Appendix
Approved by Decree 28/5 of the Audit Chamber of the RA,
dated December 24, 2019

AUDIT CHAMBER OF THE REPUBLIC OF ARMENIA

CURRENT REPORT

ON THE AUDIT OF AMBULANCE SERVICE IN YEREVAN

2019

Grounds for audit	Decisions N19/1 of September 12, 2019 and N22/3 of October 14, 2019 of the RA Audit Chamber.
Objects of audit	RA Ministry of Health, Yerevan Minicipality
Ground for auditing	Decision N22/5 of October 14, 2019
Object of auditing	Ambulance CJSC
Subject of audit	Emergency medical services in Yerevan
Period under audit	January 1, 2017 – including December 31, 2018
Audit exercise period	September 24, 2019 – including December 20, 2019
Type of audit	Performance audit
Audit procedures	Inquiry, external confirmation, analytical review, reperformance, recalculation
Auditing unit	The audit was conducted by **the Methodology, Analysis and International Relations Department of the RA Audit Chamber** which activities were coordinated **by the Chairman of the RA Audit Chamber Levon Yolyan.**
Audit Documentation	The auditing process is documented in working documents and 3 protocols.

CONTENTS

ACRONYMS

CJSC	Ambulance CJSC
RA MoH	RA Ministry of Health
SHA	State Health Agency under the RA MoH
CDS	Central Dispatch Management System

REPORT

The emergency medical service (EMS) is of strategic and social importance to the Republic of Armenia, since it is the most responsive and affordable segment of the healthcare system.

The EMS in the capital city of Yerevan is ensured by the brigades formed at the 7 substations of Ambulance CJSC, established by Yerevan municipality.

The Ministry of Health of the Republic of Armenia is implementing the “Emergency Medical Services” budget program, 43% funds of which are channeled to financing EMS in Yerevan.

The Audit Chamber studied the peculiarities of EMS provision in Yerevan and assessed its effectiveness and efficiency.

For the purposes of examining the issues under audit, the report provides description of this industry’s standards and its strategic goals.

Improvements have been made in the area of EMS in recent years, however, the results of the Audit Chamber's performance audit have revealed issues, related to compliance with standards by Yerevan Ambulance service, as well as effectiveness and efficiency related issues in terms of goals attainment.

Problems related to optimal brigade distribution and overload have been revealed.

The EMS chain, from emergency response to hospitalization, needs improvement.

The databases in this sector are not uniform. The process of data recording and management is not effective.

In reference to the issues under audit, the Audit Chamber has provided recommendations for the improvement of Yerevan Ambulance Service.

Levon Yolyan
Chairman of the RA Audit Chamber
December 24, 2019

19 Baghramyan avenue, Yerevan, Republic of Armenia

1.OVERVIEW

1.1 Emergency Medical Sservices in the RA

Emergency Medical Sservices (EMS) in the Republic of Armenia is one of the types of specialized medical assistance.

In 2017-2018, the number of ambulance calls in Yerevan increased by 12.4 thousand.

The EMS in the provinces is provided through the medical centers, established by the territorial administration bodies as well as the offices of family doctors, with the exception of the city of Gyumri, where the ambulance service is provided by the "Gyumri Ambulance Station" CJSC.

The EMS in the city of Yerevan is provided by the Ambulance CJSC, which was founded by Yerevan municipality. The CJSC can also service calls from the provinces in Armenia, if needed.

According to the official data by the RA Statistical Committee, during the period covered by the audit[1]:

- The number of ambulance stations in the Republic of Armenia was 75 and 72 respectively in 2017 and 2018,
- The number of doctors per 100,000 population was 4.2 in both 2017 and 2018,
- The total number of profile brigades was 155 and 147 units in 2017 and 2018 respectively,
- The number of specialized brigades was 19 in both 2017 and 2018, and the number of paramedic brigades was 34 and 38 in 2017 and 2018 respectively,
- The total number of ambulance calls in the RA was 465,111 in 2017 and 479,767 in 2018 (the number of calls increased by 3% as compared to the previous year).

The city has 7 substations in different administrative districts of Yerevan owned by the CJSC, where 36 brigades were deployed from January 1, 2017 to April 1, 2019 of which:

- 23 were profile (line) brigades in 2017-2018,
- 11 were specialized brigades in 2017-2018, 10 of which were resuscitation and 1 was a psychiatric brigade,
- 2 were paramedical brigades in 2017-2018.

The number of ambulance calls in Yerevan[2] was 225,151 and 237,531 in 2017 and 2018 respectively (the number increased by 5.5%, compared to the previous year).

The number of calls serviced by the CJSC made up 48% and 50% of the total calls serviced in the RA respectively in 2017 and 2018.

1.2 Funding for ambulance services

The “Emergency Medical Services” Program in the Republic of Armenia is implemented by the Ministry of Health of the Republic of Armenia within the framework of the State Budget of

[1] Source: www.armstat.am, in publications on the RA social economic situation

[2] Calls services within state order

the Republic of Armenia. The financing of the program is carried out through the simple procedure of state order, based on service contracts signed between the Ministry of Health and the emergency medical service provider.

The contract values for organizations under the Emergency Services Program are calculated based on the principle of outpatient medical care and services contractual amounts calculations as follows: the number of beneficiaries (population) in the given district or within the area serviced by the medical organization multiplied by the amount allocated per beneficiary. Contract financing is provided against the actual calls serviced by the organization, at prices approved by the order of the Minister of Health of the Republic of Armenia for the given service, but not exceeding the annual contractual amount approved.

In the period of 2017-2018, within the framework of the RA State Budget, the actual expenditure under the "Emergency Medical Services" program was as follows:

- 3,226,420 thousand AMD in 2017,
- 3,181,720 thousand AMD in 2018 (funding decreased by 1.4% compared to the previous year).

The EMS in Yerevan is financed by the simple procedure of state order of the Republic of Armenia within the framework of an agreement signed between the staff of the Ministry of Health and the CJSC.

On February 9, 2017, the Ministry of Health of the Republic of Armenia and the CJSC signed a contract on the "Provision of free and preferential medical care and services, guaranteed by the state" at the value of 1,342,311 thousand AMD. With an agreement signed on November 27, 2017, the value of the contract increased to 1,377,123 thousand AMD.

In 2014-2018, the funding of the CJSC constituted 43% of the EMS RA State Budget Program.

On January 19, 2018, the RA MoH Staff and CJSC signed a contract on the same subject at the value of 1,298,044 thousand AMD. Under the agreement signed on December 12, 2018, the price of the contract increased to 1,382,807 thousand AMD (state-order financing increased by 0.4% compared to the previous year).

As the CJSC financing is carried out at prices approved by the order of the RA Minister of Health[3], but cannot exceed the annual contractual amount, hence:

Only 187,618 of 225,151 calls in 2017 or 83.3% of the calls and 200,164 of 237,531 calls in 2018 or 84.2% of calls were funded.

