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Structure of emergencies at the prehospital stage in Moldova from 2019-2020 years

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Abstract

Background: In the last 2 years, some changes have occurred in the structure of emergencies at the prehospital stage in the Republic of Moldova, being largely influenced by the COVID-19 pandemic.

Material and methods: Retrospective analysis of the Prehospital Emergency Medical Service (PEMS) Request Sheets of the National Centre of Prehospital Emergency Medicine (NCPPEM) of the Republic of Moldova for the years 2019-2020.

Results: According to the nosological profile in 2020 at the prehospital stage, respiratory emergencies were on the first place with 23% of the 761.416 of total number of requests. On the second – cardiovascular (20.6%), on the third – neurological (13.3%), infectious – 3.1%. In 2019, on the first place – cardiovascular with 22.3% of the 845.572 of total number of requests, followed by respiratory – 19.3%, neurological – 13.6%, infectious – 2.2%. In 2020, on the first place were respiratory emergencies, which compared to 2019 increased practically by 4% and the infectious emergencies by almost 1%. The number of endotracheal intubation procedures and medical-assisted transportations practically doubled in y.2020 compared to y.2019.

Conclusions: All these changes: increased respiratory and infectious emergencies, intubation procedures, and assisted-medical transportations, have occurred exceptionally due to COVID-19 infection.

Key words: emergency, prehospital, nosological, respiratory, infectious.

Cite this article

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Introduction

Prehospital Emergency Medical Service (PEMS) is an integrated part of the Health System of the Republic of Moldova (RM), which provides the population of the entire country with Emergency Medical Care (EMC), based on the principles of universal accessibility. PEMC in the Republic of Moldova is provided free of charge to all citizens of the RM, as well as stateless persons, refugees and international travelers. The chain of emergency services at the prehospital stage begins with the request received at the single emergency calls service 112, sent to the single medical dispatcher, followed by medical assistance at the place of request, and finalized (if necessary) with transporting patients to the hospital and referral.

On September 4, 1944, in Chisinau city was opened the first EMC Station in the RM. Initially, the station had only a two-horse cart, which served the critical patients at home or in public places. In 1948, 3 teams were formed to serve prehospital emergencies: 2 teams of doctors and 1 team of emergency nurses. In 1956, the first pediatric team was created. Between 1960 and 1971 years, the specialized teams of cardiology, toxicology, traumatology, neurology, adults reanimation, and psychiatry were formed. In 1978, the first pediatrics reanimation team was organized. In 1993,

based on *Nicolae Testemitanu* State University of Medicine and Pharmacy was founded the Emergency Medicine Department. According to the Government Decision No 377 of 16.06.2015 [1] and the Order of the Ministry of Health No 537 of 26.06.2015 [2], on October 1, 2015, the EMC System was reorganized into the National Centre of Prehospital Emergency Medicine (NCPPEM) – Public Medical-Sanitary Institution (PMSI) of strategic importance, with legal personality, which is subordinated directly to the Ministry of Health, Labor and Social Protection (MHLSP) of the Republic of Moldova, accredited by the National Council for Evaluation and Accreditation (fig. 1).

The reorganization of the EMC Service in a unified system (PMSI NCPPEM), which until the reform was divided into 5 legal entities contributed to:

- ✓ Significant improvement of the institutional management system, both vertically and horizontally;
- ✓ The number of administrative functions has been reduced;
- ✓ The conditional boundaries between the served territories by the PEMC subdivisions have been eliminated;
- ✓ The opening of the new EMC Points (in the rural area) led to the improvement of the population's access and the increase of the operativity;

