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# EMERGENCY MEDICAL SERVICES IN UKRAINE

**CURRENT CAPACITIES AND OPPORTUNITIES  
FOR FUTURE DEVELOPMENT**

*report from Luhansk and Donetsk oblasts*



**QUANTITATIVE AND QUALITATIVE ANALYSIS  
OF UKRAINE'S EMERGENCY MEDICAL SERVICES  
TO ASSESS CURRENT CAPACITIES AND OPPORTUNITIES  
FOR FUTURE DEVELOPMENT**

**Report from Luhansk and Donetsk oblasts**

## ABSTRACT

Emergency medical services (EMS) systems and prehospital care are vital in saving lives and decreasing morbidities, but are difficult to evaluate because they are interrelated. This survey aims to provide evidence-based recommendations to improve the overall quality of EMS in Ukraine, with a special focus on the oblasts (administrative regions) of Luhansk and Donetsk in eastern Ukraine. A newly adopted law has assigned administrative and financial responsibilities for prehospital emergency care to EMS centres at regional level, moving from fragmented district-based supervision to a more coordinated, regional approach. The following aspects of EMS were studied: demand and efficiency, operational attributes, financial attributes, quality attributes, end-user satisfaction and public information, human resource attributes and the legal framework. The survey outlines core approaches needed in EMS reform with key suggested interventions, and proposes strategic directions.

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## Acknowledgements

The authors of this report are: Dr Omar Saleh, trauma and emergency consultant, WHO Country Office, Ukraine; Dr Gunnar Rø, statistician, Fjelltopp Ltd, United Kingdom; Mr Stanislav Gaievskiy, advisor, Ministry of Health of Ukraine; Dr Jarno Habicht, WHO Country Representative, Ukraine; and Dr Caroline Clarinval, Coordinator, WHO Health Emergencies Programme, Ukraine.

The authors are grateful for the contributions of the Ministry of Health working group overseeing reform of emergency medical services (Dr Oleksandr Danyliuk, Dr Asan Charuhov, Ms Kateryna Kalendruz, Dr Pavlo Khochai and Mr Glib Bitiukov), regional emergency medical services directors (Dr Igor Kiyashko and Dr Valentyn Pomerantsev) and heads of regional health administrations (Dr Yurii Uzun and Mr Valentyn Shkorubskiy) of Donetsk and Luhansk oblasts, administrators and Ministry of Health leaders who supported the development of the survey. They also extend thanks to Dr Ali Okhowat and Dr Vitalii Stetsyk for their contribution and editing, and are grateful to all the interviewers who collected data for the study: Dr Evita Sano, Dr Sergey Taran, Mr Pavlo Ivko, Mr Oleh Mikhalylov, Mr Mykola Korobenko, Dr Sergey Koryak, Mr Nazar Melnychuk and Mr Oleg Kemin. Special thanks go to Mr Svilen Konov for developing the protocol. The authors are very grateful to WHO donors 2019 for funding the survey.

## Acronyms

CBRN	chemical, biological, radiological and nuclear (materials)
CI	confidence intervals
ECG	electrocardiogram
EDs	emergency departments
EMS	emergency medical services
EMTs	emergency medical technicians
GPS	global positioning system
ICU	intensive-care unit
PHC	primary health care
PPP	purchasing power parity
SOPs	standard operating procedures
UAH	Ukrainian hryvnia (currency)
USPCEMDM	Ukrainian Scientific-practical Centre of Emergency Medical Care and Disaster Medicine of the Ministry of Health



## Executive summary

During the Seventy-second World Health Assembly, Member States agreed that “a functional emergency care system is essential to universal health coverage, and investing in frontline care saves lives, increases impact and reduces costs in other parts of the health system”. In 2012, the Parliament of Ukraine adopted a new law on emergency medicine and transformed the organizational structure of emergency medical services (EMS) across Ukraine. The newly adopted law assigned administrative and financial responsibilities for prehospital emergency care to EMS centres at regional level, moving from fragmented district-based supervision to a more coordinated, regional approach. Further improvements in EMS were made in 2017/2018 with the creation of a network of hospitals with required emergency medical capabilities at regional level, the introduction of a new paramedic educational programme, and the establishment of a new national central dispatch system. This has led to overall improvements in EMS coordination and response.

The aim of this survey was to provide evidence-based recommendations to improve the overall quality of EMS in Ukraine, with a special focus on the oblasts (administrative regions) of Luhansk and Donetsk.<sup>1</sup> The objectives were to: describe the EMS system in Ukraine with regards to its capacity, utilization and efficiency across selected geographic regions and catchment areas to assess the utilization and outcomes of current prehospital EMS care; identify perceived needs in key areas based on input from local stakeholders, including EMS providers, hospital-care providers, administrative staff and patients; create an evaluation model of EMS performance; and provide recommendations for improvements to the EMS system in Ukraine.

This was a cross-sectional study with retrospective elements designed to offer relevant evidence-based recommendations to

support the restructuring of the EMS system in Ukraine. Qualitative and quantitative components were included to cover the EMS system, from regional-level administration staff to ambulance drivers, with end-user patients included. Ministry of Health staff overseeing EMS at national level will be covered in the next phase of the study.

The results presented in this report are for areas from Luhansk and Donetsk oblasts; the remaining oblasts will be covered in a follow-up study that is due to start in mid-2019.

The survey assessed the following aspects of the EMS:

- demand and efficiency
- operational attributes
- financial attributes
- quality attributes
- user level of satisfaction and public information
- human resource attributes
- legal framework.

The quantitative questionnaires were analysed by calculating the proportion of respondents for each question. For this descriptive study, 95% confidence intervals are provided for all comparisons. Associations were then assessed with a chi-squared test for contingency tables or a Fischer’s exact test when the cell numbers were too small for reliable use of the chi-squared test.

The survey allowed several conclusions to be drawn, of which the following can be highlighted.

First, it is recommended that a national Ukrainian emergency medical care society that includes all health-care professionals involved in the survival chain be established. Second, it is essential to launch a computerized medical registry network to guarantee real-time qualitative information-sharing among EMS facilities. Third, there is a need to review and

<sup>1</sup> In government-controlled territories of the oblasts.

update the national EMS operational standards and to implement a monitoring system for quality control. Fourth, establishing a common computerized operational communications platform to enhance coordination and interoperability between EMS and hospitals and developing a set of quality indicators for the EMS system in Luhansk and Donetsk are recommended. The Ministry of Health ultimately is responsible for reviewing and modernizing the monitoring of these quality indicators. Fifth, the survey also suggests designing and implementing public health campaigns highlighting the scope of EMS and signs and symptoms of urgent versus

non-urgent cases, and enhancing EMS courses at university, including simulations, to improve the public image of EMS. Sixth, current EMS legislation needs to be updated and reviewed to improve the overall performance of EMS and to align them with health-care reform.

The survey demonstrates that the **Ukrainian EMS are functioning but require certain improvements**, such as the establishment of an emergency medical care society, the launch of a computerized medical registry, a monitoring system, a computerized communications platform and additional public health campaigns.



# BACKGROUND



Ukraine is the second largest country by land mass in Europe, and has 44 million inhabitants. Its territory is divided into 27 administrative regions; two of the regions – the Autonomous Republic of Crimea and the city of Sevastopol – currently are temporarily occupied. Ukraine is classified by the World Bank as a lower middle-income country.

Emergency medical services (EMS) in Ukraine are part of the health-care system and are mandated to respond to medical emergencies by law (Parliament of Ukraine, 2013). This includes diagnostics and medical treatment procedures, medical transport and inpatient services. If the emergency medical response is not prompt, severe and irreversible harm to health or even death can result. Timely, organized, functional and effective EMS in Ukraine is a public health priority, with increasing demand for reform. At the Seventy-second World Health Assembly, Member States agreed that “a functional emergency care system is essential to universal health coverage, and investing in frontline care saves lives, increases impact and reduces costs in other parts of the health system” (WHO, 2019).

EMS systems and prehospital care are vital to saving lives and decreasing morbidities, but they are difficult to evaluate because they are interrelated. Consequently, the efficacy and added value of such systems are difficult to determine. Numerous dependent and independent variables make standardization and comparison challenging, as universal indicators or one-size-fits-all solutions do not apply and are hard to define.

EMS provide short-term, prehospital emergency health care for patients with emergency conditions, in addition to home treatments. They also undertake measures of health support on-site and during transport to the closest appropriate health facility.

Complications exist due to many factors, including, but not limited to, transportation, communications, equipment, facility infrastructure, medicines and medical supply chains, and the affordability and availability of skilled health-care providers. This is true even for countries where well established

EMS are incorporated within the health-care system. These problems frequently pose insurmountable barriers to the provision of services, particularly in countries in conflict or those in transition (Norton et al., 2013).

Aiming to reach a comprehensive strategy for EMS in the country, the Ukrainian Ministry of Health initiated policies of reform to improve existing conditions (Ministry of Health, 2019a). The Ministry previously had identified that, “These changes will require recalibration of the educational, training, and practice patterns of all EMS personnel in the nation” (Ministry of Health, 2017). In collaboration with the Ministry, WHO conducted a strategic assessment of EMS in Ukraine.



### Aim

The aim of the survey was to provide evidence-based recommendations to improve the overall quality of EMS in Ukraine, with a special focus on the oblasts (administrative regions) of Luhansk and Donetsk.<sup>2</sup>



### Objectives

The survey’s objectives were to:

- describe the EMS system in Ukraine with regards to its capacity, utilization and efficiency across selected geographic regions and catchment areas;
- assess the utilization and outcomes of current prehospital EMS care;
- identify perceived needs in key areas based on input from local stakeholders, including EMS providers, hospital-care providers, administrative staff and patients;
- create an evaluation model of EMS performance; and
- provide recommendations for improvements to the EMS system in Ukraine.

The survey was designed to offer relevant evidence-based recommendations to support the restructuring of the EMS system in Ukraine.

<sup>2</sup> In government-controlled territories of the oblasts.



# **INTRODUCTION TO EMS IN UKRAINE**





## Governance of EMS

EMS in Ukraine are publicly owned. Currently, there are 25 separate EMS, one for each administrative region, and they are governed by their respective regional health administrations. In 2012, the Parliament of Ukraine adopted a new law on emergency medicine and transformed the organizational structure of EMS across Ukraine (Parliament of Ukraine, 2013). Previous to this legislation, emergency services had been subdivided by towns and districts and were subordinate to local authorities at district level (Lekhan et al., 2015).

**The newly adopted law assigned administrative and financial responsibilities for prehospital emergency care to EMS centres at regional level, moving from fragmented district-based supervision to a more coordinated, regional approach (Ukrainian Scientific-practical Centre of Emergency Medical Care and Disaster Medicine of the Ministry of Health (USPCEMDM), 2016). According to the Ministry of Health, further improvements in EMS were made in 2017/2018 with the creation of a network of hospitals with required emergency medical capabilities at regional level, the introduction of a new paramedic educational programme, and the establishment of a new national central dispatch system. This has led to overall improvements in EMS coordination and response.**

At the time of this publication, only nine regions across Ukraine had applied some form of centralized, computerized dispatching system, and only 12 had created a designated hospital with emergency medicine capabilities (that is, established emergency departments (EDs)) in accordance with the law (USPCEMDM, 2016). **National standards for staffing or equipping EDs in hospitals need to be updated (Ministry of Health, 2019a).** Current EDs function as admission departments, so access to emergency services differs greatly across regions.

The Cabinet of Ministers voted on the strategy for the development of EMS in Ukraine in 2019. In the strategy, the Ministry of Health identified the following priority

areas for improving the EMS system: build a comprehensive system of first-aid responders; improve EMS dispatching and prioritization of calls; ensure a new scope of practice model for EMS personnel and changes in their education; create an EMS quality management system; develop new principles in the organization of emergency hospital care; optimize disaster preparedness and response; and prevent emergencies through EMS. Realization of this concept note is envisioned by 2023.

The Ministry of Health has started working towards implementation of the strategy. Six regions have been identified for piloting the EMS reforms: the Vinnitsa, Donetsk, Odesa, Poltava and Ternopil regions, and Kyiv city. They will receive almost 1 billion Ukrainian hryvnia (UAH) of additional funding for implementing the new EMS reforms in 2019.



## Financing EMS

Provision of emergency care in Ukraine is guaranteed by law for all citizens and visitors to Ukraine, at no cost to patients (Parliament of Ukraine, 2013). The country, however, has a notoriously high prevalence of informal payments in the health system, and emergency care is no exception (Stepurko et al., 2017). EMS are financed mainly via a medical subvention from the central budget and receive additional funds from local budgets at different levels (Fig. 1).

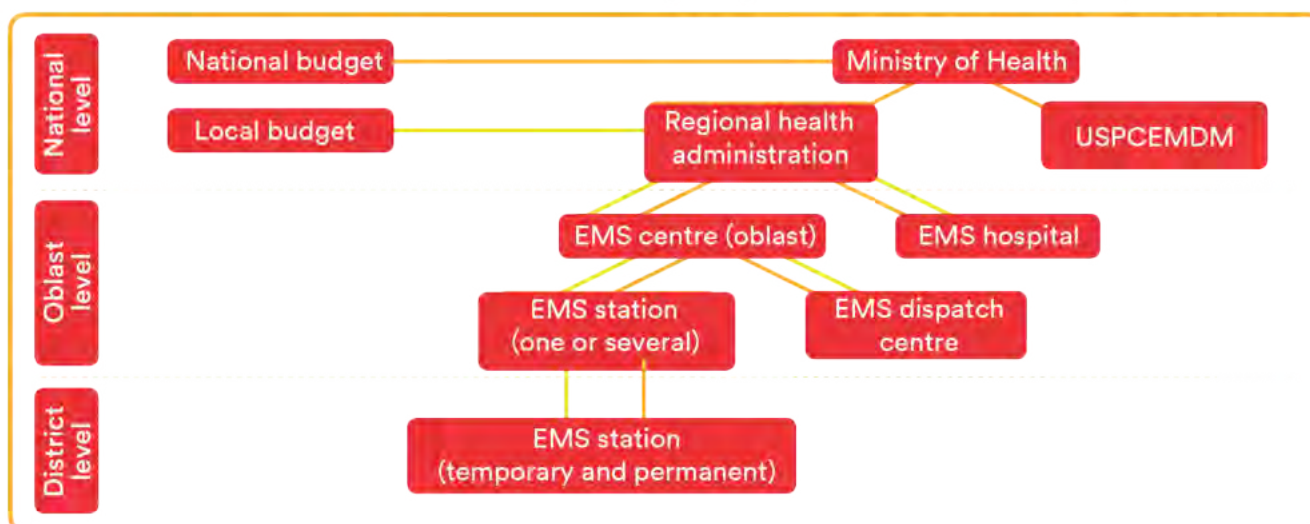
According to the Ministry of Health, the government allocated 5 021 577 157 UAH for EMS in Ukraine in 2018 from the central budget and an additional 1 130 458 168 UAH from local budgets across all oblasts. This is equivalent to spending approximately 145 UAH per resident<sup>3</sup> (€4.5<sup>4</sup>): this figure does not include the additional funds of 1 billion UAH for the reforms in pilot regions, as mentioned above.