In 2017-2018 the financing of the CJSC made up 43% of the state EMS program[4].

The CJSC provides both free (state-funded/state order) and paid medical services.

The number of paid calls made was 9,383 in 2017 and 10,157 in 2018 (the number of paid calls increased by 8.2% compared to the previous year). CJSC's proceeds from paid calls amounted to 68,940 thousand AMD in 2017 and 87,131 thousand AMD in 2018.

[3] Pricelists of 2017-2018 in Appendix 1.

[4] The comparative analysis of the 2014-2018 statistical data for EMS in the Republic of Armenia and the city of Yerevan is provided in Appendix 2.

Paid calls are calls that do not fall within the scope of state order. Such calls include transfers from hospitals to the patient's house or transfers from one hospital to another hospital/diagnostic center, brigade shifts, interregional calls, as well as corpse transfers. The price list of paid services is defined by the order of the CJSC Director.

The conditions for CJSC's accountability and monitoring of its activity within the framework of state funding (state order) are defined by the decree of the Government of the Republic of Armenia, as well as the terms provided in the service contract.

In particular:

For services provided in 2017, Organizations[5] submit monthly electronic reports to the Client on the work done within the framework of medical care and service provision, the formats of which are approved by the Minister. The procedure and timeframes for reporting are set out in contracts between the client and the organization. According to paragraph 36, the monthly reports on the work done by the organizations are controlled by the client. Supervision is performed at the time of the submission of the report by the computer software and the specialist receiving the report through studies and monitoring of the data incorporated in the report and the desk review of documents on site.

In 2018, a new monitoring toolkit[6] has been set for the services provided. Observation, monitoring, individual case management, expert assessment of the work performed by contracted medical organizations providing free and preferential medical care and services as guaranteed by the state are carried out by the client through the electronic health system. The contract stipulates the procedures for reviewing the work carried out under the contract, individual case management, observation, monitoring, expert evaluation and conclusion.

Monitoring of the medical care and service provision process, supervision over the reports (including availability of patient data, expert evaluation and analysis of work performed) is carried out by the State Health Agency[7].

[5] *Clause 37 of Appendix 2 to the RA Governmental decree 318-N, dated March 4, 2004*

[6] *Decree 1691-N of the RA Government, dated December 28, 2017*

[7] *Order 3767-A of the RA Minister of Health, dated December 29, 2017*

1.3 Aim of Audit

The aim of the audit is to provide recommendations, aimed at improving the quality of emergency medical services by means of assessing the effectiveness and efficiency of emergency medical services in Yerevan, based on performance audit.

In order to address the preconditions of the EU budget support agreement on "Public Finance Policy Reform in Armenia", performance audits have been implemented in accordance with the RA Law on the Audit Chamber, as well as in line with the international standards ISSAI 100 - Public Sector Audit Principles and ISSAI 300 – Basic Principles of Performance Audit.

1.4 Objectives of Audit

The audit addressed a set of objectives that serve the aim of the audit best via procedures established in the audit terms of reference. The following questions are on the emergency medical services provided by CJSC in Yerevan.

1. Are the emergency medical services brigades distributed and loaded adequately?
2. Is the response and service provision to ambulance calls effective and is the urgency of the service ensured?
3. Is the call/case record maintenance and funding effective through the use of e-health system?

1.5 Audit Criteria

The audit used standards and strategies set by legal acts regulating the sector (RA Government decrees, Orders of the Minister of Health), as well as statistics and sectoral standards from European countries (e.g. Great Britain, Poland, Georgia and others).

At the planning stage of the audit, GIZ supported the pariticipation of auditors in training courses on performance auditing and studies of the practices and results of emergency medical service audit in a number of European countries.

1.6 Audit Limitations

Auditors required the provision of full online access to e-databases by the objects of audit. During the audit, the Ministry of Health did not provide access to the Ministry's electronic document circulation (Mulberry) system on the grounds that the system contained personal and medical data, while databases, including no personal data, were extracted from the CDS and the Unified Electronic Health System and were provided accordingly. The Municipality of Yerevan did not provide access to the electronic document circulation system either.

Audit judgments are based on all data and facts obtained via audit.

2 DISTRIBUTION AND WORKLOAD OF BRIGADES

2.1 Distribution of Brigades

In 2017-2018 ambulance brigades in Yerevan were formed by the principle of a brigade per 30,000 residents. Under 2016-2020 Strategy, emergency medical care and service provision to the population of the Republic of Armenia envisages revision of brigade accessibility to ensure a brigade per 20,000 inhabitants.[8]

In 2017-2018, ambulance brigades in Yerevan were formed by the principle of a brigade per 30000.

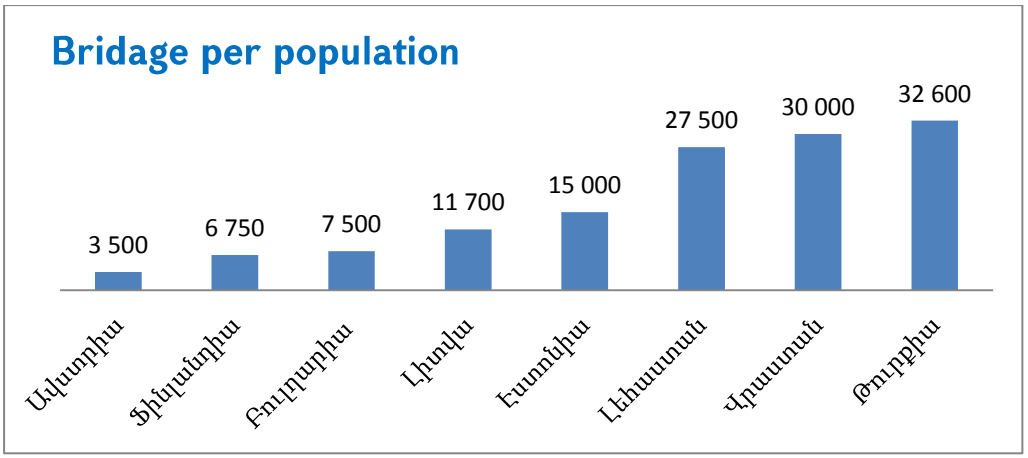
According to the data provided by the RA Statistical Committee[9], the number of permanent population in Yerevan was as follows:

- 1,075.8 thousand as of January 1, 2017,
- 1,077.6 thousand as of January 1, 2018,
- 1,081.8 thousand as of January 1, 2019.

In 2017-2018, the CJSC had 36 brigades, 10 of which were mobile resuscitation units, 23 were profile units, 1 was a psychiatric unit and 2 were paramedic units.