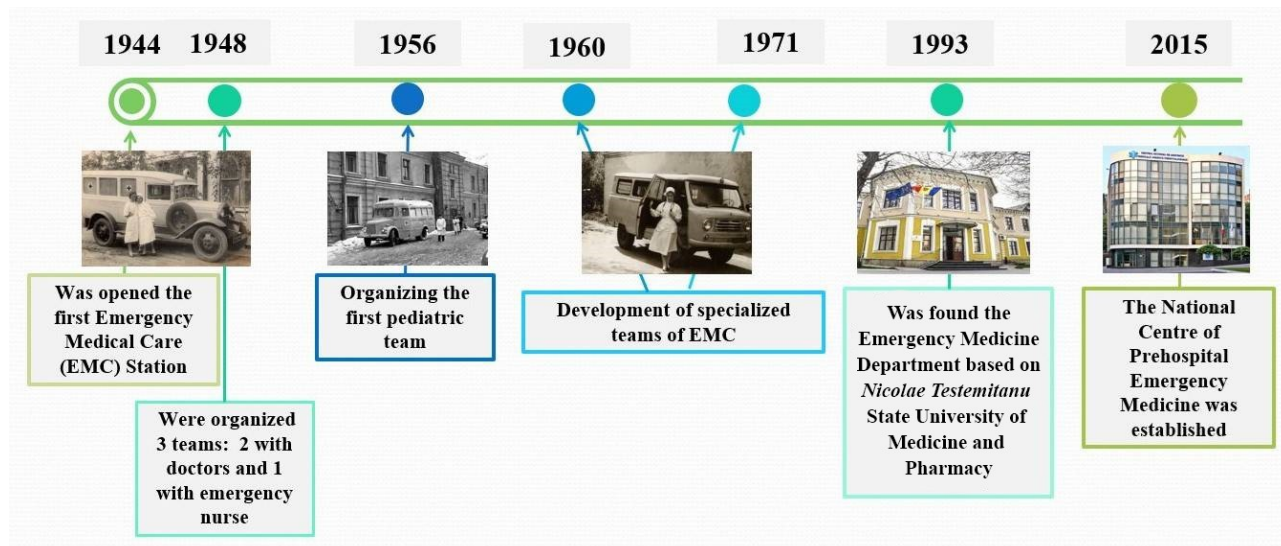


Fig. 1. History of Emergency Medical Service of the Republic of Moldova

- ✓ Unification of key processes and creation of new fields of activity;
- ✓ Mobilization of the necessary resources to solve the operative tasks.

In the last 2 years, some changes have occurred in the structure of emergencies at the prehospital stage in the Republic of Moldova, being largely influenced by the COVID-19 pandemic.

Material and methods

Retrospective analysis of the Prehospital Emergency Medical Service (PEMS) Request Sheets of the National Centre of Prehospital Emergency Medicine (NCPem) of the Republic of Moldova for the years 2019-2020.

Results and discussion

In 2020, the PMSI NCPem teams served 761.416 emergency calls (2019 – 845.572) and Prehospital EMC was given to 734.912 people with various medical-surgical emergencies (2019 – 820.813). The share of served calls in urban areas in 2020 was 53.1% or 390.102 served patients, and in rural areas – 46.9% or 344.810 served patients. The rate of the served calls in urban areas was 52.3% or 429.437 served patients, and in rural areas – 47.7% or 391.376 served patients – in 2019. Due to the service environment, there was an increase of 0.8% of the rate of the served Prehospital EMC requests (PEMC Calls) in the urban population in 2020 compared to 2019, which is due to the demographic processes in the Republic of Moldova through the continuous concentration of the population in cities. In 2020 the share of false alarm calls or unnecessary requests, out of the total number of served calls, was 3.5% or 26.504 cases. In the year 2019 – 2.9% or 24.759 cases. The average number of the served prehospital emergency medical care requests in 24 hours in y.2020 was 2.080 and in 2019 – 2.317 (fig. 2) [3].

Were performed 73 endotracheal intubations in the year

2020, while in 2019 – only 44. In 2020 year were performed 114.339 glucometries, and in 2019 – 107.506. Bladder catheterization in 2020 was performed for 1.392 patients, and in 2019 – in 1.304 cases (tab. 1) [3].

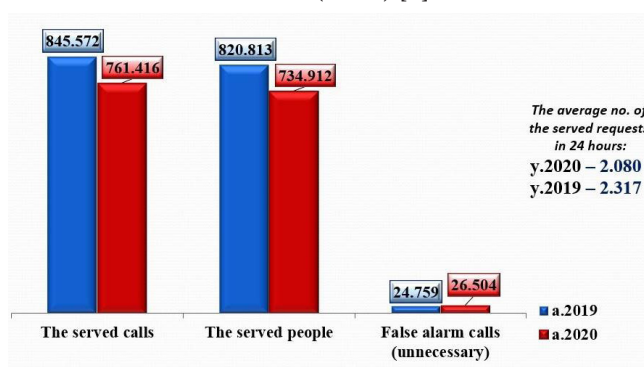


Fig. 2. The served Prehospital Emergency Medical Care Calls in years 2019 – 2020 [3]

Table 1. The served Prehospital EMC Calls and interventions for diagnosis and treatment performed by PEMC teams of the RM in years 2019 – 2020 [3]

Parameter	Year 2019	Year 2020
The served calls	845.572	761.416
The served people	820.813	734.912
Of them: Urban	429.437 / 52.3%	390.102 / 53.1%↑
Of them: Rural	391.376 / 47.7%	344.810 / 46.9%
False alarm calls	24.759 / 2.9%	26.504 / 3.5%
Average No of served requests in 24 hours	2.317	2.080
Endotracheal intubations	44	73↑
Glucometries	107.506	114.339↑
Bladder catheterization	1.304	1.392↑

