STRUCTURE OF MAIN EMERGENCIES IN THE PRACTICE OF EMERGENCY MEDICAL CARE

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Summary

Introduction The performance of the emergency medical care system serves as an indicator of the load on the health care system as a whole. The number and pattern of ambulance calls are reliable key indicators for predicting health status in a community. Mortality from diseases occurring as emergencies contributes to the overall mortality rate in Kazakhstan. This study discusses the structure of the main emergency conditions in Kazakhstan.

The aim of the study: analysis of the structure of EMS calls in the Republic of Kazakhstan and the city of Semey for the period from 2017 to 2022, identification of the main nosology that were the reasons for calling the EMS team.

Materials and methods A retrospective analytical study design was used, including a comprehensive review of emergency medical service call reports from 2017–2022. The study included all calls for all nosologies during the study period. Statistical analysis was carried out using SPSS Statistic 2.0, and charts and graphs were generated using Microsoft software.

Results Data analysis showed that the largest numbers of calls per year for all nosology were in the Almaty region and the city of Almaty. In the structure of challenges, the leading positions are occupied by such nosologies as respiratory diseases, diseases of the cardiovascular system and other diseases in our republic.

Conclusion Diseases of the respiratory system and cardiovascular system occupy leading positions in the structure of EMS calls. It is better to prevent these pathologies in advance by expanding the availability of primary care. It is important to develop a system of clinics and paramedic-midwife stations so that all residents have the opportunity to receive emergency care on site.

Keywords: EMS calls structure, paramedic, emergency nosology, ambulance.

Резюме

СТРУКТУРА ОСНОВНЫХ НЕОТЛОЖНЫХ СОСТОЯНИЙ В ПРАКТИКЕ СКОРОЙ МЕДИЦИНСКОЙ ПОМОЩИ

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Введение. Эффективность работы системы скорой медицинской помощи служит индикатором нагрузки на систему здравоохранения в целом. Количество и характер вызовов скорой помощи являются надежными ключевыми

показателями для прогнозирования состояния здоровья населения. Смертность от заболеваний, протекающих как неотложные состояния, способствует общему уровню смертности в Казахстане. В данном исследовании рассматривается структура основных чрезвычайных ситуаций в Казахстане.

Цель исследования: анализ структуры обращений скорой помощи по Республике Казахстан и городу Семей за период с 2017 по 2022 год, выявление основных нозологий, послуживших причинами вызова бригады скорой помощи.

Материалы и методы. Был использован ретроспективный аналитический дизайн исследования, включающий комплексный анализ отчетов о вызовах служб скорой медицинской помощи за 2017–2022 гг. В исследование были включены все обращения по всем нозологиям за период исследования. Статистический анализ проводился с использованием SPSS Statistic 2.0, а диаграммы и графики были созданы с использованием программного обеспечения Microsoft.

Результаты Анализ данных показал, что наибольшее количество обращений в год по всем нозологиям приходится на Алматинскую область и город Алматы. В структуре проблем в нашей республике лидирующие позиции занимают такие нозологии, как болезни органов дыхания, болезни сердечно-сосудистой системы и другие заболевания.

Заключение. Заболевания органов дыхания и сердечно-сосудистой системы занимают лидирующие позиции в структуре вызовов скорой помощи. Лучше заранее предотвратить эти патологии, расширив доступность первичной медицинской помощи. Важно развивать систему поликлиник и фельдшерско-акушерских пунктов, чтобы все жители имели возможность получить неотложную помощь на месте.

Ключевые слова: структура вызовов скорой медицинской помощи, фельдшер, неотложная нозология, машина скорой помощи.