The Ministry of Health currently is also developing a new mechanism for financing EMS care within the overall reform of health financing and the introduction of a single-payer system.

<sup>3</sup> Calculation of the number of residents is based on official statistics for 2018 (42 386 400 people) (State Statistics Service of Ukraine, 2018).

<sup>4</sup> The calculation is based on an average conversion rate for 2018 (€1 = 32.1151 UAH) (Exchange Rates UK, 2018).

Fig. 1. Organizational structure of emergency care in Ukraine



### Workforce of EMS

There are 2945 ambulance teams in the EMS of Ukraine. The total workforce of prehospital EMS consists of 42 277 people. The ambulance teams are further divided into three groups. Group 1 is 65% feldsher-(paramedic) led, usually consisting of two feldshers. Group 2 is 34% physician-led, consisting of an EMS physician and feldsher. Group 3 is 5% specialized teams, consisting of a specialized physician (mainly cardiologists) and paediatrician (USPCEMDM, 2016).

After graduating from six years of study at medical school, emergency physicians must complete 1.5 years of specialist training in emergency medicine. Feldshers are Soviet-era paramedical professionals with a three-year post-secondary education technical degree, who work either in ambulance-based prehospital care or in rural primary care clinics.

The human resource capacity of hospitals at oblast level, which should provide emergency medical assistance, currently consists of a broad range of medical specialties. Among those medical specialties, there is no separate specialty for emergency medicine, nor is there standardized training for a team-based approach to advanced life support (Ministry of Health, 2019a, 2019b).

The Ministry of Health approved new professions for EMS, in accordance with the strategy for the development of EMS, in 2018. The new professional requirements for

paramedics, emergency medical technicians (EMTs) and emergency dispatchers have already been approved by the Government. This allows education institutions to develop new curricula, and regional EMS services are now able to employ such professionals. The Ternopil Medical University and Cherkasy Medical Academy enrolled their first students in the three-year bachelor programme in paramedicine in 2018. At the beginning of 2019, the Ministry of Health, with the assistance of international donors, established the Feldsher to Paramedic Transition programme, which aims to upscale existing EMS feldshers to newly established paramedic standards of practice.



### Ambulances and equipment in EMS

According to official statistics, the EMS fleet in Ukraine consists of 3118 ambulances (0.7 per 10 000 population), with most (92%) being type B (emergency ambulances) and the remaining type C (mobile intensive-care units (ICUs)) (USPCEMDM, 2016). This is in line with other European countries in which type B ambulances are most commonly used (WHO Regional Office for Europe, 2008).

Official EMS statistics report that most ambulances in Ukraine are equipped with ventilators, defibrillators and cardiographs, as reported by regional administrations to the Ministry of Health, in contrast to recent studies that suggested a critical shortage of equipment for airway monitoring and management (Gaievskiy & Meghoo, 2019).



## Dispatching and research in EMS

EMS in Ukraine are accessible by calling the unified telephone number 103, either by landline or mobile phone. Accessing this number alerts only an emergency medical response, without simultaneously alerting emergency fire services or police (Ministry of Health, 2019a). **Most EMS dispatch centres have neither centralized nor computerized call-tracking systems. Substations' dispatch centres still use paper-based registration systems.** After the adoption of the new law in 2012, nine regions have equipped their dispatch centres with central computerized systems. Despite these improvements, there are no algorithms for call prioritization and coding.

The regulations state that all emergency medical dispatchers are now required to have a feldsher or nursing degree, but undergoing standardized training on operating the dispatch system is not a prerequisite to working as an emergency medical dispatcher (Ministry of Health, 2019a). In 2019, the Ministry of Health established new professional requirements for emergency medical dispatchers, including standardized training on operating the dispatch system. New training programmes are being developed by the Ministry.

The main institution responsible for conducting research and setting standards in Ukrainian EMS is the USPCEMDM, which develops national EMS treatment protocols and publishes annual EMS statistics. The publication of the USPCEMDM is called

the Report of EMS station #22. In 2019, internationally recommended EMS protocols were translated and adopted by the Ministry of Health. Previous to this, EMS treatment protocols had last been revised more than five years earlier. Publications by the USPCEMDM in international peer-reviewed scientific journals are scarce.



## Service delivery of EMS

The Order of the Cabinet of Ministers of Ukraine #1119 states that **the required EMS response time to urgent calls is 10 minutes in urban areas and 20 minutes in rural**, and up to two hours for non-urgent calls (Cabinet of Ministers of Ukraine, 2012). The required response time is in line with standards in other European countries, which range from eight minutes (Spain and the United Kingdom) to 20 minutes (Czechia) (Bos et al., 2010). Official statistics submitted to the Ministry of Health by the regional administrations suggest this requirement is met in 90% of cases in urban areas and 85% in rural territories (USPCEMDM, 2016). The absence of computerized dispatch recording systems, however, makes these numbers difficult to validate.

According to the registry, EMS dispatch centres in Ukraine receive 9 465 137 calls (223 per 1000 population) and deploy ambulance responses in 8 400 770 cases (198 per 1000 population) every year (USPCEMDM, 2016). These numbers are significantly higher than those in other countries (Bos et al., 2010; Norwegian Directorate of Health, 2018).





# METHODOLOGY



**D**ue to the complexity and broad range of the research question and objectives, the study utilized diverse methodological approaches for the different aspects studied. In general terms, it was a cross-sectional study with retrospective elements.

Qualitative and quantitative components were included to cover all levels of the EMS system from regional health administration staff to ambulance drivers, with end-user patients included. The results presented are for areas of Luhansk and Donetsk oblasts. The remaining oblasts and central Ministry of Health staff will be covered by the next phase of the study, which is due to start in mid-2019. The patient study sample was chosen from patients admitted to hospital who had used EMS, to avoid recall biases and to ensure face-to-face interview opportunities.



### Three-phased approach

The EMS survey was divided into three phases.

The pilot study in Phase I was carried out with the support of a small sample (N = 11) of health-care workers in Kyiv, with the goal of finalizing and checking the quality of the data collection tools and other procedural and managerial features. The questionnaire was uploaded onto tablets after being translated into Russian and Ukrainian.

The second phase of the study (Phase II) consisted of engaging stakeholders in the areas of Donetsk and Luhansk oblasts. Three groups of interviewers were formed (four consultants and four WHO staff), and each was trained on the survey background, methodology, aim, qualitative and quantitative questions and how to operate tablets. The survey was then conducted with close monitoring and technical support from the WHO team in Kyiv. Results of the survey were sent for analysis. In the meantime, a feedback form was distributed to the interviewers for their inputs to improve the survey questionnaire and methodology, the results of which will be integrated in the next and last phase.

Phase III will expand the survey to the remaining regional EMS centres and central Ministry of Health staff, depending on the funding and human resources available.

The Luhansk and Donetsk oblasts are highlighted in this report due to the current conflict situation in these oblasts and the humanitarian challenges that arise.

**Semi-structured and fully structured questionnaires were used, with an assisting data-collection tool.** This methodology allowed the development of a broader understanding than would be possible with quantitative data alone. Responses to the qualitative questions were coded and similar answers were combined to allow summarizing of key themes. Enumerations of these summarized responses are provided in the results section. Responses were originally in Ukrainian, but analysis was performed after translation to English.

Quantitative data were obtained through guided interviews or by providing a respondent with a hard copy of the questionnaire to submit later, after which answers were uploaded to the tablets.



### Sample

#### *Kyiv pilot*

The quality of the questionnaire translation and its relevance was tested by interviewing 1–2 respondents of each group (such as ambulance doctors, nurses and EMS directors).

#### *Oblasts of Donetsk and Luhansk*

The target of the study was to obtain a representative sample of the different subpopulations in the survey. For some subpopulations, the survey sampled all available participants, while for others, it sampled only a very small fraction. There was no sampling frame (a list of all those within a population who can be sampled) for individuals, but fairly complete sampling frames were in place for hospitals and other emergency units. The interviewer teams visited

all the large EMS establishments in Luhansk and Donetsk and interviewed available staff or patients. The adopted principle was to ensure the highest coverage, and confidence intervals (CIs) were calculated based on the numbers of respondents. For patients, the study aimed to achieve a precision of 5% (half the width of a 95% CI), so over 500 patients were interviewed. The aim for the other subpopulations for the whole of Ukraine was to reach a precision of 10% by aiming to interview 78 people.



### **Data collection and ethical considerations**

Qualitative and quantitative data were collected through direct interviews. The quantitative interviews were registered in electronic format using tablets, and the interviewers took notes during interviews for the qualitative interviews. The qualitative interviews were translated at a later stage. The objectives and methodology of the study were explained to interviewees in person.



### **Data analysis**

After adapting the theoretical framework, the following aspects of EMS were studied:

- demand and efficiency
- operational attributes
- financial attributes
- quality attributes
- user level of satisfaction and public information
- human resource attributes
- legal framework.

The quantitative questionnaires were analysed mainly by enumerating the responses and calculating the fraction of respondents for each alternative. The purpose of the analysis was mainly descriptive, but 95% CIs are provided for all comparisons. Associations were then assessed with a chi-squared test for contingency tables or a Fischer's exact test when the cell numbers were too small for reliable use of the chi-squared test.



### **Limitations**

Limitations that could be noted at this stage of the survey's evolution include: the selection of certain groups, as there is only one EMS director per oblast; sample size, as some areas were not accessible due to context; self-reported information; substandard quality information from the registry; and translation errors.

*The pilot study was carried out with the support of a small group of health-care workers in Kyiv*





# RESULTS



Full results from the quantitative and the qualitative interviews are presented. The groups interviewed and respective sample sizes are shown in *Table 1*.

*Table 1. Sample size of qualitative and quantitative interviewees (EMS staff and patients)*

Group	Qualitative respondents	Quantitative respondents
Regional EMS directors (census)	2	2
Doctors in hospitals	13	15
Doctors/nurses/feldshers in ambulances	34	35
Drivers	13	12

Group	Qualitative respondents	Quantitative respondents
Dispatchers	11	12
Oblast-level financial administrators (census)	2	2
Establishment-level financial administrators	15	15
Medical students	17	NA
Lecturers in medical universities	11	NA
Patients	NA	523
Oblast-level registries	NA	2

*NA = not applicable.*

## Interviews with directors of clinics/EMS directors



### Budget

Both EMS directors state that EMS are underfunded.

- Funding for EMS comes centrally through the regional administration, with potential top-ups from regional or local governments.

Clinic directors in Luhansk say they need 350 million UAH and those in Donetsk 750 million UAH for EMS.

- This means a budget increase of 40% in Donetsk and a staggering 350% in Luhansk.
- Services suffering most from underfunding are medicines and supplies, medical equipment, ambulance maintenance, human resource salaries, training simulation and logistics (repair of premises and garages).

EMS directors use population density and number of cases and calls as the main source for calculating the required funding for EMS, and one reported also using the number of facilities.

- There are enough hospitals at levels 1 and 2, but the concept of the ED is not yet being implemented.
- Ambulances and EMS staff are distributed in both oblasts based on population density (one brigade per 10 000 population).



### Dispatch centres

Dispatch centres are not centrally connected in Luhansk, with each station operating autonomously, but those in Donetsk are reported to be functionally connected.

- Luhansk has 15 dispatch centres and Donetsk has seven.

- Regional centres, stations and substations exist in both oblasts. The stations administer EMS across a larger area, and the substations are where the ambulances are stationed.
- Donetsk has one central dispatch centre that takes all calls from the oblast and directs all ambulances.
- In Luhansk, each station or substation takes calls and operates autonomously.
- Donetsk has a computerized system for dispatch–ambulance, while there is no such computerized system in Luhansk.
- Time to arrival on-site and the percentage of hot calls responded to on time are the main criteria used to evaluate the efficiency of dispatch centres (one also uses percentage of hospital referrals and the attendance registry).
- Ambulance staff can communicate with the receiving hospital prior to arrival at the hospital.
- There is no computer program in Luhansk for evaluating performance in full and no global positioning system (GPS) for ambulances.
- Both oblasts have types A, B and C (ICU) ambulances, the use of which is determined by dispatchers or the head of department.
- Telephone consultations are provided when there is no need for an ambulance in Donetsk, but not in Luhansk.
- EMS have a unified telephone number with an available backup number, but not caller-locator GPS.
- A quality and monitoring system is in place to evaluate the dispatch centres.

The proportion of non-urgent calls responded to by dispatchers (according to the EMS directors) is 1% in Luhansk and 20% in Donetsk.

- One director suggested transferring non-urgent calls to a primary care physician.



### Protocols and collaboration

Neither oblast has a clear emergency medical dispatch protocol reference system.

- The computerized system in Donetsk fulfils some of the functions of such a system, but is lacking prioritization algorithms.
- Both oblasts collaborate daily with police and rescue services: Donetsk has a chemical, biological, radiological and nuclear materials (CBRN) protocol, while there is a CBRN plan of unknown functionality in Luhansk.

**A triage protocol based on the national standard triage protocol is in place for ambulances.**

- Neither oblast has a real-time system for identifying available ICU beds in hospitals, but dispatchers sometimes call hospitals to find out.



### Ambulance maintenance

**Ambulance maintenance is carried out on demand and, in some cases, yearly.**

- No national requirements for ambulance maintenance exist.
- Ambulance equipment in one of the oblasts has not been updated in the last four years.
- Ambulances in Donetsk are checked daily.
- Luhansk does not have a transportation department.