Table 2. Structure of Calls by the degree of urgency and the Medical-assisted transportations performed by PEMC teams of the RM in years 2019 – 2020 [3]

Parameter	Year 2019			Year 2020		
	% of served people	Abs. served people	% of trans-portations	% of served people	Abs. served people	% of trans-portations
Major	26.5	217.333	71.6	28.6 ↑	210.087	68.9
Second-degree	69.1	567.509	29.1	65.5	481.576	25.8
Third-degree	3.2	25.945	14.1	3.0	21.705	9.3
Medical-assisted transportations	1.2	10.026	99.7	2.9 ↑	21.544	81.4

In 2020, of the total number of served people, by the degree of emergencies, the major ones constituted 28.6% (served patients being 210.087), grade II emergencies – 65.5% (served patients – 481.576), grade III emergencies – 3.0%, or 21.705 cases. Medical-assisted transportations were in 2.9% or 21.544 cases. In 2019, major emergencies constituted 26.5% (217.333 served patients), grade II emergencies – 69.1% (567.509 served patients), grade III emergencies – 3.2% (25.945 served patients). Medical-assisted transportations were in 1.2% or 10.026 cases (fig. 3 and 4, tab. 2) [3].

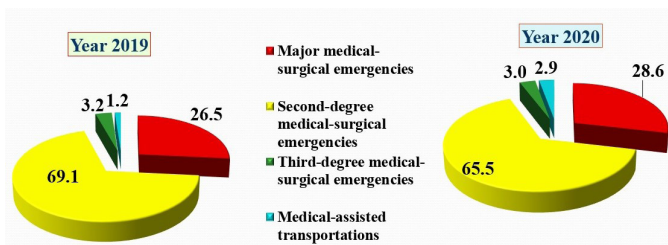


Fig. 3. Structure of emergency calls by the degree of urgency based on the Prehospital Emergency Medical Care (PEMC) Request Sheets for the years 2019-2020 (%) [3]

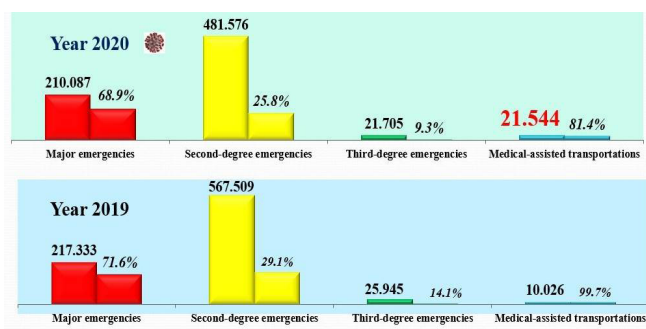


Fig. 4. Medical-assisted transportations in 2019-2020 performed by PEMC teams [3]

In the RM, many of the patients with major emergencies were left at home, because they categorically refused to be hospitalized [3]. The most common reason for being non-transported was the refusal of transportation by the patient (74.15% – 76.38%), followed by treatment of patients at the scene (15.41% – 15.74%) [4]. There is a scarcity of research on EMS reattendance to non-transported, low

acuity patients. A systematic review indicated that 2-6% of non-transported patients re-contacted the EMS, and 5-19% of non-transported patients independently presented to the emergency department within 48 hours [5, 6]. In a recent UK study, 9% of non-transported patients re-contacted the EMS provider within 3 days of the initial non-transport event [5, 7]. While reattendance to the same patient within two or three days of initial presentation might suggest that ambulance crews ‘got it wrong’ on the first assessment, the reality is that patients with minor presentations will sometimes deteriorate or other complications arise. Reattendance has been observed internationally [5, 8-10], and may be unavoidable to some degree.

By the nosological profile of the structure of prehospital EMC requests, in the RM, in y.2020, the respiratory emergencies were on the first place with a rate of 23% of the 761.416 total number of requests, or 168.866 served patients. On the second place were cardiovascular emergencies with a rate of 20.6% or 151.509 served patients. On the third place were the neurological emergencies with 13.3% or 97.727 cases. Trauma emergencies constituted 9.9% or 72.724 cases. The rate of infectious emergencies was 3.1%, that is, 22.863 served patients. In 2019, cardiovascular emergencies ranked first – 22.3% with a total number of 845.572 PEMC requests or 183.131 served patients. They were followed (second place) by the respiratory emergencies with 19.3% or 158.674 cases. Neurological emergencies ranked third with a rate of 13.6% or 111.953 neurological served patients. Trauma emergencies accounted for 10.8% or 88.902 cases. The share of infectious emergencies in y.2019 was 2.2% or 17.882 infectious served patients (tab. 3 and fig.5) [3].