Observing all the brigades owned by CJSC and the permanent population of the city of Yerevan, it was found that the principle of one brigade per 30,000 inhabitants was generally ensured in 2017-2018, but as of January 1, 2019, the service coverage of one brigade exceeded the established principle, amounting to 30,050 inhabitants.

The standards on the number of brigades existing in European countries are as follows:[10]



The psychiatric and paramedic brigades are located in "Kentron" substation and serve all the administrative districts in Yerevan. The resuscitation and profile brigades are located in 7 substations of the CJSC and service the administrative districts assigned to these substations.

[8] *Protocol Decree 14 of the Government of the Republic of Armenia, dated April 15, 2016*

[9] *Source www.armstat.am, statistical bulletins*

[10] *Ambulance care in Europe, Ambulancezorg Nederland, January 2010*

The study of resuscitation and profile brigades by territorial distribution revealed that the Kentron and Nork Marash administrative districts serviced by Kentron substation (where the ratio is a brigade per 19,620 inhabitants) were an exception, given that the principle of a brigade per 30,000 inhabitants was not maintained in the remaining 6 substations in 2017- 2018.

For example, 152 thousand inhabitants in Ajapnyak and Davitashen administrative districts had to be covered by 4 brigades under sub-station 2 (37,970 inhabitants per brigade), or 189 thousand inhabitants in Arabkir and Kanaker Zeytun administrative districts had to be serviced by 5 brigades (one brigade per 37830 inhabitants). [11]

According to the information provided by the CJSC, 15 resuscitation and 37 profile with ambulance vehicles and auxiliary devices from among those handed over to the Government of the Republic of Armenia for gratis by the Government of the People's Republic of China were transferred to CJSC on September 25, 2018. This allowed increasing brigade numbers starting on September 1, 2019.

2.2 Daily workload of brigades

According to the 2017-2018 data received from CDS, the calls recorded in the system and transmitted to the profile and resuscitation brigades by hours are distributed as follows:

- 00:00 – 07:59 – 22% of all calls,
- 08:00 – 15:59 – 31% of all calls,
- 16:00 – 23:59 – 46% of all calls.

As a result, in the period between 4:00 and 11:59 p.m. (8 hours) each brigade of the substations serviced an average of 9 – 10 calls.

The most overloaded brigades were as follows:

In 2017 the brigades at substations 5 and 6 (each brigade serviced an average of 21 calls a day).

In 2018 the brigades at Substations 5, 6, 7 and 8 (each brigade serviced an average of 21 calls a day).[12]

In the period of 16:00 – 23:59, one brigade services an average of more than one calls an hour.

Conclusions

- In 2017-2018, the principle of a brigade per 30,000 inhabitants was ensured, but according to territorial distribution all substations (except for the Kentron substation) serviced more than 34000 inhabitants, while in 2 substations the ratio went up to one brigade per over 37000 inhabitants.
- In the rush hours of the day (16:00 – 23:59), the brigades in some substations service more than one call.

Recommendations

To Yerevan Municipality and CJSC

• To ensure the optimal distribution of the brigades along with increasing the number of brigades, in accordance with the number of the population in the administrative districts serviced by the

[11] *The data for territorial distribution of the resuscitation and profile brigades in 2017-2018 are presented in Appendix 3.*

[12] *See the data in Appendix 4.*

substations in order to attain the target (20,000 inhabitants per brigade) stipulated in the brigade access strategy.

• To take into account the substations' load, in the brigade distribution process, especially focusing on the number of serviced calls during the rush hours.

3. RESPONDING AND SERVICING AMBULANCE CALLS

3.1 Full and timely recoding of calls

The CJSC records and manages ambulance calls via its structural unit for operative service – 1-03. The service has 6 call centers – 30 staff positions for call handers and emergency medical dispatchers (for 24/7 service). While each of the 7 substations of the CJSC has a call center, each with 5 staff positions for nurse-dispatchers (calls received by 1-03 hotline 24/7 are transferred to substation brigades).

The 1-03 service can receive up to 6 calls in parallel.

The calls are recorded at the CDS by creating a call card. An Order by the RA Minister of Health[13] establishes the template of the call card, as well as the procedures for completing it and the functions of ambulance dispatchers.

Upon the start of servicing the call, the CDS automatically generates the call card number and the data in the "day and time of the call" box. The other boxes in the call card are filled in by the dispatcher and, when passed over to the brigade, it is filled in by the doctor (in some cases also by the paramedic/driver, as required by the procedure of completing the card). The data in the hard copies of call record cards are entered into the system by operators after the call is serviced.

The call classification box is not mandatory to complete in the CDS.

The audit established that

- 1-03 hotline can receive up to 6 parallel calls. Received calls are recorded automatically, generating a sequential number for each call, however, 7 and more simultaneous calls are not received because of no call hold system, hence they are not recorded at the CDS on time.
- The calls received by 1-03 service made by the mobile network from the RA provinces are not automatically redirected to the territorial ambulance services (except for the calls received from the network of one mobile operator) which creates extra load for the Yerevan-based service with its limited number of call centers, creating risks for late records and service of the calls from Yerevan.

3.2 Call classification

Appendix 1 to the Order of the RA Minister of Health[13] establishes standards for the situations of providing 24/7 emergency medical services by the Ambulance care, however, there were no standards regarding calls classification for the period under audit. Appendix 5 to the same Order establishes the "call category/class" box to be filled in, according to the procedure for completing the emergency medical service call card, which, according to the procedure, is not a mandatory field to complete.

The standards of ambulance calls service in European countries envisage a 3 to 5 category scale for call classification. According to the level of call classification, latest deadlines for response are established, too.

[13] *Order N 39-N of the RA Minister of Health, dated July 24, 2013*

For example, in Baltic countries[14] Level 1 calls can be responded within 15 minutes at the latest, Level 2 calls within 20 minutes, Level 3 calls from 30 – 60 minutes and Level 4 calls within up to 120 minutes.

In Great Britain Level 1 calls shall be responded within 7 minutes, when there is threat to life. Level 2 calls shall be responded within 18 minutes, these being calls for urgent response with no threat to life. Level 3 calls do not presuppose hospitalization. The period of response to such calls in 120 minutes. The lowest level calls at Level 4 are the least urgent ones that seek telephone consultancy or prescription in case of sickness, when the service can be provided on the phone or by the visit of the ambulance team within 180 minutes.[15]

Public awareness raising materials and guides on the ambulance call classification methods are accessible on the official websites of the healthcare sector institutions in Great Britain.

During the audit, the classification of emergency medical care calls serviced by CJSC and calls redirected to the primary healthcare system was established,[16] revealing 5 types of calls:

- *Urgent calls serviced within 15 minutes,*
- *Type One, serviced within 20 minutes,*
- *Type Two, serviced within 45 minutes,*
- *Type Three, serviced within 60 minutes,*
- *Calls redirected to polyclinics.*

3.3 Transferring the call to the brigade

According to Standard 12 in Appendix 1 to the Order of the RA Minister of Health,[13] the brigade that receives the emergency medical care call shall leave the substation immediately. However, no standard is established for transferring the call to the brigade.