### Education and training

**No solid protocol for organizing a continuous training programme is in place; programmes mainly are director-led.**

- One oblast provides training after analysis of data and in response to recommendations or requests from staff.
- Training once every five years for feldshers and doctors is also provided, in accordance with an order of the Ministry of Health.
- Physicians can lose their specializations if not recertified.



## Problems and solutions

Directors in both oblasts are able to identify problems that affect their day-to-day work.

- The director from Luhansk reports problems with communication and states that while there is sufficient medicine and equipment, medical staff and drivers are lacking. A radio station is suggested as a potential solution to the communication problems.
- The director in Donetsk reports the absence of all-wheel-drive certified vehicles, lack of medical staff, retirement-age workers, and the need

to upgrade premises and salaries for all staff, stating that the Military Civil Administration has no authority to write-off fixed assets to allow for replenishment.

- Cited reasons for problems in Donetsk include communication problems, lack of investment in, and motivation of, personnel, the need for remote mobile base stations for ambulances and lack of a regional council due to security challenges in the area. Installing and improving financing and training in Donetsk are proposed as solutions.

## Interviews with doctors in hospitals



## Reception at hospital

Over 50% of physicians report having a paper-based internal registry and 30% say it is shared with local city authorities.

- All say that incoming alerts about accidents or referrals are received and the alerts are sent by phone, but it is unclear if they are alerted by the ambulance before it reaches the hospital or later by the hospital after the arrival of the ambulance.
- They all confirm that there is an alert system to inform the ED about incoming cases or referrals.
- Eighty per cent report that responding ambulances belong to EMS.
- All report that a hospital disaster plan is in place: 27% have had a drill in the previous month, 13% in the previous 2–3 months, 13% in the last 4–6 months, 27% in the last 6–12 months and 20% more than a year ago.

- Seventy-two per cent say regional hospitals have admission departments, 45% that district hospitals have them, and 36% general hospitals.
- All doctors interviewed say their hospital has a trauma specialist, and all of the hospitals receive trauma cases.
- The doctors report no patient requirements to access the admission department, but foreigners might need identification verification documents.

The doctors believe that delays in the admission department are due mainly to lack of the ED concept, specialists, medicines and even materials.

- They also mention mass admissions, insufficient equipment, ED services not being available and insufficient premises.
- Sixty-nine per cent of doctors say triage is done by the admission department doctor.



- Sixty-seven per cent say there is a national standard for the ED and 94% that the ED is not financially separate from the rest of the hospital.
- Eighty-three per cent say an emergency protocol is in place and 92% claim they have a CBRN plan.
- Hospital doctors state that secondary referral is done by medical services (30%), hospital transport (8%) and redirecting the ambulance (52%). The main reasons for secondary referral are the need for highly specialized care (54%), oncology (15%), cardiology (15%), haematology (8%), burns care (8%), neurosurgery (8%) and paediatrics (8%).
- Fifty-three per cent state that they perform endotracheal intubation in the ED, while 80% specify that they do not perform a lactate test for multi-trauma patients.
- Eighty-seven per cent indicate that their hospital does not provide mobile clinics and state that the hospital provides physiotherapy or rehabilitation, and 73% say free limb prostheses are not available.



### Staffing and working environments

All doctors are dissatisfied with their salaries, but 67% are satisfied with their working conditions.

- Seventy-three per cent report having the tools and equipment they need for their job.
- The working pattern of most (83%) doctors is organized in daily shifts to cover 24 hours, while the remainder (25%) are limited to being on call.
- In some hospitals, general surgeons are on duty 24/7 and traumatologists are on call.
- Forty-six per cent report having adequate staff but 54% say they need more staff. Many of those that report understaffing work in large hospitals.

**Eighty-five per cent say they would not change their job if they had the chance.**

- For those who would accept a career change, the main causes of job

dissatisfaction are irrelevant legislation, poor working conditions, lack of safety, low prospects of future improvements and modest salaries.

**The main recommendation the hospital doctors want to relay to their leadership to improve working environments is to increase salaries (100%).**

- They also want to improve equipment (54%), improve organization (23%), make legislative improvements (8%) and reduce the burden on doctors (8%).



### Education and training

**A range of training opportunities is available for doctors.**

- Doctors state that their establishments provide advanced trauma training (43%), basic trauma training (35%), training for mass casualty situations (28%) and other types of training (50%) for ambulance staff (including classes with doctors at hospital, yearly courses, emergency courses and infectious disease control).
- Sixty-one per cent mention that they have had a CBRN drill in the previous year.



### Problems and solutions

**During the interview process, doctors mentioned specific problems. These include:**

- lack of equipment, decreased public respect for the medical profession, minimum guarantee of EMS funding by law, outdated legislation, outdated treatment guidelines for patients with, for instance, acute myocardial infarction, absence of patient referral systems and the need to improve media perceptions;
- 44% of the doctors who identify possible problems during their work process say that the main problem is late encounters with the patient;
- another 44% identify problems related to aggressive or intoxicated patients, in addition to non-emergency patients, lack of premises and isolation facilities in patient rooms for those with infectious diseases; and

- the doctors acknowledge that the main reason for these problems is lack of knowledge of EMS and social conditions in the country; they also cite state building codes (which make it difficult to construct proper premises), finance, doctor burnout, low quality of ambulance crews, human factors and the absence of premises as causes of the problems they observe.

Most doctors (73%) suggest that these problems must be solved at societal level by normalizing the social and economic situation or by educating the public.

- Others mention the need to repair and improve premises, offer more training for doctors and increase their stress tolerance.

## Interviews with ambulance doctors/feldshers/nurses



### Pre-shift routines

The ambulance personnel report taking the following actions before the start of a shift:

- checking medicines (88%)
- checking equipment (88%)
- checking cars (79%)
- checking documents (70%)
- getting uniforms (67%)
- following the protocol (6%)
- preparing the shift (6%)
- reporting in the journal (6%)
- checking the outpatient clinic (3%).

When replenishing medical supplies, they:

- replenish at the station (22%)
- check that equipment is registered (16%)
- check that equipment is from the warehouse (13%)
- replenish with a senior paramedic or feldsher (9%)
- replenish before the shift (6%) and after each departure (6%) or as required (6%)
- use a token system (6%)
- replenish any time during the day (6%)

- keep stock for at least four departures (3%)
- replenish at the middle or end of the shift (3%).



### Equipment

The medical personnel in ambulances say they bring the following equipment when going to a scene without information about the case:

- cardiograph (58%)
- defibrillator (50%)
- medicine bag (35%)
- oxygen (12%)
- stretchers (12%)
- pulse oximeter (12%)
- tonometer (9%)
- blood glucose meter (9%)
- ambu-bag (9%)
- reanimation set (3%)
- nebulizer (3%)
- pump (3%)
- bandages (3%)
- intravenous systems (3%)
- resuscitation kit (3%)

- EMS set (3%)
- other (3%)
- eight per cent say they bring everything that is available, and 15% that everything they need is in the vehicle.



### Staffing and working conditions

All medical ambulance staff report that their salary is unsatisfactory, but overall satisfaction with work conditions is high:

- 86% say their working conditions are satisfactory
- 88% like the way their work is managed
- 80% have the tools and equipment they need for their job.

Twenty-eight per cent, however, would change their job if they had the chance.

- Sixty-eight per cent of the feldshers or nurses would retrain as a paramedic.

When asked how to improve the working environment:

- 97% mention improving salaries
- 58% improving training
- 24% providing better equipment and tools
- 9% providing more staff
- 6% ensuring better organization of work
- 3% want a type B vehicle
- 3% ask for primary care reform.

Specific issues mentioned by ambulance medical personnel during the interview process are the need for:

- better legal and physical security
- more training
- improved protocols
- more medications
- 2–3 medical staff in a team
- better communication with management
- cooperation and a memorandum with police
- keeping EMS teams as they are

- abolishing the paramedic system
- using improved vehicles
- supporting people to be ready for the reform process
- reforming medical insurance
- educating the public
- establishing and equipping training and simulation centres.

Fifty-seven per cent of the ambulance staff are involved in programmes to educate the public in first aid.

The most common emergencies seen are:<sup>5</sup>

- cardiovascular problems (83%)
- trauma (9%)
- loss of consciousness (3%)
- alcohol (3%)
- stroke (3%).

The second most common emergencies are:

- cardiovascular problems (28%)
- stroke (28%)
- trauma (25%)
- hypothermia (9%)
- alcohol (3%)
- influenza or pneumonia (3%).

Ambulance personnel, self-reporting the three most common emergencies seen, cite:

- trauma (34%)
- cardiovascular problems (20%)
- stroke (11%)
- abdominal cases (6%)
- alcohol (6%)
- hypothermia (6%)
- influenza or pneumonia (6%)
- respiratory problems (3%)
- loss of consciousness (3%)
- pulmonary oedema (3%).

<sup>5</sup> The researchers asked several groups to list the most common three emergencies; the report highlights the prevalence of the emergencies to score first, second or third.

Eighty per cent of ambulance staff say they provide oxygen in respiratory arrest/distress.

- The remaining 20% do not have oxygen equipment in their car.

Ninety-seven per cent perform a 12-lead electrocardiogram (ECG) in patients over 35 with suspected cardiac chest pain.

- Ninety-one per cent give aspirin to patients over 35 with suspected cardiac chest pain.

Twenty per cent report that they intubate patients in a prehospital setting, on average performing 36 incubations. Among reasons cited by staff for not intubating in the prehospital setting are:

- lack of practical skills or experience (36%)
- lack of equipment (25%)
- use of laryngeal masks or other alternative methods (25%)
- no identified indicators or need (21%)
- local protocols not including the procedure (4%).

Eighty-nine per cent report that they do not buy medical or other items needed for work from personal expenses. Among the items purchased from personal expenses by the remaining 11% are:

- gloves
- uniforms
- intubation sets
- stethoscopes
- flashlights.

Forty-three per cent of the ambulance staff interviewed work in an ICU ambulance.



## Communication

All confirm that they use mobile phones for communication.

- Sixty per cent say they also have GPS tracking.
- Three per cent have radio.

Sixty-seven per cent use mobile phones for backup communication.

- Fourteen per cent report using their personal phones and 10% those provided by the EMS.
- Ten per cent use the phone at the patient's home.
- Ten per cent use radio.
- Five per cent say there is no backup.



## Updates and training

Forty-seven per cent received their last official update from the Ministry of Health about EMS reform during the week of the interview:

- 22% received it within the year
- 13% within a month of the interview
- 13% within the quarter
- 6% on the day of the interview
- 24% of respondents did not reply.

The preferred routes for receiving official updates is via the website (22%), during meetings and in paper format (22%).

- Eleven per cent like to receive updates via email.
- Eleven per cent like to receive updates via information from management.
- Five per cent say the information could be communicated in any way.
- Five per cent mention that the information should be simple and understandable.

Forty-eight per cent of the ambulance medical personnel had received an upgrade of their training in the previous year:

- 22% received it more than two years ago
- 18% between one and two years ago
- 12% during the current year.

Forty-five per cent of ambulance staff received their last refresher training in 2018:

- 27% received it in 2017
- 27% before 2017.

**Ambulance staff have accessed a range of training opportunities.**

- Fifty-one per cent have received basic trauma training.
- Fifty-one per cent have received training for mass casualties.
- Forty-five per cent have received advanced trauma training.
- Forty per cent have received other training, including: acute coronary syndrome (42%), courses every five years (33%), triage (8%), workout of resuscitation actions (8%), arrhythmias (8%), cardiovascular resuscitation (8%), thrombolysis (8%), sudden cardiac death (8%), infections (8%), ABC of major trauma (8%), cardiovascular resuscitation of infants (8%), provision of EMS in different conditions (8%) and lectures (8%) (this has to be seen in the light of mandatory regular continuous medical education courses).



### Protocols

**Ninety-four per cent indicate that a written triage protocol is in place at prehospital level and all say there is a protocol for EMS treatment. The protocols in use are:**

- local protocols based on those of the Ministry of Health (29%)
- Order of the Ministry of Health # 34 (26%)
- unified clinical protocols of the Ministry of Health (20%)
- acute coronary syndrome (17%)
- stroke (11%)
- hypertensive crisis (9%)
- hyperthermia syndrome (6%)
- influenza (3%)
- triage (3%)
- polytrauma (3%)
- acute abdomen (3%)
- poisoning (3%)
- bleeding (3%)
- all active protocols (3%)
- Order of the Ministry of Health # 232 (3%)

- anaphylactic shock (3%)
- Order of the Ministry of Health # 430 (3%)
- Order of the Ministry of Health # 233 (3%)
- trauma (3%)
- epilepsy (3%)
- pulmonary oedema (3%)
- shock (3%)
- 3% could not remember.

**Fifty-one per cent find the protocols good, 45% believe they are neither good nor bad, and 3% say they are very bad.**

- Ninety-four per cent say they and their colleagues follow the protocols, while 6% sometimes do so.



### Problems and solutions

**Ambulance medical personnel identify the following problems in their work process:**

- difficult or aggressive patients (79%)
- bad roads and difficult access (70%)
- false calls (23%)
- communication problems (20%)
- unleashed dogs (17%)
- missing and old equipment and supplies (13%)
- overweight patients who are difficult to carry (13%)
- lack of qualified personnel (13%)
- time limits (3%).

**They indicate the reasons for those problems as:**

- lack of community awareness (80%)
- road conditions (73%)
- lack of coordination and communication (33%)
- lack of staff (20%)
- false calls (13%)
- lack of equipment (13%)

- long working hours (7%)
- lack of medicines (7%)
- drunken patients (7%)
- low salaries (3%).

Their suggestions on how to resolve the problems are:

- educate the public (38%)
- improve primary care (31%)
- improve and update legislation (17%)
- improve roads (10%)
- collaborate with police or security services (7%)
- update vehicles and equipment (7%)
- increase salaries (3%)
- decrease arrival times (3%)
- improve triage of calls (3%)
- incorporate EMS into primary care (3%).



## Violence at work

Among the ambulance staff, 49% report having been victims of violence during work. Of these:

- 88% have experienced violence from the patient
- 70% from a relative of the patient
- 41% from a bystander
- 12% from other sources, including dogs.

