct quarterly support supervision from region to facilities	Number of support supervision visits conducted per region per quarter	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of regions whose RECs have paid at least one quarterly supervision visit to facilities	14	9	64%
4.5.6 Conduct 6 monthly support supervision from MoH to regions	Number of regions supported MoH annually	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of 6 monthly support supervision from MoH to regions in the past three years	4	2	50%
4.5.7 Conduct national coordination meetings (monthly for EMSTWG, quarterly for EMS technical advisory committee)	Resolutions from meetings implemented	EMS program reports	Regional EMS coordinator	Leadership & Governance of Emergency Medical Services	Number of national coordination meetings held in the last three years	2	1	50%
4.5.8 Hold regional coordination meetings (monthly for regional coordination committee, quarterly for QI/QA Task force) for each region	Resolutions from meetings implemented	EMS program reports	Regional EMS coordinator	Leadership & Governance of Emergency Medical Services	Number of regions holding regional coordination meetings at least once a year	14	10	71%
4.5.9 Support the testing of emergency care tools/guidelines/ Protocols for EMS system development	Number of Emergency care materials tested and approved for use	EMS program reports	E/EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Level of development of testing procedures for protocols	4	1	25%



Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
<b>Strategy 4.6: Financing for emergency care</b>								
4.6.1 Establish budget line emergency medical services in the health facility and local government budgets	EMS budget line in hospitals and HC IVs	EMS program reports	Commissioner EMS	Financing for Emergency Medical Services	Number of regions with dedicated government budget line for EMS	14	8	57%
4.6.2 Technical assistance to incorporate emergency care explicitly into ongoing results-based financing mechanisms and National Health Insurance Scheme	Proposal to incorporate EMS in RBF and NHIS	EMS program reports	Commissioner EMS	Financing for Emergency Medical Services	Level of incorporation of emergency care into ongoing results-based mechanisms and national insurance scheme	4	1	25%
4.6.3 Technical assistance to conduct mapping of existing processes and relevant contributors to prehospital EMS funding in all regions in the country	Analysis and mapped profile of financial contributors to pre-hospital EMS	EMS program reports	Commissioner EMS	Financing for Emergency Medical Services	Number of regions with mapped profile of financial contributors	14	0	0%
4.6.4 Add a dedicated funding stream for pre-hospital and health facility emergency medical care services within the MoH budget planning cycle	Pre-hospital and health facility emergency medical care services incorporated in sector budget	EMS program reports	Commissioner EMS	Financing for Emergency Medical Services	Level of incorporation of funding stream of EMS services within the MoH budget planning	4	4	100%
4.6.5 Conduct meetings to develop EMS financing by healthcare insurers and other private providers	EMS incorporated in private health insurance and related schemes	EMS program reports	Commissioner EMS	Financing for Emergency Medical Services	Level of incorporation of EMS funding into private health insurance schemes	4	0	0%
4.6.6 Conduct meetings to streamline EMS funding in vehicle third-party insurance for road traffic trauma patients	Vehicle third-party insurance coverage for road traffic trauma patients	EMS program reports	Commissioner EMS	Financing for Emergency Medical Services	Level of streamlining EMS funding into vehicle third party insurance for road traffic trauma patients	4	1	25%

Activity	Indicator	Source of Information	Responsible Office	Relevant Pillar	Adjusted Output indicator	Target	Achieved	% Progress
<b>Strategy 4.7: EMS monitoring and evaluation</b>								
4.7.1 Conduct a two-day workshop for inclusion of key pre-hospital and health-facility-based emergency medical care data points into the existing HMIS/ DHIS2 data collection and reporting	All key EMS performance indicators incorporated in DHIS2	Revised HMIS	Assistant Commissioner Resource Centre	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of EMS data indicators incorporated into DHIS2	14	9	64%
4.7.2 Conduct quarterly regional EMS data quality audits and analysis meetings to identify improvement priorities, actions, and lessons	Number of regions producing quarterly performance analysis report	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of regions producing quarterly performance analysis reports?	15	15	100%
4.7.3 Implement standardized patient clinical form for pre-hospital and facility-based emergency medical care	Standardized data forms filled and reported by all private EMS providers	EMS program report	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Level of implementing standardized patient clinical form for prehospital and facility-based emergency medical care by private providers	4	2	50%
4.7.4 Compile and print quarterly national status reports on emergency medical care	National EMS status report	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Number of quarterly reports on EMS done in past 3 years	12	12	100%
4.7.5 Establish EMS M&E focal point at MoH	Level of establishment of EMS M&E focal point at MoH	EMS program reports	Commissioner EMS	Emergency Care Data, Monitoring, Evaluation and Quality Improvement	Level of establishment of EMS M&E focal point at MoH	4	4	100%