According to the standard applied in Great Britain,[15] the deadline of call transfer to the brigade is limited to 60 seconds during which the dispatcher shall classify the call and transfer it to the best suited brigade(s).

The data on calls transferred to resuscitation and profile brigades at the CDS after the example of the city of Yerevan[17] are presented below:

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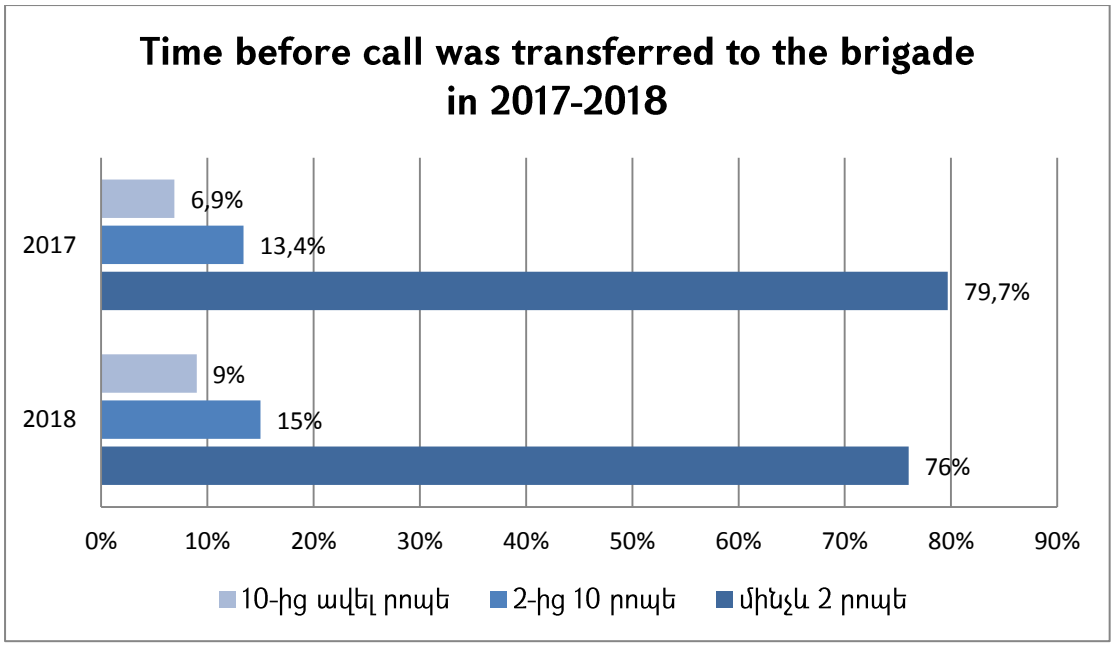
[14] *Ambulance care in Europe:Organization and practices of ambulance services in 14 European countries, Ambulancezorg Nederland, 2015*

[15] *www.england.nhs.uk, The New Ambulance Standards*

[16] *Order N 2913-L of the RA Minister of Health, dated October 10, 2019*

[17] *According to the procedure of completing a call card, approved by Appendix 5 to Order N 39-N of the RA Minister of Health, dated July 24, 2013, this field shall be completed by the dispatcher.*



3.4 Servicing calls in a timely manner

The ambulance service is specific due to the need for emergency medical care provision. The timely response and service of ambulance calls includes both receipt of calls and transfer to the brigade, and the timely departure and arrival of the brigade, and if necessary, the timely hospitalization of the patient.

Appendix 1 to the Order of the RA Minister of Health[13] establishes the following standards for timely service of the call:

- Standard 13: after the receipt of the call, the brigade shall reach the call site within 15 minutes, except for the winter months, when the maximum time for the arrival shall not exceed 20 minutes, due to the unforeseen difficulties of the traffic.
- Standard 16: the brigade servicing the call shall provide care within 30 minutes at the latest.
- Standard 17: in cases when the measures taken within the period established in Clause 16 of the standard do not lead to any positive change, the transfer of the patient to the respective specialized hospital is organized.
- Standard 18: in case of need for resuscitation, the patient is immediately transferred to a specialized hospital.

In order to comply with the above-stated standards, after the call is transferred to the brigade, the hard copy of the call card shall be completed by the brigade doctors and this data shall later be entered to CDS by the operator.

The audit revealed that the data in only 101,775 (43.4%) of 234,534 call cards in 2017 were entered into CDS. The data in the 2018 call cards were not entered into the system. It was impossible to check compliance with the above-stated standards due to the incompleteness of data of call cards available in the system.

According to the explanation provided by Yerevan Municipality, the call cards (completed in hard copy) from 2017 to July 2019 were entered exclusively into the e-health system by the CJSC, while since July 2019 they have resumed inputting data in CDS.

A sampled study of hard copy call cards revealed that for example, 28 call cards out of 125 cases that concluded with hospitalization from the total of 738 as of January 1, 2017 were not signed by the doctor. In the case of 19 cards out of 120 hospitalization cases on November 25, 2018, the doctor who received the patient had not signed. As a result, there are risks in terms of the completeness and credibility of the hard copy call cards.

Yerevan Municipality explained that sometimes the brigade receives a new call while returning from the previous one, and the brigade does not have the hard copy of the call recorded by the dispatching system.

3.5 Patient hospitalization process

Appendix 1 to the Order of the RA Minister of Health[13] establishes the following standards for the hopitalisation of the patients in the course of call service:

- Standard 21: patients transferred to hospitals by the ambulance brigades shall immediately undergo a medical examination and, if necessary, shall be mandatorily hospitalized regardless of the availability of vacant beds in the given hospital.

Medical centers refused to receive patients subject to hospitalization and transported by ambulance on the excuse of no available beds.

- According to Standard 22, information about every case of unnecessary rejection of hospitalization shall be reported to the hotline service of the Ministry of Health of the RA by the senior doctor of the given shift.

Because of incomplete entering of data of call cards via CDS it was impossible to find out the total number of cases of patients' hospitalization in 2017 – 2018. Yerevan municipality also rendered it impossible.

According to the information provided by the SHA, 45510 calls for hospitalization were financed in 2017 or 24% of all financed calls. And in 2018, 49,198 hospitalization cases (24.5%) were financed.

The audit found that there were cases when Standard 21 on hospitalization was not practically ensured. A number of medical centers that are included in the list for receiving patients for hospitalization taken there by the ambulance refused to accept the patients taken there by the ambulance brigades and eligible for hospitalization on the excuse of not having any vacant available beds. In some cases, having received rejections from more than 3 medical centers, patients diagnosed with acute respiratory condition or heart failure were not hospitalized in time (*Yerevan municipality explained that the cases of rejection were periodically reported to the RA MoH*).