Seventy-four per cent of the ambulance medical personnel claim not to have a protocol on how to protect themselves from violence. Of those who have such a protocol,

- 88% find it useful
- 11% find it more useless than useful
- all say they and their colleagues follow the protocol.

## Interviews with drivers



## Pre-shift routines

Drivers report taking the following actions before the start of their shift:

- checking the technical condition of the ambulance (67%)
- checking and refilling fuel (33%)
- checking medicines (25%)
- checking water (17%)
- checking battery levels (17%)
- checking mechanical parts (17%)
- checking oil (17%)
- alcohol test (8%)

- taking the operational order (8%)
- transferring vehicle from the previous shift (8%)
- checking oxygen (8%)
- checking equipment (8%).



## Working environment

The drivers recommend the following to improve the work environment:

- improve salaries (100%)
- improve organization of shifts (33%)
- improve equipment (33%)
- improve organization of work (8%)

- provide 4x4 cars (8%)
- make car wash facilities available (8%)
- other issues include improving facilities, not wanting to study to become an EMT, liking their job as a driver, studying if there was a financial incentive, renewing vehicles, having more control over the quality and frequency of transport service, and having a mandatory uniform.

Forty-two per cent have used personal expenses to buy medical or other items needed for work. Items purchased with personal funds include:

- wheels and tyres (40%)
- bulbs (40%)
- supplies of spare parts (20%)
- brushes for washing (20%)
- screenwash (20%).

All drivers say their salary is unsatisfactory, and 92% would retrain as an EMT if the opportunity arose.

- Thirty-three per cent would change their job if they had the chance, and all of them report that they would like to retrain as an EMT.

Eighty-three per cent report that their working conditions are satisfactory and 83% like the way their work is managed.

- Sixty-seven per cent feel they have all the tools and equipment they need to do their job.

Forty-two per cent report that they work in an ICU ambulance.

Eight per cent are involved in a programme to educate the public about first aid.



## Communication

The following means of communication are used by ambulance drivers:

- mobile phone (100%)
- personal phone (38%)

- tablet (23%)
- GPS (15%)
- any landline telephone or at a police station (8%)
- radio (8%).



## Training

All drivers had refresher training in 2018.

- Half of the drivers who replied to a question about their last training opportunity had received the training:
  - within the previous six months
  - 25% had not received training
  - 25% had had training more than six months ago.
- Three drivers commented on how often training should be available – two said monthly and one quarterly.



## Problems and solutions

The following problems with the work process are identified by drivers:

- bad roads and difficult traffic (75%)
- difficult or aggressive patients (33%)
- vehicle-related problems (25%)
- work organization (25%)
- non-core calls (8%)
- low salary (8%)
- district hospitals refusing to admit patients (8%)
- difficulty in carrying heavy patients (8%)
- legal insecurities (8%)
- having nobody nearby to ask for help (8%).

They suggest that the main reasons for these problems are:

- population misunderstandings of the service (38%)
- bad roads and traffic (23%)
- lack of spare parts for vehicles (8%)
- (23% had no suggestions).

Proposals to resolve the problems include:

- public outreach (25%)
- improved ambulance maintenance (25%)
- contract with security services (8%) and administrative penalties
- control of the situation by the police (8%)
- increased funding for transport (8%)
- joint raids with police to detect violators every month (8%)
- 24-hour instead of 12-hour shifts (8%)
- (25% did not know).



### Violence at work

Thirty-three per cent have been a victim of violence during work. All drivers who have

been victims of violence had been confronted by a relative of the patient, but 75% have also experienced violence from:

- a bystander (50%)
- the patient
- 25% from “other”.

Eighty-three per cent do not have a protocol on how to protect themselves against violence.

- The two drivers who report having such a protocol find it more useful than not.
- Protocols are being followed by drivers and their colleagues.

## Interviews with dispatchers (call receivers)



### Working environment

Ninety-two per cent of dispatchers feel their salary is unsatisfactory, but 83% report that their working conditions are satisfactory.

- Seventy-five per cent like the way their work is managed.
- Seventy-five per cent report that they have all the tools and equipment they need to do their job.
- Seventeen per cent would change their job if they had the chance.

To improve work satisfaction, the dispatchers propose:

- improving salary (100%)
- improving equipment (54%)
- improving organization of work (27%)

- other issues mentioned by dispatchers are educating the public, providing practical training courses on the coordination of rescue agencies, providing stress management courses, the need for increased knowledge of reform to improve cooperation and the need for more staff.

The most common emergencies self-reported by dispatchers are:

- loss of consciousness (42%)
- cardiovascular problems (33%)
- trauma (17%)
- stroke (8%).

The second most common are:

- trauma (33%)



- cardiovascular problems (33%)
- respiratory (17%)
- hypothermia (8%)
- pathologies associated with pregnancy (8%).

#### The third are:

- cardiovascular problems (50%)
- hypothermia (17%)
- loss of consciousness (17%)
- trauma (17%)
- paediatric emergencies (8%)
- stroke (8%).

#### On average, 35% of the calls dispatchers respond to are non-urgent.

- Seventy-five per cent say they could send police or security services instead of an ambulance as a first responder.
- Ten per cent say they could send volunteers as first responders.

#### Seventy-five per cent do not have real-time knowledge of available ICU beds in hospitals.

- Of the 25% who did so, they acquire the information by calling the hospital.

#### Seventeen per cent of dispatchers are involved in programmes to educate the public in first aid.



### Training

#### Forty per cent of dispatchers had their last training in the previous two years.

- Forty per cent had their last training before 2017.
- Twenty per cent claim they have never had training.
- Eighty per cent want training upgrades every five years and 20% every six months.
- Thirty per cent have received basic trauma training.
- Ten per cent have had training for mass casualties.

- Seventy per cent have had “other” training, which includes refresher training every five years, paramedic courses and lectures at the substation.
- Dispatchers who are feldshers access monthly self-study training, training every four years and courses on communicating with people. Sixty per cent received their last refresher training before 2017, 30% in 2018 and 10% in 2017.



### Protocols

#### All dispatchers say there is a written protocol for their prehospital work, identifying the following protocols:<sup>6</sup>

- call acceptance algorithm (25%)
- hypertension (25%)
- Order of the Ministry of Health # 34 (17%)
- coronary artery disease (17%)
- hyperthermia (17%)
- response to stopping breathing or fainting (8%)
- resuscitation (8%)
- intercommunication protocols (8%)
- paediatrics (8%)
- unified clinical protocols (8%)
- first aid in the prehospital setting (explanation by telephone) (8%)
- shock (8%)
- 75% find the protocols very good or excellent and 25% neither good nor bad, but all dispatchers say they and their colleagues follow the protocols.



### Problems and solutions

#### Dispatchers identify the following problems during their work:

- communications problems (45%)
- bad roads (27%)
- aggressive and difficult patients (27%)
- non-core calls (27%)
- no differentiation between emergency and urgent care (9%).

<sup>6</sup> All are Ministry of Health protocols.

The main reasons for these problems, as suggested by the dispatchers, are:

- uninformed population (44%)
- communication problems (33%)
- lack of primary care capacity (22%)
- fastidiousness of elderly patients (11%)
- the special status of the region (11%)
- “cannot be determined” (22%).

To resolve the problems, the dispatchers suggest:

- educating the public about EMS and primary care (56%)
- improving communication (56%)
- securing sufficient funding (11%).



## Violence at work

Half of the dispatchers have been victims of violence during work:

- 67% of whom reported having been victimized by the patient
- 50% by a relative of the patient
- 17% by others, including neighbours and intoxicated people.

Three-quarters report not having a protocol for protecting themselves against violence; of those who do have such a protocol:

- 67% say it is more useful than not
- 33% that it is neither useful nor useless
- 67% report that they and their colleagues follow the protocol.

## Interviews with financial administrators at oblast level



## Budgeting

The main algorithm used at oblast level for EMS budget calculations is based on the number of cases and calls and available ambulances.

One financial administrator reported the breakdown of the EMS budget in the oblast.

- The main expense is human resources, accounting for 68% of the budget, followed by medicines (12%), equipment (5%) and training (1%), with 14% assigned to issues such as utilities, spare parts, gasoline and office premises.
- When asked about how this distribution could be changed, an administrator suggested that the main change needed is an increase in the overall budget.

One administrator believes EMS is underfunded in the oblast and one that it is not.

- The administrator who claimed there is underfunding identifies medicines, ambulance maintenance and equipment as the areas that suffer most due to underfunding. Additional financing of 4 million UAH for vehicle maintenance, 1 million UAH for equipment and 37 million UAH to purchase 46 vehicles is needed.

The EMS budget comes from oblast level and is approved centrally by the Ministry of Health, which uses cost per capita, yearly budget analysis and the number of requests from the field as mechanisms to check whether EMS funding is sufficient.

- There is no follow up on financial flows in EMS in Donetsk, but field inspections are in place in Luhansk to check budget use.

Both financial administrators agree that patients do not need to pay for EMS, but patients may be asked to pay out of pocket to procure drugs in hospitals.

- Care is provided free only for the first day.
- The financial administrators confirm that emergency care is free of charge and there is no need for co-payments.
- Both oblast-level financial administrators say their oblast has a written budget.
- One claims there are budget deficits at the end of every year.
- The other says this is not the case, conceding, however, that there is a lack of follow up of financial flows.

The total funding of EMS is reported to be 400 million UAH in Donetsk and 125 million UAH in Luhansk.

- The administrators feel the EMS in Luhansk is underfunded, but not in Donetsk.
- Both say a verification mechanism is in place to ensure EMS funds are sufficient and claim the oblasts have financial tracking mechanisms.
- No emergency budget reserve for EMS exists in Luhansk, and it is unknown if there is one in Donetsk.

## Interviews with establishment-level financial administrators



### Budgeting

The average budget for the establishments included in the survey is 100 million UAH.

- The average total funding for EMS is 50 million UAH, 5 million UAH of which on average is assigned to admission departments.

The main flow of funding towards the establishment comes from:

- local budgets (regional health administration) (93%)
- state budget (20%)
- sponsorship (7%)
- income from non-free medical services (7%)
- charity (7%).

When asked about how the budget is distributed:

- 27% say according to the plan

- 7% according to needs
- 7% say the money flows from top to bottom
- 7% would like to have a more flexible budget.

Three respondents included a breakdown of the budget, with salaries making the largest contribution, at an average of about 70%. Other large items include:

- supplies
- medications
- communal services.

Eighty per cent believe EMS are underfunded in their establishment. They report that the amount of underfunding is:

- unknown (27%)
- 1–20 million UAH (20%)
- 10–25 million UAH (20%)
- 25–50 million UAH (13%)

- 0 (13%)
- one respondent claims that 90% of medical treatment is not funded.

When asked what EMS areas suffer from underfunding:

- 67% mention medications
- 40% salaries and human resources
- 20% ambulance maintenance
- 20% food for patients in hospital
- 20% services
- 20% capital expenditures
- 20% feel there is no underfunding.

The procedure for requesting funds is through application to:

- the regional department of health for 40% of administrators
- local level for 40%
- at national level for 13%.

Forty-three per cent do not have a mechanism for checking if funding for EMS is sufficient, but 50% do a budget analysis to determine if the funding is adequate.

The administrators report that financial flows are tracked against the financial plan (33%), but 17% have no tracking mechanism.

- Departments submit reports (8%).
- Medical facilities have accounts with the Ministry of Finance (8%).

- Head nurses create procurement plans (8%).
- The health department controls all financial flows (8%).
- Ministry of Finance (8%).
- Statistics departments report from hospital wards (8%).

All report that EMS are free, but payment might be required in hospital.

Sixty per cent of establishment financial administrators say their establishments never run out of budget before the end of the year, but:

- 20% say they more commonly do not run out
- 13% that they run out every year
- 7% that they sometimes run out.

Sixty per cent report having a verification mechanism to ensure EMS funds are sufficient in the establishment.

- Ninety-four per cent report a financial tracking mechanism in the establishment.

Fifty-three per cent say their admission departments have a budget reserve available in case of disaster.

- The average budget reserve is 7% of the total establishment budget.

Fifty-six per cent say prostheses are available for free.

## Interviews with students



### Future careers in EMS

Eighty-seven per cent say the prospect of a career in EMS is interesting, but 56% are not considering it due to reasons including:

- it is too stressful (12%)
- they would like to learn more (6%)
- they have had a negative experience when working in EMS (6%)
- it is not very popular (6%).

When asked how to make the EMS specialty more interesting:

- 59% suggest improvements in university and study
- 44% propose improvements to the EMS system.

Suggestions for changes at university include:

- more training, exercise and practice (58%)
- more information about EMS (6%)
- studying contemporary technologies (6%)
- including students in the real life of EMS (6%)

- creating dedicated courses for year 5–6 students.

Suggested improvements related to the EMS system include:

- improving EMS vehicles (18%)
- improving work conditions (18%)
- increasing pay (18%)
- improving supplies and equipment (18%)
- informing the population about EMS (6%)
- reforming the EMS system to look more like those elsewhere in Europe and in the United States of America (6%).

## Interviews with lecturers



### Student interest

Fifty-four per cent of the professors report that while there is student interest in EMS, issues such as the following reduce their interest:

- low salary (9%)
- fear of emergency situations (9%)
- lack of specialized courses (9%)
- fear of assuming responsibilities for people's lives (9%)
- lack of financial support to create an EMS course at university (9%).

Nine per cent of professors nevertheless believe interest would grow as EMS developed.

When asked about how to expand interest in the EMS specialty among students:

- 64% of professors mention improvements that could be taken forward at university level
- 45% mention improvements to the EMS system.

Suggested university-level improvements include:

- more practical lessons, including simulations with mannequins (30%)
- provision of emergency medicine courses (30%)
- making new methods and technologies clear to students (20%)
- providing more information about EMS specialties (10%)
- organizing events, training and seminars (10%)
- engaging students to work in EDs (10%).

## Interviews with patients



Thirty-five per cent of the interviewed patients had finished high school as their highest educational degree, 24% college and 25% university. The remaining 16% had not completed high school.

The self-rated severity of illness was higher in Donetsk than in Luhansk.