<p align="center">**Түйіндеме**</p>

ШҰҒЫЛ МЕДИЦИНАЛЫҚ КӨМЕК ТӘЖІРИБЕСІНДЕГІ НЕГІЗГІ ТӨТ ЖАҒДАЙЛАРДЫҢ ҚҰРЫЛЫМЫ

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Кіріспе. Жедел медициналық көмек жүйесінің тиімділігі жалпы денсаулық сақтау жүйесіне түсетін салмақтың көрсеткіші ретінде қызмет етеді. Жедел жәрдем шақыруларының саны мен сипаты халықтың денсаулығын болжаудың сенімді негізгі көрсеткіштері болып табылады. Төтенше жағдайларда пайда болатын аурулардан болатын өлім-жітім Қазақстандағы жалпы өлім көрсеткішіне ықпал етеді. Бұл зерттеу Қазақстандағы негізгі төтенше жағдайлардың құрылымын зерттейді.

Зерттеудің мақсаты: 2017-2022 жылдар аралығындағы Қазақстан Республикасы мен Семей қаласының жедел жәрдем шақыру құрылымын талдау, жедел жәрдем бригадасын шақыруға себеп болған негізгі нозологияларды анықтау.

Материалдар мен тәсілдер. 2017–2022 жылдарға арналған жедел медициналық қызметке шақыру есептерін жан-жақты талдауды қамтитын ретроспективті аналитикалық зерттеу жобасы пайдаланылды. Зерттеу кезеңіндегі барлық нозологияларға барлық сұраныстарды қамтыды. Статистикалық талдау SPSS Statistic 2.0 көмегімен орындалды, ал диаграммалар мен графиктер Microsoft бағдарламалық құралының көмегімен жасалды.

Нәтижелер Деректерді талдау жыл сайын барлық нозологиялар бойынша сұраныстардың ең көп саны Алматы облысы мен Алматы қаласында болатынын көрсетті. Республикамыздағы аурулар құрылымында респираторлық аурулар, жүрек-тамыр жүйесі аурулары және басқа да аурулар сияқты нозологиялар жетекші орындарда.

Қорытынды. Жедел жәрдем шақыруларының құрылымында бірінші орындарды тыныс алу және жүрек-тамыр жүйесі аурулары алады. Алғашқы медициналық-санитарлық көмектің қолжетімділігін кеңейту арқылы бұл патологиялардың алдын алған дұрыс. Барлық тұрғындардың өз орнында шұғыл көмек алу мүмкіндігін алу үшін емханалар мен фельдшерлік-акушерлік пункттер жүйесін дамыту маңызды.

Түйінді сөздер: шұғыл медициналық шақыру құрылымы, фельдшер, шұғыл нозология, жедел жәрдем.

Introduction.

It is known that the emergency medical care system is designed to diagnose and treat emergency conditions in sick and injured people. Emergency medical care is a set of immediate therapeutic, diagnostic and tactical measures aimed at eliminating a sudden pathological condition that threatens the life and health of a person or those around him at all stages of treatment.

Emergency conditions include: life-threatening conditions or pathological conditions associated with disruption of vital functions (blood circulation, breathing, etc.); conditions that threaten health, pathological conditions with a high risk of developing impairments in vital functions or that can cause persistent health impairments that may occur in the absence of timely medical care in the near future; conditions requiring urgent medical intervention in the interests of others due to the patient's behavior.

The structure of ambulance calls distinguishes between sudden illnesses and syndromes requiring emergency medical care, trauma and poisoning. According to the National Scientific and Practical Society of Emergency Medical Services of the Russian Federation, the most common are cardiovascular diseases (hypertensive crisis, angina pectoris, myocardial infarction, heart failure, rhythm and conduction disorders), respiratory diseases (bronchial asthma, pulmonary embolism, pneumonia), nervous system (stroke, traumatic brain injury, syncope, headache, autonomic crises and vertebrogenic pain syndrome) [8].

The performance of the emergency medical care system serves as an indicator of the load on the health care system as a whole. The number and pattern of ambulance calls are reliable key indicators for predicting health status in a community [5]. During the COVID-19 pandemic, there has been a significant increase in ambulance call volumes worldwide [2]. For example, in New York City alone, the number of ambulance calls increased from the usual daily high of 4,000 calls to more than 7,000 calls in early 2020 [9]. The number of emergency calls in Israel increased by 1,900% in the first three months of 2020. In Tijuana, Mexico, there was a decrease in the number of non-emergency calls, while the share of urgent cases in the call mix increased sharply to 11.2%. For comparison, it can be noted that the level of such calls before the pandemic was 6.7% in the structure of all ambulance calls [4].