By the order of the RA Minister of Health,[18] every day medical organizations shall earmark at least 10% of their resuscitation service beds for the patients taken to medical hospitals by the ambulance brigades of the CJSC. To study compliance with this requirement, data on the number of available beds in hospitals were checked in the CDS to ensure urgent hospitalization. According to the data available in the system, as of December 5, 2019, 3 multi-profile medical centers had 30 available beds in their cardiology and resuscitation units. Whereas according to the information received by the CJSC on December 5, 2019, the units of the above-mentioned hospitals had no available beds.

[18] *Clause 34.2 of the Order of the RA Minister of Health N 2848-A, dated November 6, 2018*

In relation to compliance with Standard 22 (alerts received by the hotline service) and according to the information provided by the RA MoH, no complaints were recorded by the hotline service on the rejections of hospitalization in 2017 – 2018.

Conclusions

- Because of the lack of a call hold system, 1-03 hotline could receive only up to 6 simultaneous calls. 7 and more simultaneous calls are not recorded in the CDS in a timely manner.
- The calls received by 1-03 hotline from the mobile networks from RA provinces are not automatically redirected to territorial ambulance services (except for the mobile network run by one of the operators active in Armenia). They are redirected to Yerevan, and then from Yerevan again to the ambulance care unit in the provinces.
- No criteria were set for the classification of the calls received in 2017-2018, while in CDS the field for calls classification is not mandatory.
- No standard is set on the timing for calls transfer to the brigades. In 2017 – 2018 only the duration of calls transfer to profile and resuscitation brigades in 7 – 9% of cases was longer than 10 minutes.
- In order to assess compliance with the timely response and service standards, necessary data is not available, since after the transfer of the call to the brigade the other data and fields of the call card are filled in manually in CDS from the hard copy of the call card, whereas the data on the call cards were not mainly entered into the CDS.
- In the hard copies of the call cards the details of the call were in some cases incomplete.
- There were cases when medical centers rejected hospitalization to those patients who were taken there by the ambulance brigades on the excuse of no available beds. The data on the number of beds available at the medical institutions provided online to the CSJC were not accurate.

Recommendations

To Yerevan Municipality and CJSC

- Within a reasonable period to introduce a call hold system at 1-03 hotline, integrating it with the CDS which will enable to promptly record and respond to 7 and more simultaneous calls.
- To solve the issue of automatic re-routing of calls received from mobile operators' networks within reasonable time, especially in order to avoid overloading the 1-03 hotline in Yerevan with calls from the remote provinces.
- To align the calls classification process when completing the call card in the CDS with the new methodology of classifying calls for urgent and emergency medical care and those redirected to the primary healthcare system.

To the RA Ministry of Health

- To raise public awareness via mass media on the types of urgent and emergency medical care calls and the longest timing for response.
- To establish a standard on the longest duration of transferring calls to ambulance brigades and the sequence of call transfer steps.
- To ensure a wider automatization of call detail records, which will make it possible to assess the timely and quality performance for service implementation and ensure a necessary level of objectivity for the data. For example, the automatic determination of the arrival to the

site of the call, the departure from the site of the call, the place and time of hospitalization through GPS and the automatic completion of data in the respective fields of the card.

- To conduct continuous monitoring in order to ensure completeness of data in the hard copies of call cards. Along with the improvement of the CDS and the development of CJSC's technical capacity, to abandon the practice of maintaining hard copies of call cards, by means of the implementation of the call cards maintenance directly in the CDS domain with tablets by the doctors (the CJSC owns 38 tables which are practically unused).
- To establish a procedure of online data processing and maintenance by hospitals to ensure data provision accurancy by medical institutions on the number of available beds in compliance with the standards.

4. RECORDING CALLS IN THE E-HEALTH SYSTEM AND FINANCING

According to the procedure for financing, established by the RA Government,[19] the work done by the CJSC is the volume of medical care and aid envisaged by the contract and reflected in the reports submitted via the RA MoH e-health system (the requirement for e-health submission was added by Decree N 1691-N of the Government of the RA, dated December 28, 2017). Hence, since 2018 the funding of the calls was fully implemented by the volume of work entered in the e-health system which should not exceed the value of the contract. The contract on the medical aid and care service provision for free and on preferential terms as guaranteed by the state, signed between the RA MoH staff and CJSC for service provision in 2018, established the requirements for reporting in the e-health system.

The contract also envisages monitoring, observation and study of case management. And in relation to the terms of service provision or the responsibility in case of the violation thereof it is envisaged that in accordance with the procedures on receiving and managing calls as approved by the Minister, in case of incompliance with the approved forms and procedures for entering them into e-health systems, a deduction of 500 AMD per case will be administered during performance-based payment.

The audit established that[20] in the course of 2017 (since May) full patient identification data (first and family names, passport data, public service number) are existent only in 20.3% of cases, out of the total number of calls that received ambulance care, while in 2018 identification data are available only in 27.4% of all cases.

In the first half of 2019 the same indicator amounted to 33.8%. In the period of the audit exercise, namely in October and November, the indicator rose over 45%, and in November it reached 62% (as of November 27, 2019).

As explained by Yerevan Municipality, the lack of identification data can be accounted for by those patients who have not shared their social security card with the doctor or did not have the card with them, which would enable their identification.

The study of the e-health system data revealed cases when the time for the start and end of service provision is the same.

In 2017, 205 such cases were recorded 197 of which did not end in hospitalization, and 8 concluded with hospitalization.

10,872 such cases were recorded in 2018, 86 of which were serviced by the paramedic teams, 8507 did not conclude with hospitalization, and 2279 ended with hospitalization.

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[19] *Appendix 2 to Decree N 318-N of the Government of the RA, dated March 4, 2004*

[20] In accordance with the data available in the e-health system

The number of such cases in 2019 amounted to 1148 (as of November 27, 2019) of which 32 were ineffective, 1046 did not conclude with hospitalization, and 370 ended with hospitalization.

The study of the e-health system data revealed that there are over 10 cases when the time of the start of service provision (without a second of difference) is the same, even though the maximum number of call centers of the CJSC is only 6.

For example, the start of service was indicated at 00:01:00 on September 17, 2019 and the end of service was at 23:59:00 on September 17, 2019 for 492 calls entered into the e-health system.

There are similar cases in the data for 2018. For example, the time of the start of the service and that of the brigade visit are the same for 500 cases in the e-health system, the end of service details are the same for all these cases.

In general, in relation to such cases (when the starting time for all cases is the same) with 10 and more repetitions:

In 2017, 1,635 repetitions were recorded with a total number of 93,076 calls. In 2018, 3,450 such repetitions were revealed with a total of 86,673 cases, and in the first half of 2019, 87 repeitions with 1,224 cases.

Yerevan Municipality confirmed the cases of repetitions, stating that the calls were entered by the copy-paste method to accelerate the call record entry process.

