



## CURRENT ASPECTS OF THE PREVALENCE OF CARDIOVASCULAR DISEASES IN THE REPUBLIC OF UZBEKISTAN, KAZAKHSTAN AND THE RUSSIAN FEDERATION

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### ABSTRACT

*Cardiovascular pathologies are currently one of the key problems for the healthcare system, ranking first among the causes of death and significantly reducing the quality of life of the population. The statistics from the World Health Organization (WHO) indicate that approximately 56 million people are killed by these diseases every year. This number is not constant, as it is dependent on the demographic traits of each country, the state of the healthcare sector and the environmental status. The primary causes are heart and vascular diseases, cancerous tumors, respiratory issues and other diseases that are infectious. The ratio of these causes of death varies significantly depending on the geographical location: each country and region demonstrates its own specifics. This is due to both the general health of residents and their way of life, as well as the level of development and availability of medical services.*

### I. INTRODUCTION (HEADING 1)

Among the worsening environmental conditions, the rapid pace of modern life, and decreasing social support for specific groups of people, there is a consistent increase in diseases affecting the cardiovascular and nervous systems, as well as other health issues. These diseases are caused by problems with the vascular system, infections, exposure to various toxins, injuries, past diseases that are infectious, as well as mental and physical stress. Every year, the devastating impact of cardiovascular diseases claims the lives of countless individuals, solidifying their position as the nation's most significant health threat. This alarming situation poses complex questions for the healthcare system and society as a whole, emphasizing the need for effective preventive strategies. Prevention of cardiovascular diseases and the formation of a healthy lifestyle culture are considered key areas of state policy in the field of healthcare. The spectrum of heart ailments is



remarkably wide. These conditions include everything from elevated blood pressure to ischemic heart disease, which is a consequence of inadequate blood supply resulting in events such as heart attacks. Furthermore, different diseases impact the heart muscle itself; these can originate from varied causes. We also observe endocarditis, characterized by inflammation of the heart's internal surface, and myocarditis, where the heart muscle becomes inflamed. Aortic aneurysms, presenting as an abnormal widening of the aorta, are another category. Pulmonary hypertension involves an elevated pressure within the pulmonary artery, and thromboembolism describes the perilous movement of blood clots throughout the veins.

Data from global statistics and regional studies indicate that the Republic of Uzbekistan is among the countries with some of the highest mortality rates from cardiovascular diseases. In particular, data from the European Health Monitoring Survey confirm the significant prevalence of non-communicable diseases, especially circulatory diseases, among the population of Uzbekistan. Cardiovascular diseases often arise as a result of a complex interaction of various factors, among which genetic predisposition, bad habits, unhealthy diet and lack of physical activity play a key role. The reduction of cardiovascular disease incidence is heavily dependent on adhering to a healthy lifestyle, characterized by a nutritious diet, consistent physical activity, and the rejection of tobacco use and overindulgence in alcohol. Studies consistently demonstrate that adopting straightforward lifestyle modifications significantly lowers the risk of cardiovascular diseases. The cornerstone of good health involves several key lifestyle adjustments. These encompass quitting smoking entirely, moderating sodium intake, incorporating a greater amount of fruits and vegetables into one's diet, consistently participating in physical exercise, and limiting alcohol consumption to moderate levels. Public health initiatives are absolutely essential in bolstering these healthy behaviors. This involves creating settings that actively encourage well-being, ensuring that health-promoting resources are accessible and financially feasible, striving to improve air quality, and actively addressing various forms of environmental contamination. Beyond individual choices, the onset of cardiovascular diseases is also deeply affected by broader societal and economic factors such as global integration, urban sprawl, and the demographic shift towards aging populations, which necessitate a comprehensive approach to health management. Poverty, chronic stress and hereditary factors also have a significant impact on the incidence rate. The main factors contributing to the increase in the prevalence of cardiovascular diseases (CVD) are poverty, chronic psychoemotional stress and genetic predisposition. CVD covers a wide range of pathologies affecting the cardiovascular system, including ischemic cardiomyopathy, a condition characterized by impaired blood circulation in the coronary arteries, which limits the nutrition of the heart muscle. Moreover, the category of cardiovascular illnesses encompasses cerebrovascular conditions, impacting the blood channels within the brain, along with peripheral arterial ailments affecting the limbs. Rheumatic fever arises from a Streptococcal bacterial assault. As a result of infection, rheumatic heart disease often emerges. This disease is recognized by its harm to the heart's valves and the muscular heart wall (myocardium). Also, the