Emergency medicine practice in Kazakhstan is evolving and presents challenges that contribute to poor outcomes in acute care settings. Mortality from diseases occurring as emergencies contributes to the overall mortality rate in Kazakhstan. This study discusses the structure of the main emergency conditions in Kazakhstan.

The aim of the study: analysis of the structure of EMS calls in the Republic of Kazakhstan and the city of Semey for the period from 2017 to 2022, identification of the main nosologies that were the reasons for calling the EMS team.

Materials and Methods: A retrospective analytical study design was used, including a comprehensive review of emergency medical service call reports from 2017–2022. The study included all calls for all nosologies during the study period. Statistical analysis was carried out using SPSS Statistic 2.0, and charts and graphs were generated using Microsoft software.

Results and discussion:

Every year, the emergency medical service of the Republic of Kazakhstan carries out from 7 to 8 million calls, providing emergency medical care to citizens of the Republic of Kazakhstan and foreign citizens located on the territory of our republic.

In 2022, the emergency medical service in the republic was represented by 18 independent stations, 123 city substations and 291 district departments.

The structure of calls by urgency category is as follows:
- 1st category of urgency 417,165 calls (4.9%);
- 2nd category of urgency - 2,299,839 calls (27.1%);
- 3rd category of urgency - 2,540,500 calls (30%);
- 4th category of urgency - 3,224,869 calls (38%) [6].

When calls of the 4th category of urgency are received, the emergency medical service dispatcher, through an automated control system, transfers the call to the paramedic and specialized (medical) teams of the emergency medical department at the healthcare organization providing primary health care (hereinafter referred to as the emergency medical service department at the primary health care organization. Arrival time of paramedics and specialized (medical) teams to the patient's location from the moment of receiving a call from the emergency medical service dispatcher is: 1st category of urgency - up to ten minutes; 2nd category of urgency - up to fifteen minutes; 3rd category of urgency - up to thirty minutes; 4th category of urgency - up to sixty minutes [6].

From 2017 to 2020, there was a decline in calls in the Republic of Kazakhstan. In 2017, the number of calls in the republic was 7,377,942, in 2018 – 7,158,851 calls, in 2019 – 3,823,171 calls, in 2020 – 3,750,797 calls. There was a sharp decrease in the number of calls from 2018 to 2019, when the indicator almost halved (Figure 1). This may be due to the onset of the pandemic and the population's fear of calling emergency services. A similar situation was observed in the United States: compared to the pre-pandemic period, the average number of daily ambulance calls across the state decreased from 2,453.2 to 1,969.6,

representing a decrease of 19.7% [9]. In the UK, there was a 14.74% decrease in call frequency during the pandemic compared to pre-pandemic times [3]. Since the start of the pandemic in Turkey, the number of patients admitted to the emergency surgery clinic has decreased by 55%; the number of patients receiving medical care decreased by 37%; the number of patients operated on decreased by 63%, and the number of patients hospitalized due to injury decreased by 60% [1]. Since 2021, there has been a sharp jump in the number of calls across the republic. In 2021, this figure amounted to 8,252,281 calls; in 2022 - 8,482,373 calls (Figure 1).
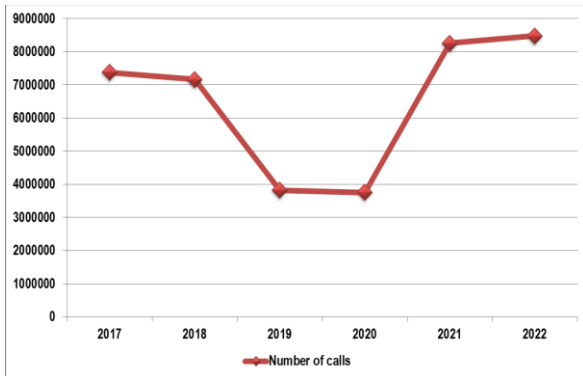

Figure 1. Dynamics of the number of calls in the Republic of Kazakhstan for 2017-2022.