- Sixty-four per cent rated their illness or injury as severe, 32% as moderate and 4% as mild.
- For 54% of patients, it was the first time in the last two years that they had called EMS due to personal ill health.

Ninety-eight per cent of patients rate the politeness and professionalism of the dispatchers as 7 or higher on a 10-point scale.

- Sixty per cent could distinguish between different roles in the EMS team.
- Sixty per cent report that they had always been kept informed of the procedures they would receive during their stay in the hospital, 28% were sometimes informed and 12% were never informed.

Almost all patients (99.6%) report that they did not have to pay anything through the process of receiving EMS, but had had to spend an average 3600 UAH on medical services (2100 UAH in Luhansk and 4300 UAH in Donetsk) at hospital level.

- This is similar to the average monthly income the patients reported of 3850 UAH (3185 in Luhansk and 4200 in Donetsk).

Ninety-two per cent of patients are satisfied with EMS:

- 5% are neither satisfied nor dissatisfied
- 2% are not very satisfied
- 1% are dissatisfied.

When asked about what they like best about EMS, patients answer:

- staff professionalism (49%)
- short arrival time and fast service (24%)
- everything (or nothing in particular) (15%)
- quality of the service (7%)
- qualifications of the team (2%)
- good and clean ambulance (2%)
- good communication (0.2%).

One per cent cite negative opinions that include:

- logistical failures (old vehicle, cold in the vehicle)
- administrative failures (left in gynaecology department)
- lack of professionalism.

When asked what the ambulance/hospital staff could have done to make the experience better, 60% of patients answer “nothing”.

Other comments include:

- have better vehicles (12%) and improved roads (8%)
- improve EMS staff salaries (5%)
- improve hospitals (4%) and equipment (3%)
- increase the range of medications in EMS (2%)
- make medications more affordable or free (1%)

## Registries

- improve arrival times (1%)
- other suggestions include: improve the dispatcher service, increase staff numbers, improve working conditions, increase the number of EMS teams, improve communication with the team, include a physician in the EMS team, have a procedure for transport back home, collaborate with international organizations, address cultural issues, decrease the cost of diagnostic services, provide more information to patients, provide free services (surgery), have better transportation services, have stretchers in the vehicle, create better conditions and better triage in admission departments, improve communication and display greater respect for elderly people, have more dispatchers, create a change in the Ministry of Health leadership, and improve EMS responsiveness for ordinary cases.

### Problems patients encounter include:

- having no EMS station in their village
- hospital services not being free (the patient was asked for money to be transferred to hospital)
- having to call the service more than once
- bureaucracy in hospital
- a patient's case being published online without consent
- not having the required drugs
- EMS not arriving and having to take a taxi instead
- dispatcher refusing to send a vehicle.

The data presented in *Table 2* were collected through the national registry. Certain indicators of the aggregated data are incomplete, imprecise or inaccurate; the information management system is not computerized in Ukraine, so human error cannot be excluded.

*Table 2. Data extracted from national registry*

Indicator	Luhansk	Donetsk
State-owned ambulances	94	371
Number of doctors (full-time)	NA	182
Number of doctors (part-time)	3	4
Number of drivers (full-time)	NA	698
Number of nurses (full-time)	NA	80
Number of paramedics (full-time)	NA	323
Average response time (minutes)	8	10
Number of calls	151 533	451 855
Number of calls that did not lead to dispatch of ambulance	2 171	14 734
Proportion of calls that did not lead to dispatch of ambulances (percentage)	1	3
On-site treatment	114 378	17 291
Proportion of calls that led to onsite treatment (percentage)	76	4
Delivered to hospital	33 096	97 107
Percentage of calls leading to hospitalization (percentage)	22	21
Deaths on arrival	1 430	445
Deaths during transport	129	2

NA = not available.

*Resting area of EMS staff*







# DISCUSSION



Six attributes of the Ukrainian EMS are discussed using the data gathered in quantitative (n = 618) and qualitative (n = 118) interviews, including data from the registry of the Ministry of Health:

- demand and efficiency
- operational attributes
- finances
- quality
- user satisfaction and public awareness
- human resources
- legal framework.



### Demand and efficiency

According to the national registry from 2017, EMS in Ukraine received 187 calls per 1000 inhabitants. On average, 203 calls per 1000 inhabitants were received in 2017 in Donetsk and 211 calls per 1000 in Luhansk. The call rates are similar to those in other European countries; for example, Belgium had 330 calls per 1000 inhabitants, Hungary 200 calls per 1000, Norway 170 per 1000, and the United Kingdom 130 per 1000 (Bos et al., 2010; USPCEMDM, 2016; Norwegian Directorate of Health, 2018).

Based on the national registry, the average time of arrival of the ambulance to the scene in Luhansk was eight minutes and that in Donetsk 10 minutes. Further studies should focus on the duration of the phone calls; in the absence of an electronic registry, human error cannot be excluded.

The most common reasons for the calls are shown in Table 3. Twenty-two per cent of the calls in Luhansk and 21% in Donetsk led to hospitalization. One per cent of calls in

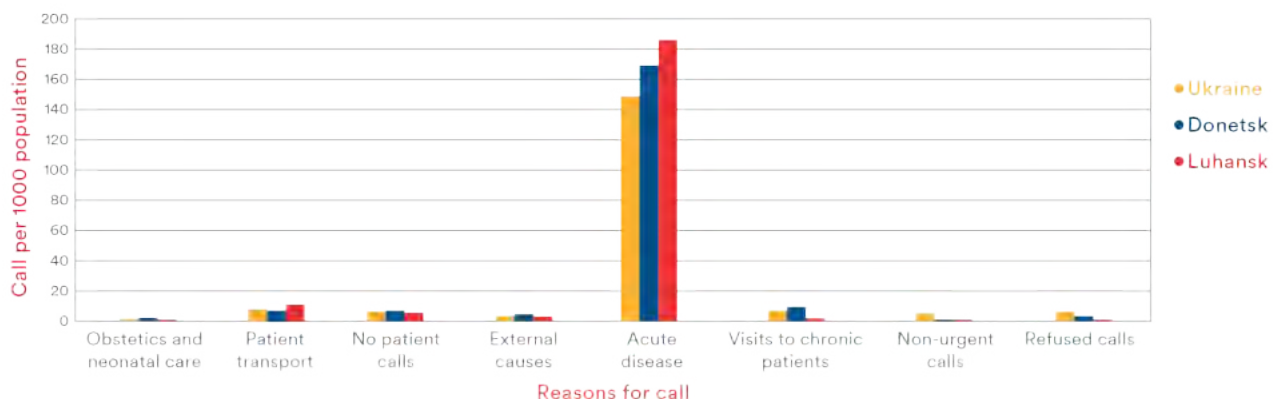
Luhansk and 3% in Donetsk did not lead to the dispatch of an ambulance. This indicates overutilization of ambulances and highlights the need to roll out an updated triage protocol to dispatch centres.

Table 3. Most common reasons for calls in Luhansk and Donetsk

Question	Luhansk	Donetsk
Total number of calls	151 533	451 855
Most common reason for call	Sudden onset of disease 121 914 calls (80%)	Hypertension 73 452 (16%)
Second most common reason for call	Accidents, trauma, food poisoning 9 517(6%)	Trauma 31 039 (7%)
Third most common reason for call	Need for medical transportation to hospital 6 909 (5%)	Arrhythmia 14 034 (3%)
Fourth most common reason for call	Non-justified calls 4 205 (3%)	Asthma 9 982 (2%)
Fifth most common reason for call	Obstetric delivery 351 (0.2%)	Injury 8 349 (3%)

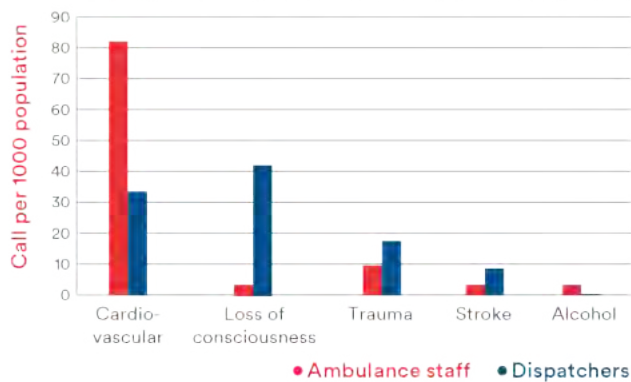
Fig. 2 illustrates the distribution of calls received by the EMS in 2017 and reported by the Ministry of Health medical statistics service (USPCEMDM, 2016). These calls are categorized according to the dispatcher’s interpretation of the case: most fall into the category of “acute diseases”, a categorization that is too crude to allow for optimal use of limited resources. A national standardized case definition would improve the accuracy and quality of information management, which would lead to improved efficiency in the EMS system.

Fig. 2. Reasons to call EMS, per 1000 population



On site, the most common cases ambulance staff observed were cardiovascular-related incidents, while for dispatchers the most common cases recorded were loss of consciousness. The distribution of the most common emergencies is shown in Fig. 3.

Fig. 3. Most common emergencies recorded by dispatcher and seen on site by ambulance staff



There is evidence that the most commonly seen emergency differs between dispatchers and ambulance staff ( $p$  value 0.004); for instance, Fig. 2 demonstrates an over- or underestimation of certain cases, a discrepancy that raises cause for concern. This underlines the lack of standardized case definitions. Dispatchers' lack of precision on case definitions will result in inappropriate use of limited EMS resources, increasing the burden on the system and negatively affecting its efficiency. As a result, patients are unlikely to access timely life-saving medical care. Either ambulances are dispatched to cases where they are not needed, or life-threatening emergencies are not being attended fast enough. Accurate case definition and triage by dispatchers is essential to improving the efficiency of EMS.

The national registry indicates a minimal number of non-urgent calls: 2171 calls out of 151 533 (1%) in Luhansk and 14 734 out of 451 855 (3%) in Donetsk represent a very low ratio of non-urgent calls. This requires further research.



### Operational attributes

EMS directors estimate that the number of hospitals available in Luhansk and Donetsk oblasts is sufficient. Both oblasts have functioning dispatch centres with a unified

EMS telephone number (103) and backup number. Both have ambulances of type A, B and C (see Box 1) that the EMS directors state are distributed based on population density to accord with international guidelines, with one brigade per 10 000 people. This shows that certain essential operational aspects of the EMS system in Ukraine are functioning well.

An EMS system must encompass a spectrum of care, with dedicated prehospital and in-hospital medical facilities. EMS have to be organized to include all necessary services, such as triage, accurate initial assessment, prompt resuscitation, efficient management of emergency cases and transport to definitive care.

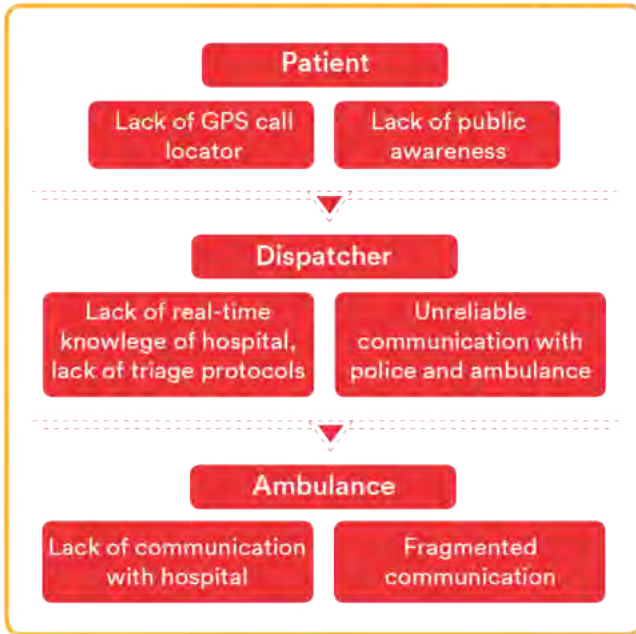
Ninety-two per cent of doctors ( $N = 15$ ) stated that a CBRN plan existed and 61% mentioned having had a drill in the previous year. The EMS directors confirmed that CBRN plans existed, but believed their functionality needs to be tested. Based on this information, it is suggested that a centrally led review of existing oblast CBRN plans should take place regularly and include simulation exercises.

**All EMS interviewees emphasized the necessity to improve communication and coordination among key stakeholders.** Fig. 4 shows the minimum requirements for communication channels in EMS.

#### Box 1. Types of ambulance

Types A and B ambulances are basic ambulances with different equipment and different mandates; type C ambulances are mobile ICUs; type D ambulances are motorcycle ambulances; type E ambulances are small vehicles for minor roads; and type F are helicopters. Type A and B ambulances are staffed by emergency personnel and are used for emergency transportation. They have standard medical equipment for primary airway management procedures and oxygen delivery, such as bag-mask ventilation, oxygen supplements and portable suction. They are equipped with automated external defibrillators, first-aid wound care supplies, intravenous access kits and immobilization equipment. This type of ambulance is the most common. Type C ambulances are equipped with more advanced equipment, such as ventilators, pulse oximeters, a non-invasive transcutaneous pacemaker, a cardiac monitor and defibrillators with (three-lead) ECG monitoring to enable skilful cardiopulmonary resuscitation, airway management and adequate oxygenation. Type C ambulances are also fitted with intravenous access equipment, various devices for immobilization, fluid replacement therapies for cases of hypovolemic shock, and a range of drugs (Papaspyrou et al., 2004).

Fig. 4. Minimum requirements for communication channels in EMS



One of the better functioning areas of communication across EMS is the way in which dispatchers engage with callers: 98% of patients rated the politeness and professionalism of the dispatchers as 7 or higher on a 10-point scale.

The following areas require improvement.

#### Real-time information about availability of hospital beds, including ICU beds

Peripheral dispatch centres in Luhansk are not functionally connected to the central dispatch. Seventy-five per cent of dispatchers reported not having access to real-time information about available ICU beds in hospitals. To obtain this vital information, dispatchers take the initiative and call hospitals individually. **There is no system in place to provide real-time information to dispatchers and no standard operating procedures (SOPs) requiring them to verify the availability of ICU beds and specialists.**

In Donetsk, a computerized system is used to support communication between dispatchers and ambulances. This is a significant step in the right direction, but currently it does not include information about available hospital services, including ICU beds. This lack of real-time information is expected to contribute to

delays in patients receiving appropriate and timely care. Ambulance drivers complained that their patients were refused admission upon arrival at hospital due to unavailability of services or beds. **This could be solved with a computerized system, which would also optimize secondary referral.**

#### GPS data location

EMS directors cited no caller-location GPS data being available to dispatchers as another issue regarding current communication. A caller-location GPS application would facilitate location of patients and improve ambulance arrival times.