Table 3. The structure of prehospital emergency calls by the nosological profile, years 2019-2020 (% & abs.) [3]

Parameter	Year 2019		Year 2020	
	%	Abs. served people	%	Abs. served people
Cardiovascular	22.3	183.131	20.6 ↓	151.509
Respiratory	19.3	158.674	23.0 ↑	168.866 ↓
Neurological	13.6	111.953	13.3	97.727
Trauma	10.8	88.902	9.9 ↓	72.724
Infectious	2.2	17.882	3.1 ↑	22.863 ↑

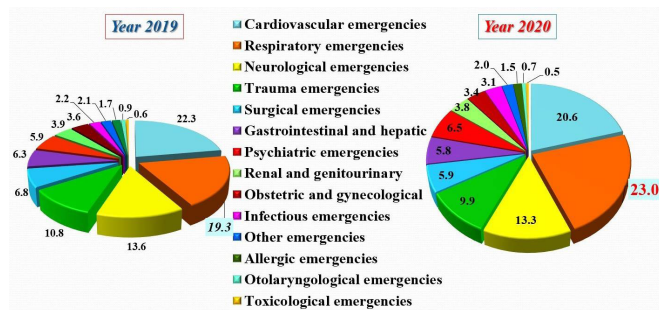


Fig.5. The structure of prehospital medical-surgical emergencies by the nosological profile, years 2019–2020 (%) [3]

In 2020, in the RM, on the first place were respiratory emergencies, which compared to 2019 increased practically by 4% and the infectious emergencies – by almost 1% [3]. After the first reported case of SARS-CoV-2, there were significant increases in complaints, chiefly of fever (211% increase, $p < 0.001$) and respiratory symptoms (245% increase, $p < 0.001$) [11]. The data for the period 2013–2017 from Italy showed that, with some exception due to environmental differences, the highest proportion of incoming emergency calls is not acute or urgent and could be more effectively managed in other settings than in an Emergency Department (ED). Better management of dispatch can reduce crowding and save hospital emergency department’s time, personnel, and health system costs. This data highlights the importance of promoting policies to increase the availability of ambulances with staff who can manage problems on site, reducing the admissions of less appropriate EDs [12].

In the RM, the share of prehospital cardiovascular emergencies decreased in y.2020, reaching 20.6%, compared to 22.3% in y.2019. Trauma emergency in 2020 declined and accounted for 9.9%, compared to 10.8% in 2019 [3]. In Saudi Arabia the cardiac cases showed a smaller difference at 26.61%, whereas trauma cases showed a decline of 1.641 (a change of – 6.11%). Some of the medical or cardiac cases related to COVID-19 complications could not be determined from the data collected [4].

In 2020, according to nosologies, in the RM was determined the following structure of cardiovascular emergencies:

- Hypertension (HTN). Hypertensive urgencies – 56.095 served patients or a share of 37% of the total number of 151.509 cardiovascular emergencies.
- Essential HTN and tension jumps – 27.462 cases or 18.1%.
- HTN. Hypertensive emergencies – 20.185 served patients or a rate of 13.3%.
- Acute coronary syndrome (ACS) without ST-segment elevation – 3.359 cases or 2.2%.
- ACS with ST-segment elevation – 1.800 cases or 1.2%.
- Sudden cardiac death – 194 cases or 0.1%.

In y.2019, according to nosologies, in the RM was the following structure of cardiovascular emergencies:

- ❖ Hypertension (HTN). Hypertensive urgencies – 65.286 cases or a rate of 35.6% of the total number of 183.131 cardiovascular emergencies.
- ❖ Essential HTN and tension jumps – 33.732 cases or 18.4%.
- ❖ HTN. Hypertensive emergencies – 23.570 served patients or a share of 12.9%.
- ❖ ACS without ST-segment elevation – 4.705 cases or 2.6%.
- ❖ ACS with ST-segment elevation – 2.022 cases or 1.1%.
- ❖ Sudden cardiac death – 244 cases or 0.1% (tab. 4) [3].