The population began to actively return to the usual life that was before the pandemic: going to work, going on holidays, walking at night, drinking alcohol, going to nightclubs, etc. All this, in turn, led to an increase in emergency calls for all nosologies (Fig.2), including diseases of the cardiovascular system (acute coronary syndrome), respiratory system, trauma and poisoning (road accidents, ethanol poisoning, etc.), neurological causes (strokes), gastrointestinal diseases (bleeding, exacerbation of pancreatitis). In the structure of challenges, the leading positions are occupied by such nosologies as respiratory diseases, diseases of the cardiovascular system and other diseases (Fig.2, Fig. 3). Other diseases included those nosologies that were not included in the previous list (hypotension of unknown origin, endocrinological pathologies, hematological diseases, etc.). The smallest number of calls from 2017 to 2022 were for urinary tract diseases. In 2017 there were 255,312 calls, in 2018 – 231,816 calls, in 2019 – 118,521 calls, in 2020 – 96,313 calls, in 2021 – 157,470 calls, in 2022 – 164,635 calls (Fig.2).

Diseases of the heart and respiratory system are one of the main problems in medicine today. This is due to the high prevalence of such diseases. The main risk factors for heart and respiratory diseases are poor diet, physical inactivity, tobacco use and harmful use of alcohol according to the World Health Organization. The incidence continues to increase, and according to forecasts from the same World Health Organization, about 23.6 million people will die from CVD in 2030 [11].
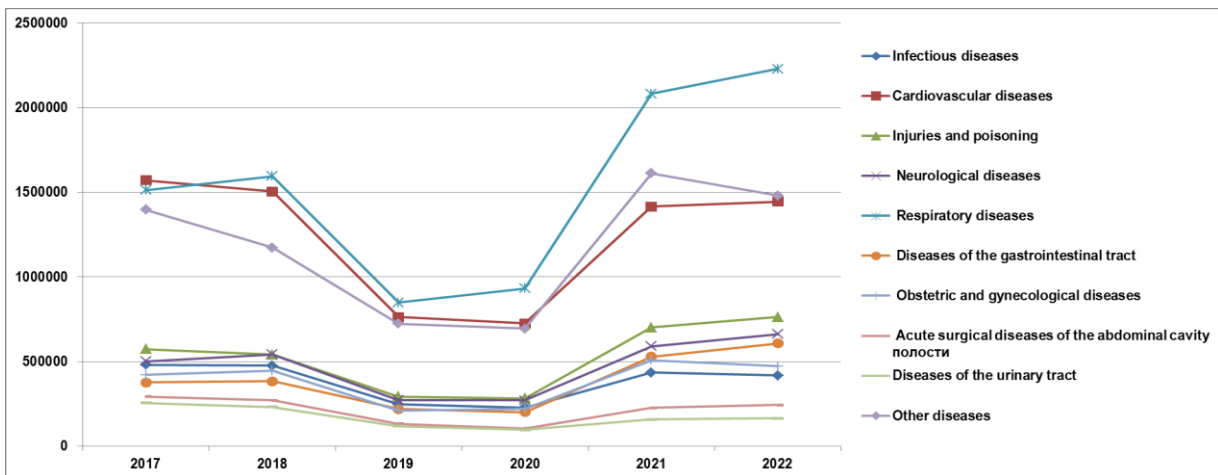

Figure 2. Dynamics of the number of calls in the Republic of Kazakhstan by nosology for the period from 2017 to 2022.