According to the information provided by the RA MoH, no deductions, fines and penalties were applied in 2017-2018 as established by the signed contract.

Conclusions

- Patient identification data are existent in only 20 – 27% of total calls for ambulance care, recorded in the e-health system in 2017 – 2018.
- The data in the CDS and e-health system are not fully in line with each other. The process of data recording and management of the systems was not effective.

Recommendations

To the RA Ministry of Health

• To fully integrate the data of state-funded medical aid cases in the CDS along with ensuring maximum automatization of call card data generation, which will allow minimising human impact in completing call cards in the electronic health system.

• To periodically analyze data to avoid discrepancies in the data within the dispatch and electronic health systems and, as a result, enforce measures enshrined in the contract in the event of failure to comply with the requirement to complete the established forms and implement approved procedures.

CONCLUSIONS

During the reporting period, a number of improvements were made to the operation of Yerevan Ambulance Service due to the development and continuous introduction of sector-specific standards and regulations. The sector's goals and objectives have mainly been incorporated into health sector strategic plans.

However, as a result of the audit conducted by the Audit Chamber of the Republic of Armenia, the following conclusions have been drawn in relation to the effective distribution and load of Yerevan Ambulance Brigades, effective response to and service of emergency calls, effective call recording in the e-health system and funding processes:

In relation to Ambulance care brigades distribution and load

1. In 2017-2018, the principle of 30,000 inhabitants per brigade was provided, but according to territorial distribution, the ratio is one brigade per over 34,000 inhabitants in all substations (except Kentron substation) and one brigade per over 37,000 inhabitants in two substations.
   Note: The creation of new brigades with the donated cars in 2018 has enabled to provide more effective service to Yerevan population with 53 brigades.
2. During the rush hours (from 16:00 to 23:59) the brigades from some substations service more than one call per hour.

In relation to responding to and servicing ambulance care calls

1. Due to the lack of a call hold system, 1-03 hotline can receive up to 6 calls simultaneously. 7 and more simultaneous calls are not recorded in CDS in a timely manner.
2. Calls received from the provinces of Armenia onto the 1-03 hotline via mobile network are not automatically re-directed to regional ambulance services (except for calls from a mobile operator). They are routed to Yerevan, and then from Yerevan again to the ambulance services in the provinces.
3. In relation to the classification of calls received in 2017-2018, there was no established standard, while the field for calls classification in the CDS is not mandatory for completion.
4. There is no standard timing for transferring calls to the brigades. In 2017-2018, only the time spent on transferring the call to specialized and resuscitation brigades was over 10 minutes in 7-9% of cases.
5. There are no necessary data available to assess compliance with the timely response and service standards, since after the call is transmitted to the brigade, the rest of the data on the call card is completed in the CDS from the hard copy of the call card and the former is not generally entered in the CDS.
6. In the hard copies of the call cards, call details were incomplete in some cases.
7. There are cases when the patient taken to hospital by an ambulance brigade was denied medical care on the grounds that the hostipal did not have available beds. The information on the number of beds available at the medical facilities provided to the CJSC was incorrect.

In relation to the records of ambulance calls in the e-health system and financing

1. Patient identification data are available in 20-27% of total number of calls serviced by the ambulance care and recorded in the e-health system in 2017-2018.

   Note: In the second half of 2019, resident identification process improved, reaching 62%.

2. The data on dispatch and electronic health systems are not uniform. The system for data entry and management has not been effective.

RECOMMENDATIONS

To Yerevan Municipality and the CJSC

- To achieve the target of brigade access, stated in the strategy (20,000 inhabitants per brigade) it is necessary to ensure optimal distribution of the brigades along with increasing the number of the brigades in accordance with the number of the inhabitants in the administrative districts serviced by the substations.
- In the brigade distribution process, it is necessary to take into account substations' loads, especially during the rush hours of the day, based on the number of calls serviced.
- It is necessary to introduce a call hold system within 1-03 hotline, integrating it with the CDS, which will allow recording 7 and more simultaneous calls.
- It is necessary to solve the issue of automatic routing of calls received from mobile operator networks within reasonable time, in order to avoid overloading Yerevan 1-03 hotline, especially with calls from remote provinces.
- It is necessary to align the classification of calls while maintaining call cards in the CDS with the new methodology for classifying urgent and emergency care calls and calls redirected to primary health care clinics.

RA Ministry of Health

- To provide publicly available information on the types of urgent and emergency medical care calls and the longest response time via mass media.
- To set a standard on the longest duration for transferring calls to ambulance brigades and the sequence of call transfer steps.
- To ensure wider automation for filing call cards in the CDS, which will allow for the timely and high quality call service execution and provide the required level of data objectivity (e.g. automatic record of the place of arrival, departure from the call site and place and time of hospitalization via the Global Positioning System (GPS), fixing and filling in the relevant fields of the call card).
- To perform continuous monitoring of hard copy call cards to ensure data integrity. In parallel with the improvement of the CDS and the enhancement of the CJSC's technical capacity, to abandon the practice of hard copy call cards, promoting electronic call cards maintenance directly by the doctors through the use of tablets.
- To establish a procedure for the development and maintenance of online data provided by hospitals on available beds, to ensure the accuracy of medical institution's provision of data on available beds in accordance with the standards set.
- To fully integrate the data of state-funded medical aid cases in the CDS along with maximum automatization of call card data generation, which will enable to minimize the human impact in completing call cards in the electronic health system.
- To periodically analyze data to avoid discrepancies in the data within the dispatch and electronic health systems and, as a result, enforce measures enshrined in the contract in the event of failure to comply with the requirements of completing the established forms and implementing approved procedures.

OBJECTIONS AND EXPLANATIONS BY OBJECTS OF AUDIT

During the audit, 3 protocols were drawn up, which were submitted to the heads of facilities under audit (inspection) in the manner prescribed by law.

The Ministry of Health of the Republic of Armenia submitted objections and explanations to the audit protocol (see below). The overwhelming majority of the objections were not accepted by the Audit Chamber on appropriate grounds, and some objections were, in essence, explanations of the recorded facts.

The Municipality of Yerevan did not object in principle to the protocol but mainly provided explanations, which were included in the current conclusion, as appropriate. The CJSC did not object to the inspection protocol either.

On the basis of objections and explanations, editorial adjustments have been made to the interim conclusion.