proper functioning of the heart can be hampered by congenital heart defects. These are heart malformations already present when someone is born. The problems arise from unusual developments during the gestation process. Blood clots developing within the deeper veins of the legs, triggering deep vein thrombosis (DVT) and subsequently the potential for pulmonary embolism (PE), represent a serious peril to overall well-being. Sudden and serious cardiovascular events, encompassing conditions like heart attacks (myocardial infarctions) and strokes, arise when blood flow to either the heart or brain is abruptly halted. This typically happens because blood vessels become obstructed. The root cause is frequently the buildup of fatty substances, referred to as atherosclerotic plaques, that impede blood circulation. Cardiovascular ailments encompass diverse ailments impacting both the heart and blood vessels. For example, coronary artery disease arises from inadequate blood supply reaching the cardiac muscle itself, while cerebrovascular disease stems from compromised blood flow to the brain. This insufficient cerebral circulation drastically impairs brain function. Moreover, cardiovascular diseases incorporate peripheral artery disease (PAD), and also conditions affecting limb circulation. These disorders, which restrict blood flow, ultimately result in a state of oxygen deficiency. Rheumatic heart disease develops as a subsequent complication of rheumatic fever. This condition, triggered by streptococcal infections, is marked by the erosion of the heart's valves and the consequential damage to the myocardial tissue. Congenital heart defects represent the structural malformations that occur during fetal development, directly impairing the heart's functional capacity. Deep vein thrombosis (DVT), a serious medical issue, combined with the danger of pulmonary embolism (PE), emerges from the development of blood clots inside the deep veins found in the legs. These clots hold the potential to break away, subsequently journeying to either the lungs or the heart, and, thereby, present a substantial hazard to both an individual's health and survival. Events relating to sudden heart problems, including heart attacks (also known as myocardial infarctions) and strokes, take place because of the abrupt stopping of blood circulation to the heart or the brain. The usual cause is a restriction of blood flow within the vessels as a result of the accumulation of atherosclerotic plaque. Specifically, strokes can manifest in two ways: as a result of a burst cerebral blood vessel (hemorrhagic stroke) or the formation of a blood clot that blocks a vessel (ischemic stroke). Projections suggest that, by 2030, cardiovascular diseases (CVD) could be responsible for around 23.6 million deaths globally. However, an individual's risk of mortality is influenced by the effectiveness of diagnostic, preventive, and therapeutic interventions. The implementation of these measures is complicated by global problems, such as insufficient funding, high cost of drugs and limited availability of high-tech medical care (HTMC).

According to the World Health Organization (WHO), cardiovascular diseases (CVD) affect approximately 1.28 billion adults aged 30 to 79 years, with the majority of cases occurring in low- and middle-income countries. Notably, 46% of individuals with hypertension are unaware of their condition, and only 42% receive appropriate diagnosis and treatment. The increase in CVD incidence is due to a combination of factors, including



lifestyle changes, population aging, high stress levels, as well as insufficient prevention and early diagnosis. Despite existing government health programs, the incidence and mortality from CVD remains high, which requires a comprehensive approach to solving this problem.

The aim of the work is to study the impact of the accounting methodology on mortality rates and prevalence of cardiovascular diseases in Uzbekistan, Kazakhstan and the Russian Federation.

## II. METHODOLOGY

Materials of the WHO and statistical services of Uzbekistan, Kazakhstan and the Russian Federation, as well as publications assessing the correctness of the comparison of mortality and morbidity data. The occurrence of cardiovascular disease (CVD) is gauged through various investigations, including snapshot analyses, clinical observations, and population-wide epidemiological research. These studies involve a randomly selected group intended to reflect the overall population. The gathered information from these studies is subsequently transmitted to the National Center for Health Statistics, accessible online at <http://www.cdc.gov/nchs/nhis.htm>. There, it undergoes analysis and processing, serving as a basis for predictions regarding future expenditure in healthcare. The investigation is conducted by medical professionals. They meticulously evaluate every single ailment included in the research, relying on the diagnostic standards outlined within the established Protocol. A patient's situation is officially classified as a "case" only when their presented symptoms precisely align with the pre-defined criteria detailed in the same Protocol. The findings gleaned from this ongoing study will continue to be integrated into the yearly publications issued by the World Heart Association.