Disease indicators by region were distributed as follows: the largest numbers of calls per year for all nosology were in the Almaty region and the city of Almaty. The smallest number of EMS calls was recorded in the North Kazakhstan region (Figure 4). This is due to the population size in these regions. The maximum number of people as of January 1, 2023 is in the city of Almaty (2,161,695 people), and the minimum number is in the North Kazakhstan region (534,024 people) [7].

In 2021, the highest rate of infectious diseases was in the Mangistau region (40,793 calls). This is due to outbreaks of measles and salmonella in the region. The first outbreaks of measles in the Mangistau region were recorded in 2019 - 1,422 cases and in 2020 - 361 cases [5]. The lowest rates of infectious diseases are in Western Kazakhstan: West Kazakhstan region (3403 calls), Aktobe region (3414 calls), Atyrau region (3430 calls) (Figure 5).

In terms of cardiovascular diseases, the leading positions are occupied by the Almaty region (78,942 calls), the Karaganda region (62,507 calls), and the city of Almaty (71,391 calls). The lowest rate for CVD diseases is in the Mangistau region (8942 calls) (Figure 5).

For diseases of the respiratory system, the Karaganda region was in first place (100,020 calls). Since 1952, lead-zinc ores have been mined in this area. The results of a radionuclide study of the composition and concentrations of radioactive elements suggest that increased values of radioactivity associated with natural geological and man-made factors create a significant proportion of the dose load on the population, which leads to diseases of the respiratory system [8]. The lowest figure is in the Mangistau region (3486 calls).
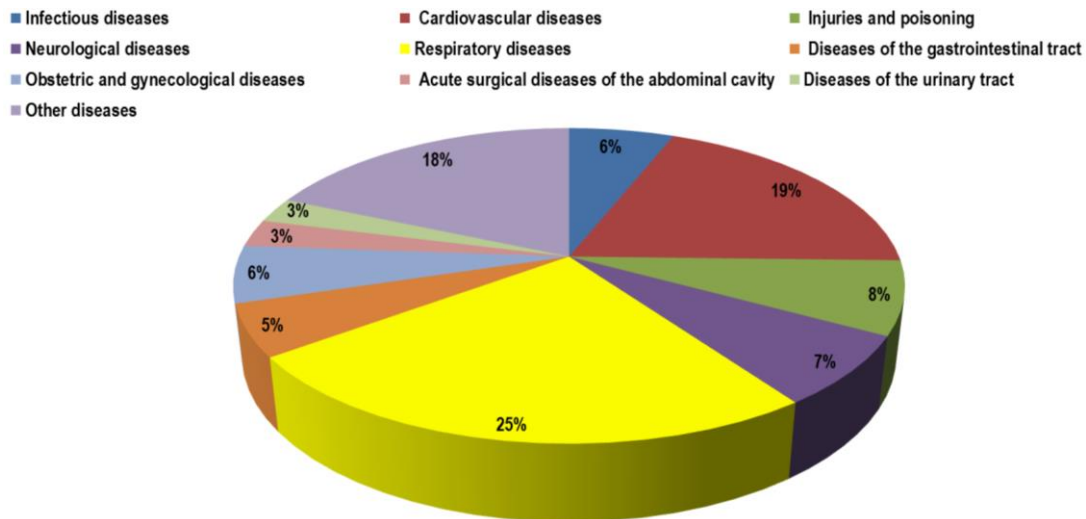
Infectious diseases   Cardiovascular diseases   Injuries and poisoning
Neurological diseases   Respiratory diseases   Diseases of the gastrointestinal tract
Obstetric and gynecological diseases   Acute surgical diseases of the abdominal cavity   Diseases of the urinary tract
Other diseases