#### Communications means

All ambulance medical staff reported that they use mobile phones and landlines for communication, with only 3% also using a radio, but limited backup options are available to teams. **Mobile phones are the most common backup communication devices. If networks are not functioning, EMS teams are left with no alternative communication system.** This was further highlighted by the EMS director in Luhansk, who said that they needed a radio station to improve communication across the oblast.

Challenges of using only mobile phones include potential lack of coverage, lack of call quality and risk of cessation of service in the event of an emergency. Lack of mobile coverage is likely to be a larger problem in Donetsk and Luhansk due to security issues. The lack of reliable communication means is likely to contribute to a lack of access to EMS in those areas. Investment in radio communication to ensure backup communication is available at all times, especially during emergencies, is therefore needed.

#### Intersectoral coordination

**Coordination among ambulance services, the police and the fire brigade is essential for EMS, both to provide first aid and ensure security for EMS staff if violence**

is anticipated. Seventy-five per cent of dispatchers reported that they could send police or security services as first responders, but additional research is required to assess how often these services actually respond to medical emergencies. EMS directors also reported daily contacts between EMS and other services, but the outcome of these communications remains unclear and further research is required.

**The results of this study demonstrate a need to improve real-time communication across all EMS stakeholders.** The operational communications platform should link all the components of the EMS survival chain.

No single solution to prevent medical errors exists. The best interventions focus on creating a culture of safety and collaboration among the sectors. Any solution needs to start with improving communication among the different members of the care team (Singer & Vogus, 2013). A common communications platform for dispatchers, ambulances and hospitals, for example, would improve situational awareness, decrease the time of arrival of ambulances and time to appropriate care, and reduce rates of unnecessary secondary referrals. All of this would be expected to reduce morbidity and mortality.

Before such a system is set in place, SOPs should be developed, implemented and monitored to improve inter- and intrasectoral communication. Currently, there is a clear lack of standard protocols for communication.

### Traffic and poor road conditions

Drivers and ambulance staff underlined difficult traffic and poor road conditions as a major problem. This is likely to cause delays and increase the time before the patient reaches the hospital; doctors in hospitals report that late presentation of patients is one of the main problems they face. **Late presentations can also be due to lack of public awareness of life-threatening signs and symptoms of diseases, indicating when to contact EMS.**

### Maintenance of ambulances

The EMS directors in Luhansk mentioned that they did not have a fleet department, while drivers said that car maintenance needs to be improved and spare parts were missing. Forty-two per cent of drivers reported buying spare parts out of their own pocket. Some patients also voiced complaints about the conditions of the ambulances, implying that **ambulance maintenance needs to be improved.** A fleet or transportation department applying national SOPs for ambulance maintenance should be established. There is also a need for increased funding to procure additional ambulances and for a dedicated budget for maintenance.

Results on operational attributes highlight the need to provide real-time information on services available in hospitals (including number of ICU beds), improve coordination and communication among all key stakeholders, operationalize CBRN plans, establish an ambulance fleet department with clear objectives to maintain ambulances and improve road conditions.



### Finances

Financial administrators reported that the current budget for EMS in Luhansk is 125 million UAH and in Donetsk 400 million UAH. The population in Donetsk is approximately 4.1 million and in Luhansk is 2.2 million, according to recent government estimates. This corresponds to 58 UAH (€2) per capita in Luhansk and 96 UAH (€3.3) per capita in Donetsk. Both EMS directors reported that EMS were underfunded and asked for significant budget increases of 350% in Luhansk and 40% in Donetsk. This would lead to 203 UAH (€7) per capita in Luhansk and 134 UAH (€4.6) in Donetsk. Per capita expenditure on EMS for all the oblasts in Ukraine can be seen in *Fig. 5*, and comparison with European countries' per capita expenditure in *Fig. 6*. The comparisons are made after adjusting for purchasing power parity (PPP) which, in this case, is a way to render different countries' expenditures on their EMS systems comparable across currencies.

Fig. 5. EMS spending per capita in 2018 from 24 oblasts in Ukraine (includes central and local budgets and other sources of funding)

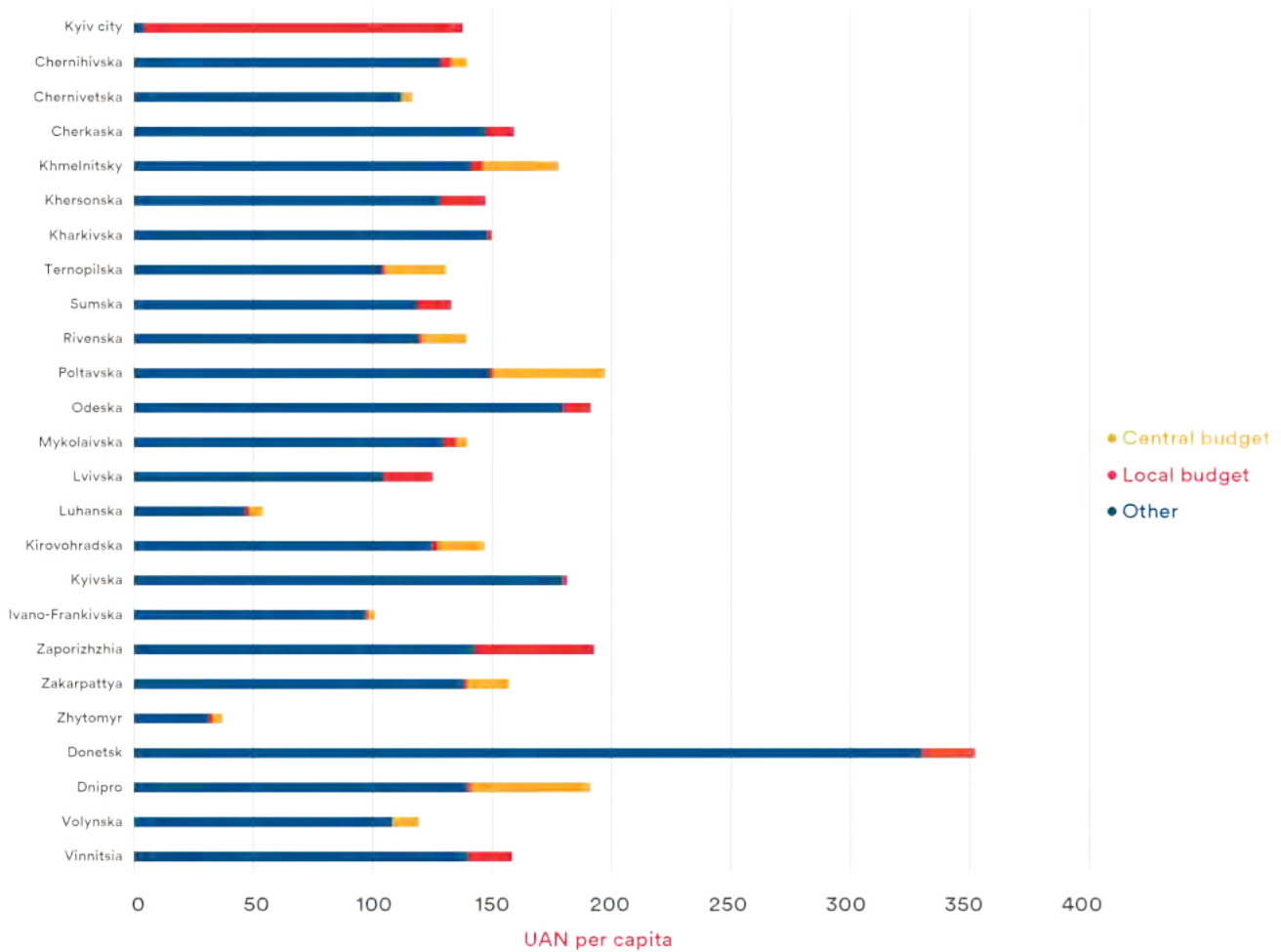
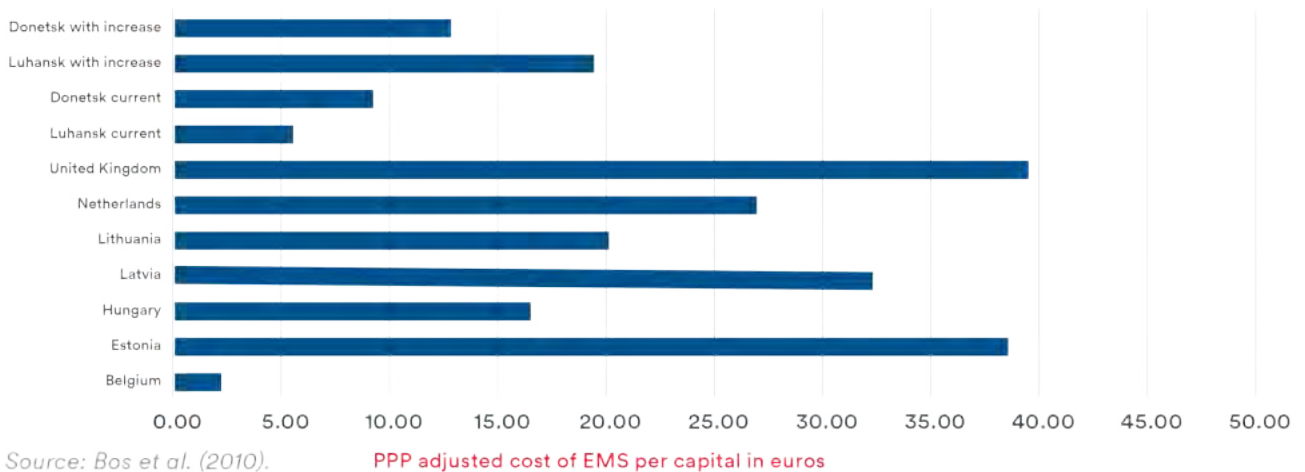


Fig. 6. PPP adjusted cost of EMS per capita in European countries



Source: Bos et al. (2010).

PPP adjusted cost of EMS per capita in euros

The directors reported that all EMS services are affected by underfunding. Eighty per cent of facility financial administrators also reported underfunding of their EMS. When asked to choose among several options of areas in which EMS are underfunded, 67% mentioned non-structural issues such as medicines and medical equipment, 40% professional issues

(including salaries and human resources), 20% structural issues (including ambulance maintenance) and 20% capital expenditures.

EMS directors stated that population density, the number of cases and the number of EMS facilities are the main indicators for calculations of financial requirements.

Financial administrators at oblast level also reported that the EMS budget is based on the number of cases and calls and the available fleet. The EMS budget comes from the central Ministry of Health through regional health administrations, with potential top-ups from regional or local government.

The oblast-level EMS budget, according to the financial administrator in Luhansk, is spent as follows: 68% on human resources, 12% on medicines, 5% on equipment, 1% on training and 14% on other items, including office space, utilities and gasoline. This corresponds to reports from facility financial administrators in which similar amounts were spent on human resources.

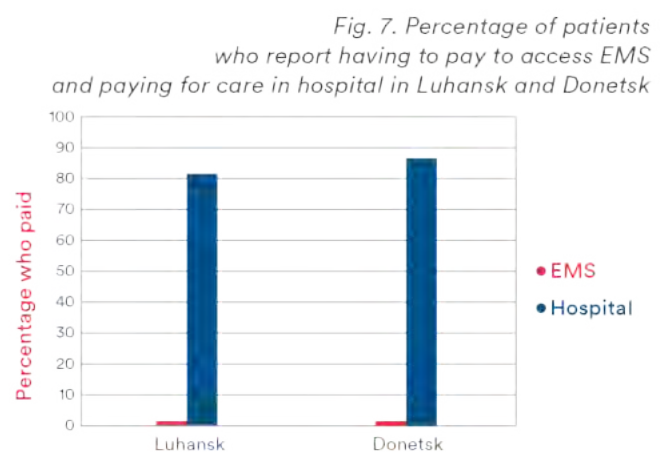
These data show that a very large proportion of the EMS budget is spent on human resources compared to other EMS systems globally. A WHO report found that the average percentage of general health-care expenditure used for human resources globally is 42%, ranging from 29% in the WHO African Region to 50% in the WHO Eastern Mediterranean Region (Hernandez et al., 2006). Despite the large proportion of the budget being spent on human resources, all interviewed staff were dissatisfied with their salary. In addition, the large proportion spent on human resources in Luhansk oblast (not in Donetsk) does not permit development in other areas of EMS.

To address this issue, either the distribution of the budget covering human resources needs to be made more cost-efficient, or the total budget needs to be increased through new sources of funding. To provide specific recommendations on the level of funding increase, further research is required.

Financial administrators at oblast level did not report having access to any emergency contingency budget for EMS. At facility level, 47% of administrators also reported not having access to any emergency contingency budget.

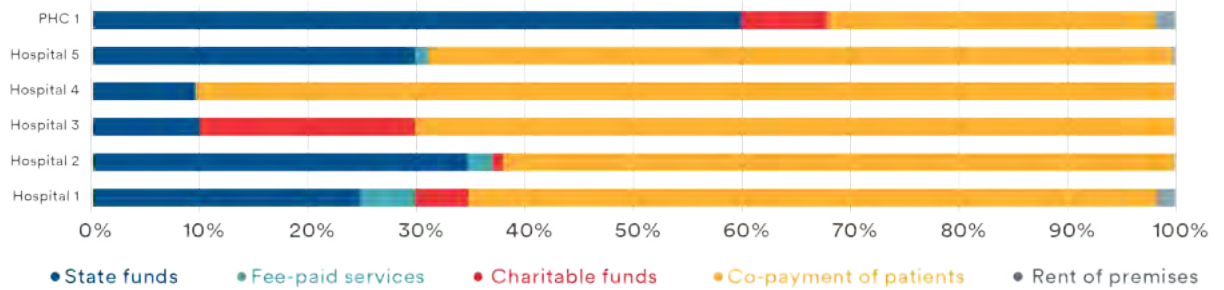
Facility administrators reported the lack of a financial tracking mechanism in EMS and that only 60% of facilities had a mechanism to verify if funding for EMS was sufficient. This was also highlighted by one oblast-level administrator. It indicates a need for a unified computerized system to improve financial accounting, and a need to invest in SOPs and training for financial and other administrative staff. In addition to reinforcing the system, it is also crucial to build the capacity of administrative and finance staff.