Objections and Explanations provided by the MoH on the Audit Protocol Submitted on December 10, 2019

Distribution and Loads of Brigades

Objections and Explanations provided by the RA MoH

1. RA Government's Protocol Decree No. 14, dated April 15, 2016, states that "It is expedient for Yerevan to adopt a norm after the principle of 20,000 inhabitants per brigade, resulting in the formation of about 50 brigades in Yerevan," which is merely a vision for the organization and development of ambulance care, not being a legally binding norm subject to enforcement. At the same time, I would like to inform you that the Ministry of Health, taking into consideration the load of the emergency medical services in Yerevan and a number of urban communities in the provinces, as well as the circumstance that in 2019 the government budgetary allocations for the state ambulance services program have increased by 500 million AMD, Health Minister's Order No. 2088-A, dated June 20, 2019, revised the ambulance service standards. As a result of this revision, as of August 1, 2019, the proportion in the city of Yerevan has been ensured at a brigade per 20,000 residents.
2. The ambulance service of the City of Yerevan is considered as one unit and the approved standard refers to the service of the whole city. As regards the division of brigades among substations, it is conditional and is an internal logistic tool for the organization.

The Position of the Audit Chamber

1. The issue related to the distribution of brigades within performance audit was considered to evaluate the effectiveness of the brigade, rather than assess compliance with legal norms. And the selected assessment criterion was the measure approved by the above-mentioned Governmental Decree, which according to the sector strategy is a requirement for the further development of the service. As for the developments of 2019, which are not included in the audit period, they are summarized in the interim conclusion.
2. As a result of the audit conducted by the Audit Chamber, efficiency issues identified in the internal organizational processes of the CJSC (e.g. optimal distribution and load of brigades in the administrative districts of Yerevan) are also within the competence of the entities under audit, namely Yerevan municipality (as its founder) and the Ministry of Health (as the lead agent for budget program execution).

Prompt response to calls and servicing thereof

Objections and Explanations provided by the RA MoH

1. The Ministry of Health is negotiating with other mobile operators to resolve this issue.

2. Since July 2019, the Dispatch System has been integrated with the Electronic Health System, as a result of which the data entered in the Dispatch System are automatically reflected in the Electronic Health System.

3. Since 2004, reports on the state-funded work in the healthcare system have been received through electronic systems.

The Position of the Audit Chamber

1. This is not an objection, it is an explanation.
2. This is not an objection. These are explanations, relating to the period beyond audit.
3. The Protocol mentions the electronic health care system that was introduced by the RA Governmental Protocol Decree No. 43, dated October 25, 2012, and the protocol stated that the contract signed between the RA MoH Staff and the CJSC stipulated the requirements for reporting in the electronic health system, which does not contradict the MoH explanation.

Recording calls in the E-Health System and Financing

Objections and Explanations provided by the RA MoH

1. Financing is provided by the Ministry of Health based on the cases entered into the electronic health care system in the prescribed manner, and no legal acts provide for a mandatory legal norm on the entry of personal data. Clause 2.2.2 of the Contract on the Provision of Free and Preferential Medical Care and Services guaranteed by the State also requires “to compile and submit reports on the work carried out within the framework of the Medical Care through the electronic health system (Ministerial Order N 63-A, dated 24.01.2011, Report on the Work Performed within the State Order by Budget Programs and Types of Medical Services" (Form N HP-011) and (Form N SC-011)) in line with the proportional contractual monthly sums." For the Ambulance Services program, organizations submit reports in HP-011 Form, which also does not imply mandatory disclosure of personal data. Moreover, according to paragraphs 6 and 7 of Chapter 2 of the Appendix to Order 1664-A of the Minister of Health, issued on June 29, 2018, “The data foreseen by paragraph 2 of Clause 1 of this Procedure shall be entered into an electronic health system by the organizations upon the written consent of the patient receiving free of charge and preferential medical care and services guaranteed by the state, as fixed either in the form for primary health care services provider selection or the change of a previously made choice, or the case record, or an ambulance call card. In the event of the patient's written disagreement or impossibility to give consent or disagreement, the patient's data shall be entered into the electronic health care system without completing the patient's personal data specified in Clause 2 (1) of this Procedure (unknown patient). ”

   Due to the lack of technical integration of the two abovementioned softwares (e-health system or dispatching system), the medical organization had to re-enter the data, which resulted in the incomplete transfer of information from one software to the other, causing some data loss.

2. The fields of "start of service", "end of service" in the electronic health system do not reflect the timing of emergency calls. Exact service periods, starting from the phone call to the end of the service, are recorded on the Locator.am website, so I suggest that you be guided by the information on call service details logged in the Dispatch System.
3. The funding for Emergency Medical Service program is disbursed on a monthly basis and there is no case management procedure for ambulance services due to inexpediency. For a closer look at the cases presented in the protocol, in which the "start of service", "end of service" fields are the same, we propose to study the same cases in the Dispatching System.

The Position of the Audit Chamber

The objections are unacceptable, in particular:

1. Both by Order No. 3767-A of the Minister of Health of the Republic of Armenia “On the Procedure for Entering, Receiving and Examining Data in the Electronic Health System”, dated December 29, 2017, and Decree No. 1664-A “On Approving the Procedure for the Entry, Suspension and Schedule of Cases in Electronic Health System,” dated June 29, 2018, establish the requirement of entering the personal data of

the patient as soon as the latter calls. Personal data cases relate to cases of written disagreement given by the patient and the impossibility of provision of disagreement by the pateint, but no facts in this regard were presented to the auditors during the audit. Given the fact that in 2017-2018 identification data were available in 20-27% of all calls, and in November 2019 this figure exceeded 60%, it is possible to conclude that the 2017-2018 data were not properly entered into the system, which is also supported by the explanations provided by the Ministry of Health of the Republic of Armenia in the following paragraph.

2. Since the call cards data for 2017-2018 were not fully entered in CDS, so the fact of incomplete data on services or visits (including start and end time) in CDS was recorded in the audit protocol.

3. According to the RA Government Decree N 318-N, Appendix 2, Chapter 6, Article 38, dated March 4, 2004, the contract shall provide for the procedures for the examination, case-management, observation, monitoring, expert evaluation and conclusions on the contractual activities carried out by medical organizations providing free and preferential medical assistance and services guaranteed by the state, and Chapter 3 of the Contract signed by the RA MoH and the CJSC in 2018 defines the case management procedure as a form of control, which, as claimed by RA MoH, is not conducted due to its inexpediency. See paragraph 2 on incomplete data on services or visits as available in CDS.