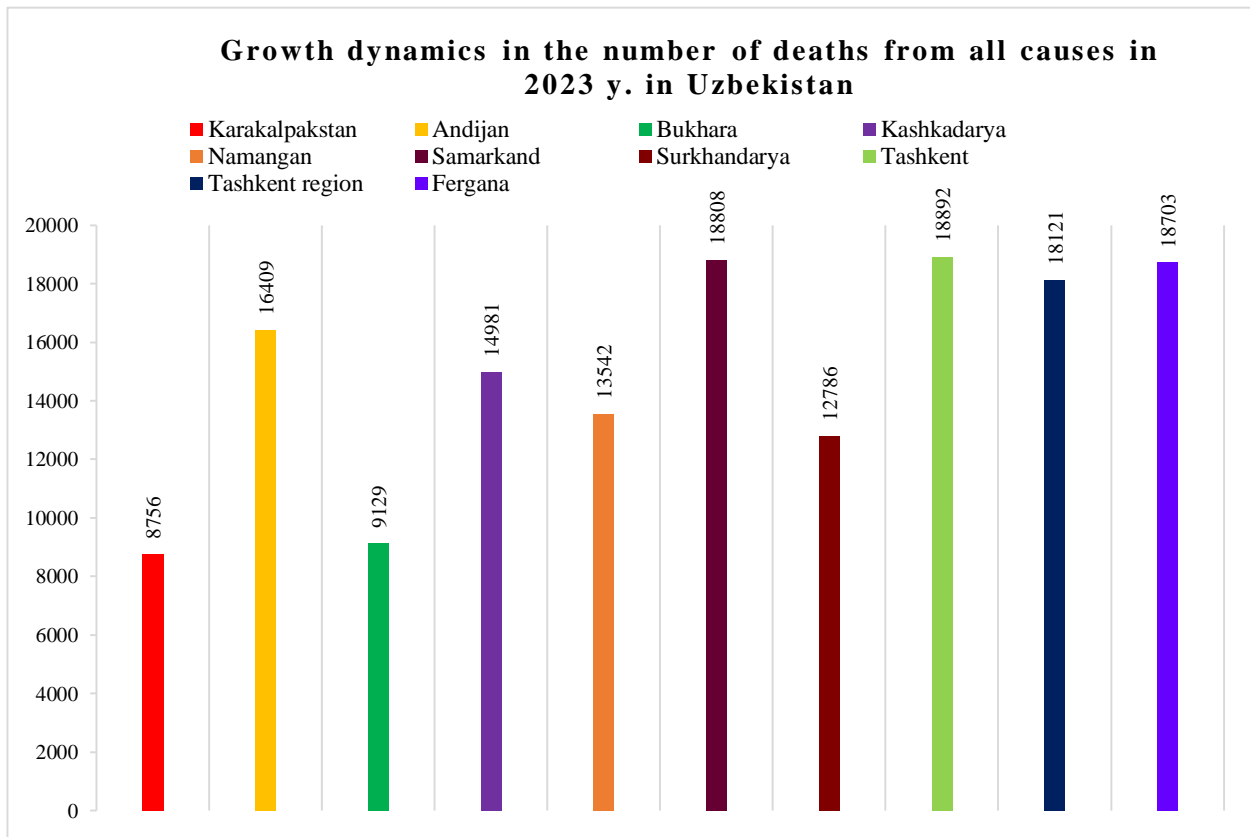
Methods: comparative and logical analysis of data.

## III. RESULTS

According to the World Health Organization (WHO), the Republic of Uzbekistan is classified as a region with a high risk of developing cardiovascular diseases (CVD). In 2022, non-communicable diseases accounted for 83.5% of all deaths in the country, with 702.8 registered cases per 100,000 inhabitants, 60.3% of which were related to CVD. By 2023, the proportion of CVD cases increased to 61.7%, representing 107,666 cases out of a total of 174,500 (*diagram 1*) [9;10;14].