According to the Prehospital EMC Request Sheets of the NCPeM, of the RM, during 2019-2020, which were the basis of this research, it was determined that in 2020 the number of investigations increased, such as bladder catheterizations and glucometries, and the number of endotracheal intubations practically has doubled. In y.2020, it can be noted an increase of the share in major emergencies by 2.1% and medically-assisted transportations by 1.7% compared to 2019. Also, in 2020 increased the share of emergencies grade I (majors), hypertensive urgencies (commons), hypertensive emergencies (extremes), and ACS with ST-segment elevation.

In 2020 were registered 102.529 pediatric medical-surgical emergencies or a share of 14.0% from the total no. of served people in the RM. The structure of pediatric emergencies according to the nosological profile was:

- Respiratory – 50.701 cases or 49.5%.
- Trauma – 14.766 or 14.4%.

Table 4. The structure of cardiovascular emergencies by the nosological profile based on the Prehospital Emergency Medical Care Request Sheets for the years 2019-2020 (% & abs.) [3]

Parameter	Year 2019		Year 2020	
	%	Abs. served people	%	Abs. served people
Hypertension (HTN). Hypertensive urgencies.	35.6	65.286	37.0 ↑	56.095
Essential HTN and tension jumps.	18.4	33.732	18.1 ↓	27.462
HTN. Hypertensive emergencies.	12.9	23.570	13.3 ↑	20.185
ACS without ST-segment elevation.	2.6	4.705	2.2 ↓	3.359
ACS with ST-segment elevation.	1.1	2.022	1.2 ↑	1.800
Sudden cardiac death	0.1	244	0.1	194

- Infectious – 4.740 (4.6%).
- Neurological – 2.204 (2.1).
- Cardiovascular – 1.287 (1.3%).

In 2019 year, 159.309 medical-surgical emergencies were registered in children or a share of 19.4% from the total number of served people. By the nosological profile, the structure of pediatric emergencies was:

- ❖ Respiratory – 82.951 cases or 52.1%.
- ❖ Trauma – 19.750 or 12.4%.
- ❖ Infectious – 8.464 (5.3%).
- ❖ Neurological – 3.011 (1.9).
- ❖ Cardiovascular – 2.92 (1.3%).

It can be noticed, that in 2020 compared to 2019, the percentage of respiratory and infectious emergencies decreases, which is the opposite for adults. Instead, pediatric trauma and neurological emergencies are increasing in the RM (tab.5) [3].

Table 5. Structure of pediatric emergencies by the nosological profile (% , abs.) 2019–2020 [3]

Parameter	Year 2019		Year 2020	
	% of served people	Total, Abs.	% of served people	Total, Abs.
Pediatric emergencies in RM	19.4	159.309	↓ 14.0	102.529
Of them: respiratory	52.1	82.951	↓ 49.5	50.701
trauma	12.4	19.750	14.4 ↑	14.766
infectious	5.3	8.464	↓ 4.6	4.740
neurological	1.9	3.011	2.1 ↑	2.204
cardiovascular	1.3	2.092	1.3	1.287

Conclusions

In 2020, compared to 2019, at the prehospital stage, increased the share of emergencies grade I (majors), hypertensive urgencies (commons), hypertensive emergencies (extremes), and ACS with ST-segment elevation, likewise, increased the number of bladder catheterizations, glucometries, endotracheal intubations, medical-assisted transportations, which, in many cases was due to the worsening of health in patients infected with the SARS-CoV-2 coronavirus (COVID-19 disease), and with comorbidities.

Many of the patients with major emergencies were left at home, because they categorically refused to be hospitalized for several reasons, one of which, in 2020, was the fear of infection with the SARS-CoV-2 coronavirus. However, the refusal of hospitalization in emergencies requires raising the level of health education of the population.

By the nosological profile of prehospital EMC requests structure, compared to 2019, the respiratory emergencies in

2020 were on the first place, and the rate increased practically by 4% and the infectious ones – by almost 1%. The number of endotracheal intubation procedures and medical-assisted transportations practically doubled in 2020 compared to 2019. All these changes: increased respiratory and infectious emergencies, the intubation procedures, and assisted-medical transportations, exceptionally have occurred due to COVID-19 infection.

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Authors' contribution

BG conceptualized, designed and conducted the research, drafted the manuscript, revised the manuscript critically; MP collected the data, designed the research, did statistics and interpreted the data, drafted the manuscript, revised the manuscript critically; TB designed the research, interpreted the data, revised the manuscript critically; SL designed the research, interpreted the data, revised the manuscript critically; LP revised the manuscript critically; ND designed the research, interpreted the data, revised the manuscript critically. All the authors revised and approved the final version of the manuscript.

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Ethics approval and consent to participate

Not applicable.

Conflict of Interests

There is no known conflict of interests and financial or non-financial support associated with this publication.