REFERENCES

1. The Law of the Republic of Armenia on Medical Care and Service
2. RA Government Decree No. 894-N of July 15, 2010 on Approving the Strategy on the Republic of Armenia Emergency Medical Service Modernization Strategy and Schedule for Implementation of Emergency Medical Service Modernization Strategy Actions
3. RA Government Decree No. 318-N of 4 March, 2004 on Free and Preferential Medical Assistance and Service Guaranteed by the State
4. RA Government Protocol Decree No. 14 of April 15, 2007 on Approving Emergency Medical Care and Service Provision to the RA Population Strategy 2016-2020
5. Order N 39-N of the RA Minister of Health on Approving the State Standard for Ambulance Services Provided to the Population under Free and State-Guaranteed Medical Assistance and Service, Format of Ambulance Call Card, Notice Form, and Job Description for Ambulance Dispatchers, dated July 14, 2013
6. Order 2848-A of the RA Minister of Health On the Approval of the Standard for the Provision of State-guaranteed Free and/or Preferential Hospital Medical Care and Services to the Population, dated November 6, 2018
7. Order No. 2913-L of the Minister of Health of the Republic of Armenia on Approving the Classification of Calls Serviced by Ambulance Care CJSC into Calls Requiring Emergency and Urgent Medical Care and Calls Redirected to Primary Health Care System", dated October 10, 2019
8. "Healthcare System, Morbidity and Medical Service," Social situation in RA, RA NSS, 2018, www.armstat.am
9. The New Ambulance Standards, "NHS England" non-departmental public body, www.england.nhs.uk
10. Ambulance care in Europe, Ambulancezorg Nederland, January 2010
11. Ambulance care in Europe: Organization and practices of ambulance services in 14 European countries, Ambulancezorg Nederland, 2015

APPENDICES

Appendix 1

LIST
State-Funded Urgent and Emergency Medical Services and Prices in 2017-2018

Name	Price according to RA MoH-SP -0003000 contract (2017) AMD	Price according to RA MoH-SP -0003000 contract (2018) AMD
General (line) brigade call/case[21], concluding with hospitalization (Yerevan)	7,500	7,000
General (line) brigade call/case (Yerevan)	7,300	6,850
General (line) brigade call/case (Yerevan) (60%)	4,380	4,110
Paramedic brigade call/case (Yerevan)	5,100	4,800
Paramedic brigade call/case (Yerevan) (60%)	3,060	2,880

[21] *Payment for service in 2017թ. was carried out per calls, in 2018 per case.*

Appendix 2

Comparative analaysis of statistical data of emergency medical assistance in the Republic of Armenia and Yerevan Ambulance

Data from the RA Statistical Committee[22] *(including the sity of Yerevan)*

Name	2014	2015	2016	2017	2018
Total number of calls, unit	**480,136**	**489,911**	**501,764**	**465,111**	**479,767**
Number of stations, unit	104	101	74	75	72
Line brigade, unit	221	207	160	155	147
Specialized brigade, unit	19	19	19	19	19
Paramedic brigade, unit	39	37	35	34	38
Annual funding from state budget, thousand AMD	**3,179,105**	**3,323,502**	**3,241,597**	**3,226,420**	**3,181,720**

Data for the city of Yerevan[23]

Name	2014	2015	2016	2017	2018
Number of calls serviced under state funding	**216,328**	**228,333**	**240,393**	**225,151**	**237,531**
Number of stations, unit	7	7	7	7	7
Line brigade, unit	23	23	23	23	23
Specialized brigade, unit	11	11	11	11	11
Paramedic brigade, unit	2	2	2	2	2
Annual funding from state budget, thousand AMD	**1,372,388.0**	**1,385,877.2**	**1,395,434.5**	**1,377,123.0**	**1,382,806.8**

[22] *Source – www.armstat.am, Publications on the socio-economic situation in 2014-2018*

[23] *Provided by CJSC.*

Data comparison for RA and the city of Yerevan

Calls/Funding

Year	Number of calls in the RA	Funding	Number of calls in Yerevan	Funding
2014	480,136	3,179,105	216,328	1,372,388
2015	489,911	3,323,502	228,333	1,385,877
2016	501,764	3,241,597	240,393	1,395,435
2017	**465,111**	**3,226,420**	**225,151**	**1,377,123**
2018	**479,767**	**3,181,720**	**237,531**	**1,382,807**

Yerevan's share in the indicators of the RA (calls)

Year	Number of calls in RA	Number of calls in Yerevan	Yerevan's share in RA calls
2014	480,136	216,328	45%
2015	489,911	228,333	47%
2016	501,764	240,393	48%
2017	**465,111**	**225,151**	**48%**
2018	**479,767**	**237,531**	**50%**

Yerevan's share in the indicators of the RA (funding)

Yerevan	RS State Budget Program	Funding for CJSC	Yerevan's share in the state budget
2014	3,179,105	1,372,388	43%
2015	3,323,502	1,385,877	42%
2016	3,241,597	1,395,435	43%
2017	**3,226,420**	**1,377,123**	**43%**
2018	**3,181,720**	**1,382,807**	**43%**

Appendix 3.

Resuscitation and specialized brigade territorial distribution in 2017-2018

Name of Substation	Administrative districts	Number of specialized and resuscitation brigades	Number of population as of January 1, 2017 (thousand people)	Number of population as of January 1, 2018 (thousand people)	Number of population as of January 1, 2019 (thousand people)	Average number of population per 1 brigade in January 1, 2017 – January 1, 2019 (thousand people)
Substation 1	Arabkir	5	115.4	115.0	114.8	37.83
	Kanaker Zeytun		74.0	74.0	74.2	
Substation 2	Ajapnyak	4	109.2	109.3	109.7	37.97
	Davitashen		42.5	42.4	42.5	
Substation 4	Erebuni	4	127.2	127.8	128.6	34.42
	Nubarashen		9.8	9.8	9.8	
Substation 5	Avan	5	53.0	52.9	52.9	36.94
	Nor-Nork		131.0	131.7	132.6	
Substation 6	Shengavit	4	139.6	140.0	140.7	35.03
Substation 7	Malatia Sebastia	4	136.7	137.5	138.6	34.40
Kentron substation	Kentron	7	125.6	125.5	125.7	19.62
	Nork Marash		11.8	11.7	11.7	

Appendix 4 [24]

Average number of calls serviced by 1 (specialized, resuscitation) brigade at the substations in 2017

Name of Substation	Number of calls serviced by 1 brigade in the period of 00:00:00 - 07:59:59	Number of calls serviced by 1 brigade in the period of 08:00:00 – 15:59:59	Number of calls serviced by 1 brigade in the period of 16:00:00 – 23:59:59
Substation 1	5	6	9
Substation 2	4	6	9
Substation 4	4	6	9
Substation 5	5	7	10
Substation 6	5	6	10
Substation 7	4	6	9
Kentron Substation	4	5	8

Average number of calls serviced by 1 (specialized, resuscitation) brigade at the substations in 2018

Name of Substation	Number of calls serviced by 1 brigade in the period of 00:00:00 - 07:59:59	Number of calls serviced by 1 brigade in the period of 08:00:00 – 15:59:59	Number of calls serviced by 1 brigade in the period of 16:00:00 – 23:59:59
Substation 1	5	6	9
Substation 2	5	6	9
Substation 4	4	7	10
Substation 5	5	7	10
Substation 6	5	6	10
Substation 7	5	6	10
Kentron Substation	4	6	8

[24] *Source: State funded and paid calls transferred to specialized and resuscitation brigades and recorded in the Central Dispatcher Management System*