EMS staff at all levels agreed that services are provided free, and only 0.4% of patients reported having had to pay out of pocket to access EMS. Access to the EMS system was therefore free for 99.6% of the patients who were interviewed. Payment, however, does occur at facility level. Even though health care is provided free in Ukraine by law, there is a well developed system of unofficial payments (Stepurko et al., 2017). Of the interviewed patients, 85% reported having paid for their health care (Fig. 7). They also reported having spent on average 3600 UAH for treatment while in the hospital. This is similar to the average reported monthly salary for those patients, which amounts to 3850 UAH.



Physician-managers were asked in another study to evaluate coverage of the cost of treatment from different sources. According to their estimates, about 70% of the cost of treatment is covered by patients (Fig. 8) (Lykhanova et al., 2017).

Fig. 8. Physician-managers' estimates of proportion of total cost of treatment from different sources



Source: Lykhanova et al. (2017).



## Quality

The professionalism of EMS staff (including dispatchers, doctors, nurses and feldshers) was rated highest by the patients, with 49% citing this element when asked what they liked best about EMS.

When asked which equipment to bring to an unknown case, or what actions are taken at the start of the shift for ambulance personnel, the answers were heterogeneous. The lack of SOPs for deployments suggests that a review and update of national standards and SOPs should be undertaken. Developing, endorsing and disseminating SOPs for responses to emergency cases will improve the quality of services provided.

Ambulance and hospital staff answered several technical questions exploring their knowledge and adherence to standard treatment protocols (Table 4). The results highlight a lack of coherence and consistency, indicating the need to review, update, endorse, distribute and monitor adherence to standard treatment protocols.

Twenty per cent of the interviewed ambulance staff, for example, felt confident in intubating patients in prehospital settings; the remaining 80% do not intubate because of lack of practical skills or experience and lack of equipment, or use alternative methods such as laryngeal masks. Only 20% of the interviewed hospital doctors indicated that they performed lactate tests for multi-trauma patients. This highlights that treatment protocols in hospitals need to be updated. Training programmes should be developed following endorsement of the standard treatment protocols and the required equipment made available.

Table 4. Percentage of essential prehospital and hospital procedures performed to verify adherence to standard treatment protocols

Procedure	Where?	Percentage of respondents who perform the procedure
Do you provide oxygen in respiratory arrest/distress?	Pre-hospital	80
Do you intubate in prehospital setting?	Pre-hospital	20
Do you perform a 12-lead ECG in patients over 35 with suspected cardiac chest pain?	Pre-hospital	97
Do you give aspirin to patients over 35 with suspected cardiac chest pain?	Pre-hospital	91
Is endotracheal intubation performed in the ED?	Hospital	53
Do you perform lactate test for multi-trauma patients?	Hospital	20

All building blocks of a well functioning EMS (Fig. 9a and b) must be developed simultaneously to improve the quality of EMS, as they form one coherent system.

Fig. 9a. Building blocks of a well functioning EMS: WHO Health Systems Framework

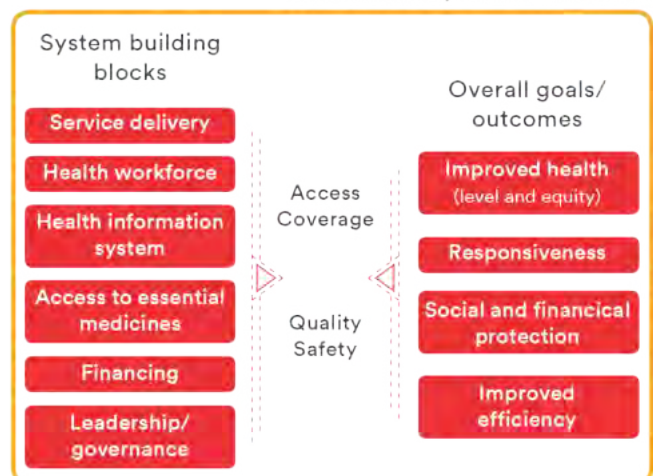
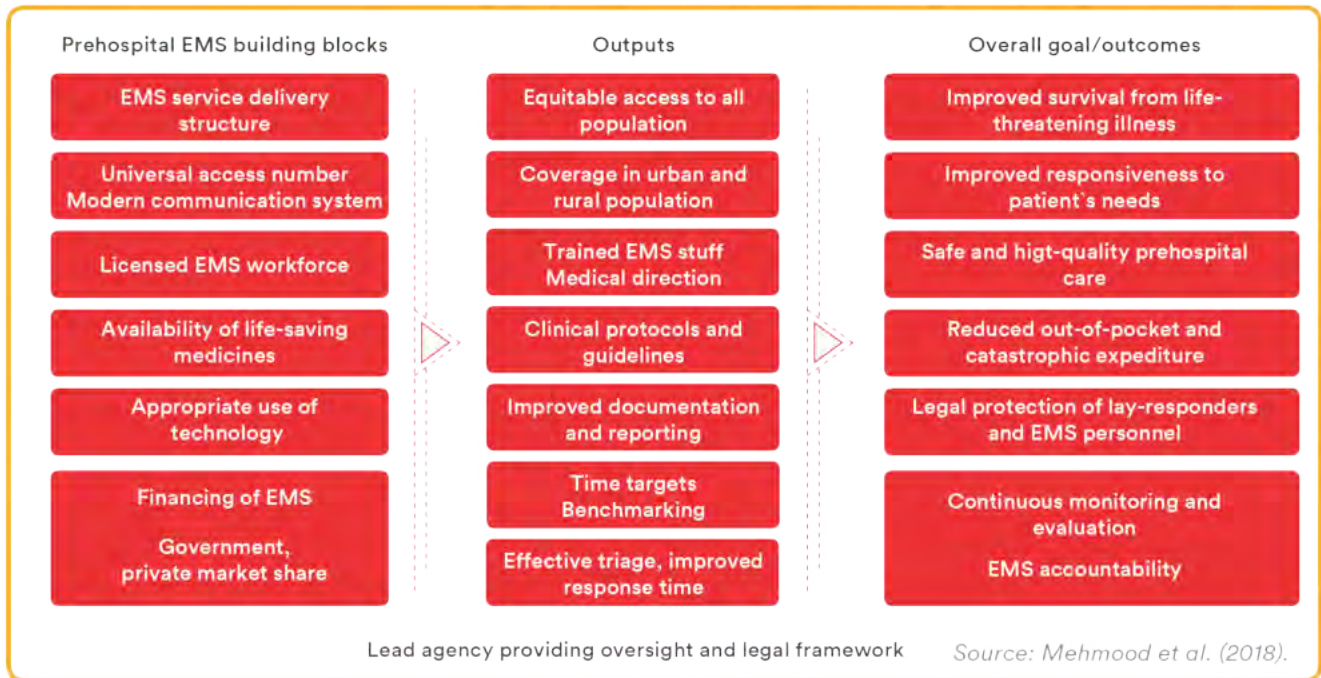




Fig. 9b. Building blocks of a well functioning EMS: Prehospital EMS Framework



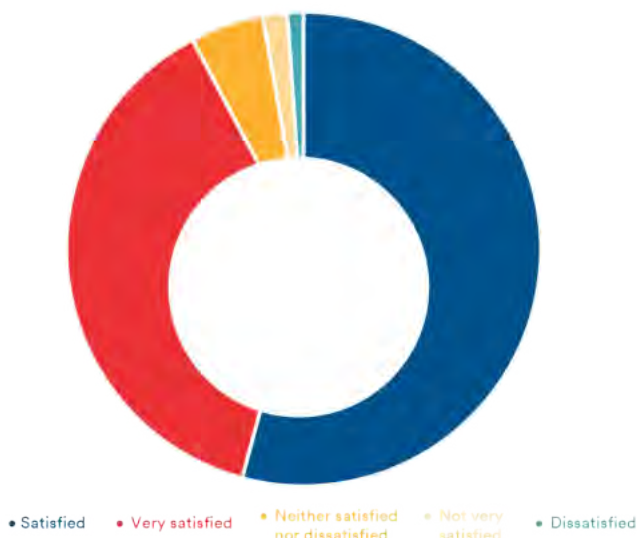
Quality indicators are developed to test the overall performance of the EMS and to monitor the progress of EMS reform. A set of country-specific quality indicators needs to be tailored to Ukraine. These indicators should be developed to ensure they fit the country context and, more important, can reliably be measured.



### User satisfaction and public awareness

Ninety-three per cent of interviewed patients (N = 523) were satisfied with the EMS. The distribution of patient satisfaction can be seen in Fig. 10.

Fig. 10. Distribution of patient satisfaction with EMS



Additional complaints raised by individual patients ranged from a lack of professionalism and lack of administration to cold ambulances. Some of these complaints were serious, including a patient's personal details being published on the Internet. While the complaints highlight important structural issues, their diversity shows the heterogeneity of the system overall. EMS would benefit from a national complaints registry that addresses the issues transparently and anonymously.

Ambulance staff, doctors and dispatchers highlighted lack of community awareness about the EMS system mandate, including knowledge of when to call EMS and how to interact with EMS staff, or when to reach out to the primary health care (PHC) system. When asked about the severity of their illness, 64% of the interviewed patients rated their condition as severe, 32% as moderate and 4% as mild: the fact that 36% rated their case as moderate or mild indicates an overreliance on the EMS system. This might partly be due to the public perception that EMS offer the only free and reliable way of getting admitted to hospital. Many of these cases should be channelled through the PHC system and use transportation means other than ambulances to reach the facilities.

Participants recommended raising public awareness about appropriate use of EMS

and PHC services. A national plan to improve public awareness about when and how to access the EMS system should be developed and implemented. Slots for social advertising on TV, including mobile alerts and social media, could be utilized to educate the public. In addition, strengthening the PHC system is essential to reducing the burden on EMS by absorbing non-urgent cases. Several options could also be explored on how to strengthen and advertise alternative non-urgent transportation means.

It is recommended that ambulance staff be included in public awareness programmes to improve public perceptions of the EMS system. Awareness programmes should include an introduction to first aid for communities and comprehensive first-aid courses for first-aid providers such as police forces, fire brigades and professional drivers. Fifty-seven per cent of medical ambulance staff and 8% of drivers were involved in programmes to educate the public about first aid. This approach is valuable and worthy of further investment, as good public knowledge on provision of first aid will improve patient outcomes and potentially reduce the burden on EMS. Educating the public in first aid should be scaled up and participation in these programmes should be compulsory for EMS staff.

 **Human resources**

Most of the interviewed EMS staff, such as the ambulance medical staff, drivers and dispatchers, were satisfied with their work conditions (Table 5 and Fig. 11). They also liked the way their work was managed, and most stated that they have the tools and equipment they need. In the absence of clear protocols,

however, these responses must be considered cautiously.

All members of staff (except for one) were dissatisfied with their salary. Dissatisfaction regarding salaries was also raised in other questions focusing on specific challenges within EMS. Despite this, most staff would not change their job if they had the opportunity to do so. Based on these results, a strong commitment among EMS staff can be inferred. Investing in building their capacity therefore is recommended.

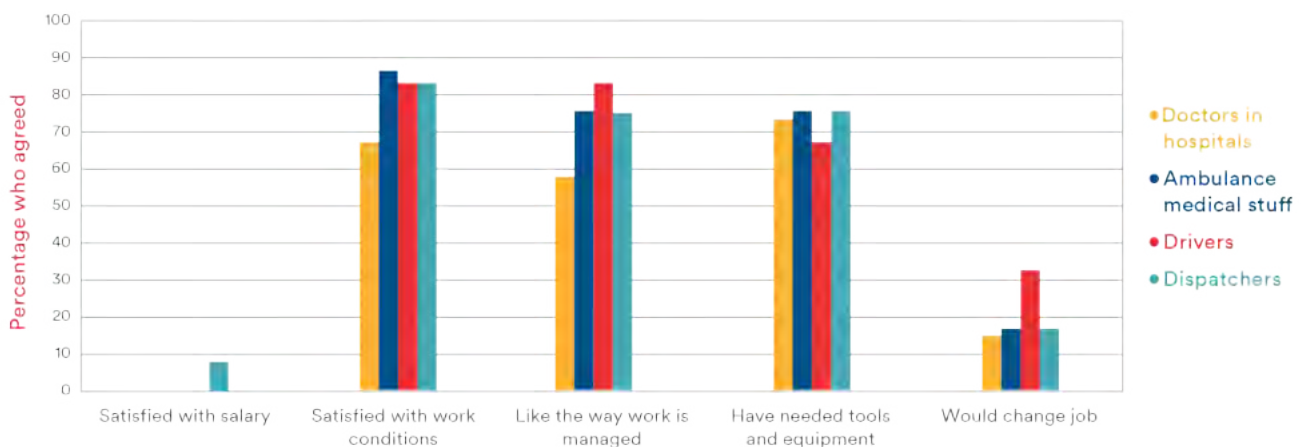
Blau et al. (2016) state that the main reason for EMS staff (EMTs and paramedics) to change jobs are related to pursuing higher education or changing location, followed by a wish for better pay.

Table 5. Job satisfaction for staff in EMS

Question	Doctors in hospitals	Ambulance medical staff	Drivers	Dispatchers
Satisfied with salary	(0/15) 0%	(0/35) 0%	(0/12) 0%	(1/12) 8%
Satisfied with work conditions	(10/15) 67%	(30/35) 86%	(10/12) 83%	(10/12) 83%
Like the way work is managed	N/A	(29/33) 88%	(10/12) 83%	(9/12) 75%
Have needed tools and equipment	(11/15) 73%	(28/35) 80%	(8/12) 67%	(9/12) 75%
Would change job if they had the chance	(2/13) 15%	(10/35) 29%	(4/12) 33%	(2/12) 17%

Note: due to low sample sizes, the differences between staff categories are not statistically significant

Fig. 11. Work condition satisfaction indicators for four groups of EMS staff



Doctors, dispatchers and students mentioned that work in EMS is stressful and that improved mechanisms for stress management are needed. Having adequate support for EMS staff which includes healthy ways of managing stress is necessary for a well functioning EMS system. Stress-management courses or access to psychological support should be made available when required to the EMS workforce to avoid burnout.