Figure 3. Structure of EMS calls in the Republic of Kazakhstan in 2021.
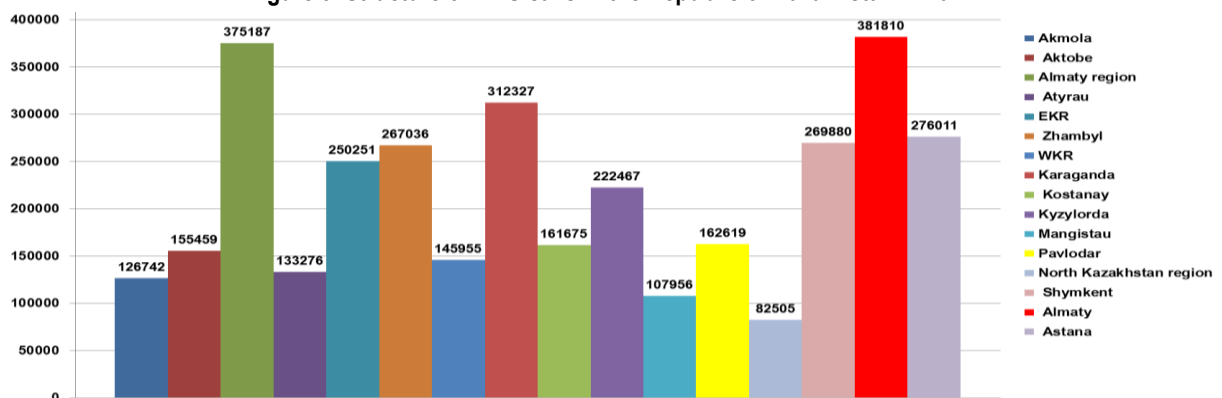
Figure 4. Total number of calls for 2021 by region.

Almaty region is in first place for diseases of the gastrointestinal system (32,521 calls) (Figure 5). This may be due to factors such as the pace of life in a metropolis and the variety of unhealthy food outlets. According to experts from the World Health Organization [11], by the middle of the 21st century, diseases of the digestive system will occupy one of the leading places, which is due to the lifestyle of modern people (stress, poor nutrition, physical inactivity, bad habits), environmental pollution, and an increase in diet share of low-quality and genetically modified food products.
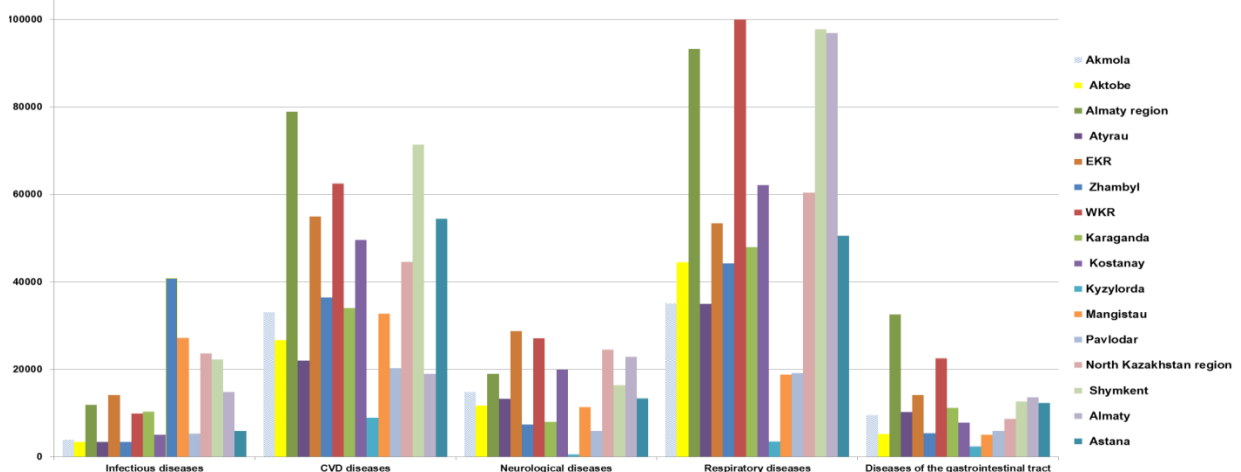
Figure 5. Number of calls for therapeutic diseases by region for 2021.