When asked whether they had received any training, 54% of ambulance staff stated they had received training on mass casualties, 54% on basic trauma, 45% on advanced trauma and 40% other types of training. EMS doctors in Ukraine need to recertify every five years, and a similar programme exists for feldshers. This demonstrates that training is available, but **further research is required to assess overall training needs across the EMS workforce and to develop, implement and monitor a national training strategy, including accredited training facilities, accredited instructors, a standardized curriculum and independent testing.**

A professional development strategy and plan would support improvements in the quality of the EMS workforce. The ongoing EMS reform has introduced two new EMS roles: paramedics and EMTs. In the survey, 92% of drivers would be willing to retrain as EMTs if this included an increase in salary, and 67% of nurses and feldshers in the ambulances also said they would be willing to retrain as paramedics<sup>7</sup>.

**One of the issues highlighted by EMS professionals during the interviews was the ageing of the current EMS workforce. The future of EMS depends on engaging current medical students who would be interested in working in EMS in the coming years.**

The interviewed medical students and their lecturers were asked to discuss the students' interest in EMS. Eighty-seven per cent of the students reported that the EMS specialty is interesting or useful, but 56% are not considering choosing EMS as a specialty. The

reasons reported were: the job is too stressful, lack of knowledge about EMS overall and a negative experience from working in EMS. This correlates with the lecturers' perceptions; only 54% reported student interest, confirming that the lack of interest is due to the reasons above.

The students and lecturers emphasized that efforts need to be invested in the quality of EMS teaching during university and improvements in the EMS system in general to increase their interest in the specialty. Students' suggestions included more training, exercises and practice, additional information about EMS and the study of contemporary technologies. Improvements related to the EMS system include scaling-up the EMS fleet, improving work conditions, raising salaries, ensuring appropriate supplies and equipment, and increasing public awareness. The lecturers' suggestions were very similar, but with greater emphasis on increased practical sessions and developing an EMS course. Based on these interviews, a review of teaching and practices regarding EMS in universities should be undertaken. Additional practical experience, including simulations, during studies is essential.



### Legal framework

The study confirmed that citizens and foreigners have access to treatment from EMS for free through Ukrainian law (Parliament of Ukraine, 2013). Ukraine has a functioning legal framework for EMS and currently is undergoing a reform process. The legal framework includes treatment and ambulance triage protocols under the Ministry of Health (Ministry of Health, 2019c (with subsequent updates)). Based on answers from EMS staff, it is recommended that existing protocols are reviewed in light of recent evidence, and that national SOPs are developed for new procedures.

All ambulance staff reported that they have access to EMS triage and treatment protocols based on the Ministry of Health national protocols. Fifty-one per cent of ambulance medical staff found the protocols to be good, while 45% found them neither good nor bad. This suggests that additional research is

<sup>7</sup>Further advice on human resources planning can be found in Hall (1998).

required to test the functionality of the current protocols and perceptions of their quality.

All of the dispatchers reported that they had protocols for prehospital care and 75% felt the protocols were good. When asked about which protocols they follow, however, they mainly mentioned treatment protocols, with a smaller subsection mentioning call-acceptance or dispatch-level triage protocols. This demonstrates the need to develop, endorse, implement and monitor triage protocols at dispatch level. The protocols should include guidance on the use of ICU ambulances and seek to improve the appropriate utilization of ambulances and referrals to PHC centres.

The legal framework should include triage and treatment protocols at dispatch and hospital level, operational aspects such as SOPs for ambulance maintenance, EMS financial management and pre-shift check lists. This would address many of the issues reported by the study participants.

**Forty-nine per cent of ambulance medical staff, 33% of drivers and 50% of dispatchers reported having been the victim of violence during their work.** Only 25% of medical staff, 17% of drivers and 25% of dispatchers reported having a protocol (most likely at oblast or facility level) to protect themselves against violence. Of the staff who reported having such a protocol, most found it useful (Table 6).

Based on this, it is recommended that a national protocol be developed, with

investment in training for EMS staff on how to communicate with intoxicated and stressed people, and how to address and/or avoid those who are violent. There should also be legal protections for first responders and close coordination with police and security services. Any public education campaign needs to address this issue. The protocol developed for violence prevention should include mandatory reporting of every incident in which EMS staff are the victims of violence. Reporting should be analysed and clear targets for reduction of violence against EMS staff defined. Current EMS legislation needs to be reviewed and updated to align with health-care reform and to include the so-called Good Samaritan Law.

Table 6. Violence against ambulance medical personnel, drivers and dispatchers<sup>a</sup>

Question	Ambulance medical personnel	Drivers	Dispatchers
Have you been a victim of violence during work?	(17/35) 49%	(8/14) 67%	(6/12) 100%
Is there a protocol on how to protect yourself from violence?	(9/35) 26%	(2/12) 7%	(3/12) 25%
If yes, is the protocol useful?	(8/9) 89%	(2/2) 100%	(2/3) 67%
If yes, do you and your colleagues follow the protocol?	(9/9) 100%	(2/2) 100%	(2/3) 67%

<sup>a</sup> The table shows the proportion of personnel who answered "yes" to the questions.

# CONCLUSIONS AND RECOMMENDATIONS



Consideration should be given to responding to the following conclusions and recommendations.



### Demand and efficiency

- A national Ukrainian EMS society that includes all health-care professionals involved in the survival chain should be established. The society would develop and disseminate guidelines and SOPs in collaboration with relevant institutions, such as the National Science Centre for Emergency and Disaster Medicine. It would also ensure the sharing of up-to-date scientific circulars, including recent advances in EMS (Ukraine EMS journal), and organize scientific conferences.
- A computerized medical registry network should be launched to guarantee real-time qualitative information-sharing among EMS facilities. The registry would collect accurate and segregated data to promote high-quality data analysis and permit evidence-based decision-making.



### Operational attributes

- National EMS operational standards should be reviewed and updated and a monitoring system for quality control implemented.
- A common computerized operational communications platform should be established to enhance coordination and interoperability between EMS and hospitals. The platform must guarantee that all patient routings region-wide are managed by a single high-tech communication centre that monitors resources available in every EMS centre in the region and coordinates patient transportation to the appropriate and ready-to-receive facility 24 hours per day, seven days per week, 365 days per year.
- Current financial systems and patient registries should be upscaled and computerized to monitor continuously the quality of services provided.
- An oversight body should be established to verify the accuracy of data collection, finance management and compliance.

- A transparent mechanism for the allocation of emergency funds across oblasts should be developed.
- The existing disaster plan should be reviewed and updated, and regular simulation exercises should be carried out. Sufficient funding should be allocated through a centralized emergency contingency budget.
- Specific triage protocols for dispatch centres should be developed, in addition to treatment protocols.
- Close monitoring of the adherence of ambulance and hospital staff to current triage protocols should be ensured.
- Job action sheets and technical guidelines booklets should be developed and distributed to the EMS workforce.
- The strategic distribution of the newly developed ED should be defined to ensure appropriate coverage across oblasts.
- A systematized referral system should be developed to provide timely access to proper care.



### Finances

- The funding allocated to EMS should be aligned to meet the preconditions for establishing an effective and efficient EMS. Further study is required, however, to define the approximate amount of additional funding needed and how to distribute the additional resources fairly.
- A computerized financial management system, including an expenditure tracking system, should be rolled out and administration and finance staff trained appropriately.



### Quality

- A set of quality indicators for the EMS system in Luhansk and Donetsk should be developed.
- Monitoring of the quality indicators should be reviewed and modernized.
- Future strategy and adjustments for the EMS system should be based on the quality indicators.

- Quality indicators at oblast level should be published every year.
- A caller ID locator and ambulance GPS locator should be installed in all dispatch centres.
- National standards for training of health-care professionals involved in the survival chain should be developed, implemented and monitored. These should include accredited training facilities, accredited instructors, a standardized curriculum and independent testing of knowledge transfer. EMS staff should acquire frequent recertification, including training.
- Sufficient funding for quality assurance should be ensured and an independent quality monitoring oversight body established.



### **User satisfaction and public awareness**

- A public education campaign highlighting the scope of EMS and signs and symptoms of urgent cases versus non-urgent cases should be designed and implemented. The campaign should provide information about when to access EMS and when to seek help from PHC facilities.
- Standards for communications should be developed to promote public awareness.
- New communication means to increase community awareness should be explored, including the use of social media.
- Community-based first-aid programmes should be implemented.
- A mental health safety net should be designed and implemented to provide support to the EMS workforce.



### **Human resources**

- EMS courses at university should be enhanced, including simulations and improving the public image of EMS.
- A transparent system for electronic feedback from EMS staff and patients

should be established. The system should be linked with the quality monitoring oversight body and should be nominal or anonymous.



### **Legal framework**

- Current EMS legislation needs to be updated and reviewed to improve the overall performance of EMS and to ensure alignment with health-care reform. This includes the development of SOPs, and triage, treatment, and monitoring and evaluation protocols to assess the adherence of EMS staff to the standards. It also includes the adoption of a legal basis protecting EMS staff and the adoption, implementation and monitoring of the so-called Good Samaritan Law.
- Opportunities to include charity organizations and nongovernmental organizations in EMS to assist in accessing patients in hard-to-reach areas, thereby improving universal health coverage, should be explored.
- The legal basis for upscaling current admissions departments to become EDs should be developed, and related protocols (including triage) implemented.
- The law should assure that all EMS phone calls are recorded and monitored to enhance professionalism, reduce violence and improve quality.



### **Recommendations for further research**

Specific research topics are suggested to support the Ministry of Health leadership to improve EMS, including research on:

- the need to increase the budget for EMS
- overall training needs across the workforce
- relevance and functionality of current treatment protocols
- perceptions of the quality of protocols
- the actual magnitude of non-urgent calls.

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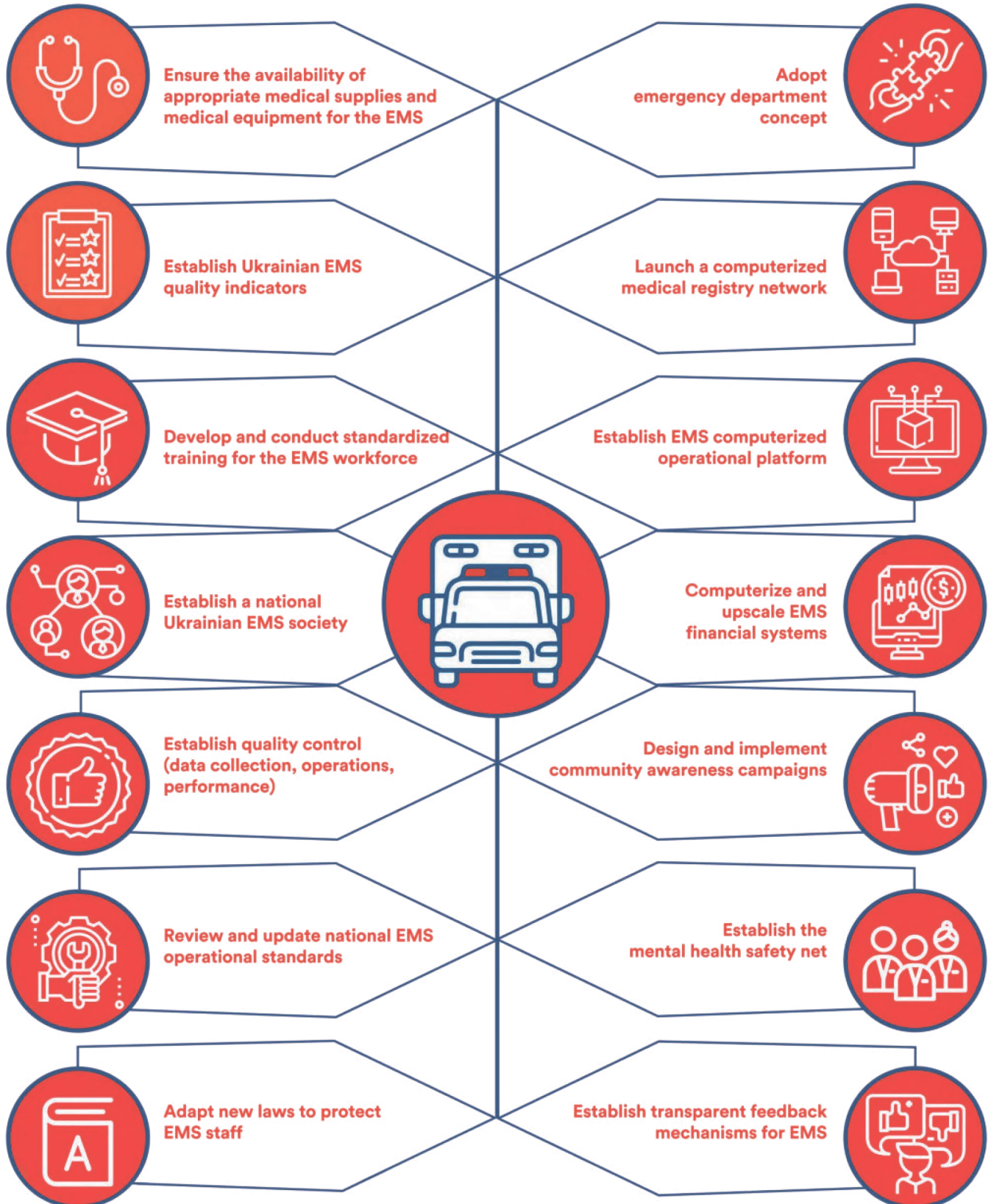
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# PRIORITIES FOR ACTION TO IMPROVE EMERGENCY MEDICAL SERVICES (EMS) IN UKRAINE

Essential WHO recommendations based on the report from Luhansk and Donetsk oblasts, *Quantitative and qualitative analysis of Ukraine's emergency medical services to assess current capacities and opportunities for future development (2019)*



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