Almaty takes the leading position in almost all surgical conditions: injuries and poisonings - 49,408 calls, obstetric and gynecological diseases - 29,145 calls, acute surgical diseases of the abdominal cavity - 10,716 calls, urinary tract diseases - 13,875 calls (Figure 6). This is due to the size and density of the population, the rhythm of city life, high traffic on the roads, which leads to injuries and surgical acute conditions. The smallest number of calls regarding surgical pathologies were identified in the North Kazakhstan region: injuries and poisonings - 5718 calls, obstetric and gynecological diseases - 2136 calls, acute surgical diseases of the abdominal cavity - 1675 calls, urinary tract diseases - 1137 calls . This is also due to the small number of residents in this area [7].

In the city of Semey in 2021, the structure of calls was distributed as follows: other diseases - 39574 (22%),
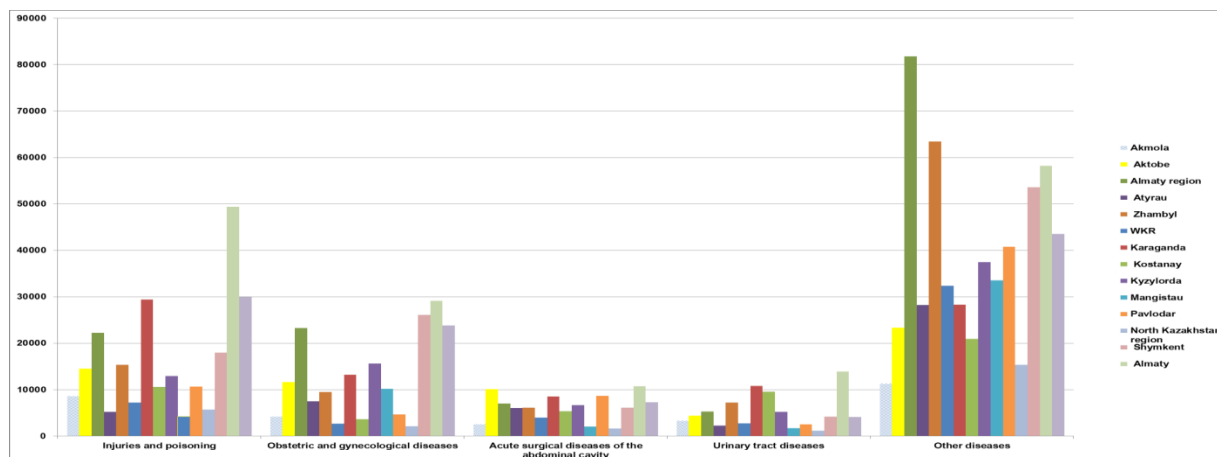
Figure 6. Number of calls for surgical diseases by region for 2021.

cardiovascular diseases - 35467 (20%), respiratory diseases - 34398 (20%), injuries (accidents) and poisoning - 18210 (10%), obstetrics and gynecological diseases - 12863 (7%), infectious diseases - 8531 (5%), neurological diseases - 6472 (4%), gastrointestinal diseases - 7294 (4%), acute surgical diseases of the abdominal cavity - 6211 (4%), urinary tract diseases – 7293 (4%). These indicators are almost similar to the structure of calls by nosology throughout the country.

Considering the predominance of respiratory and cardiovascular diseases in the structure of calls, it is necessary to improve algorithms for providing emergency care for these nosologies and conduct training for emergency medical personnel. Since in case of cardiac arrest, assistance must be provided in the first 6-8 minutes, it is necessary to train persons without medical education to provide assistance until the ambulance arrives.

Conclusion. Diseases of the respiratory system and cardiovascular system occupy leading positions in the structure of EMS calls. It is better to prevent these pathologies in advance by expanding the availability of primary care. It is important to develop a system of clinics and paramedic-midwife stations so that all residents have the opportunity to receive emergency care on site. It is necessary to increase the medical literacy of the population: conduct educational work among the population, teach people to correctly assess their condition and know when to seek medical help or provide emergency medical care before the arrival of the ambulance. Develop psychological support programs for patients who are prone to panic and often call an ambulance without good reason.

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