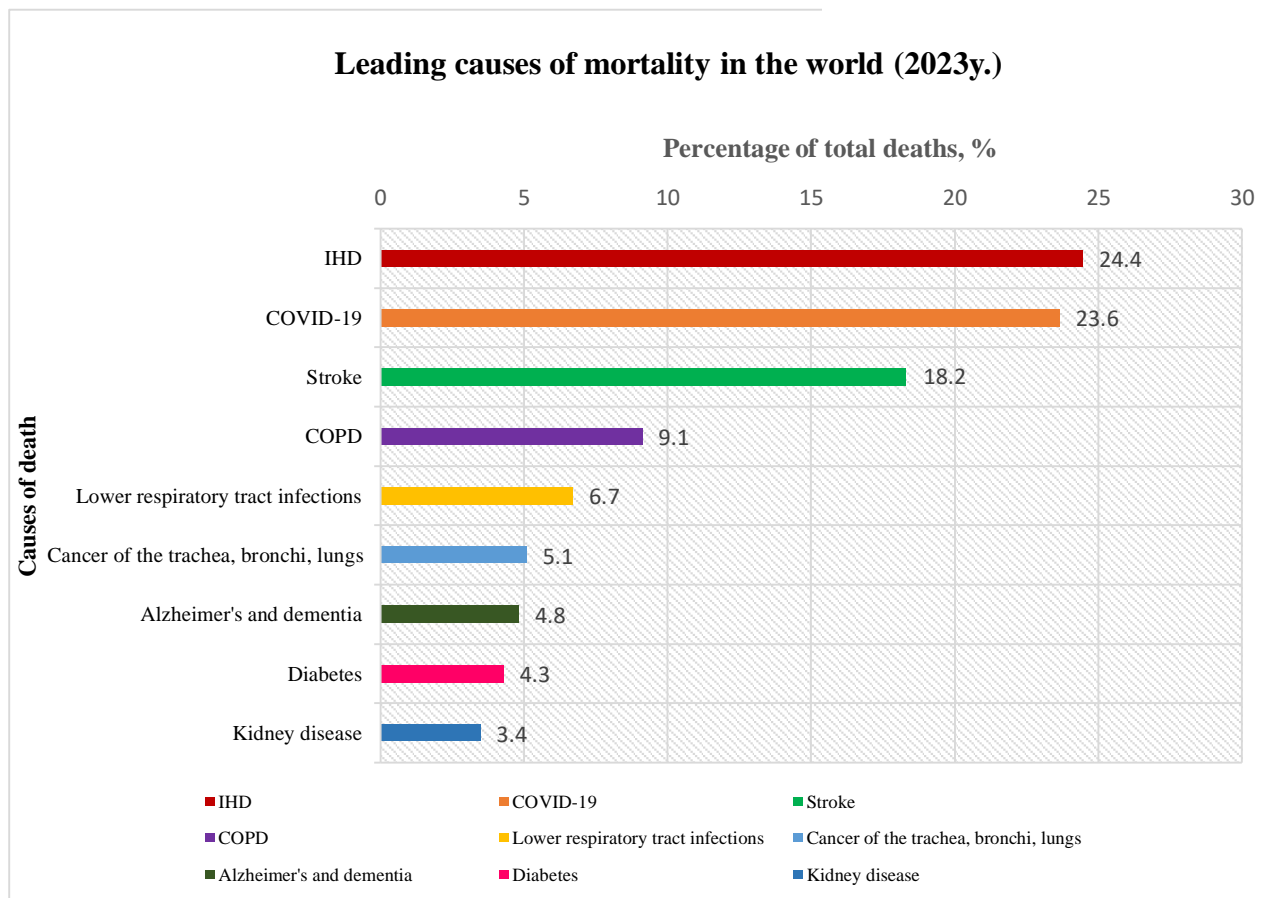
Diagram 1



In addition, mortality in the 18-74 age group demonstrated a significant gender imbalance: male mortality is twice as high as female mortality. Coronary heart disease (CHD) continues to be the world's leading killer, responsible for a significant 13% of all fatalities globally. Notably, this particular ailment has experienced the most dramatic rise in mortality since the year 2000. Specifically, by the year 2023, the grim tally of CHD-related deaths had swelled by a staggering 2.7 million, ultimately reaching a total of 9.1 million. The COVID-19 pandemic, moreover, significantly reshaped mortality data. In the year 2021, the coronavirus itself resulted in 8.8 million deaths worldwide. As a direct consequence, other diseases correspondingly adjusted in rank. Thus, while stroke and COPD occupied the second and third positions, respectively, among leading causes of mortality in 2019, but by 2021 they moved to third and fourth positions, causing approximately 10% and 5% of all deaths, respectively. Lower respiratory tract infections still remain in fifth place in the world in terms of the number of deaths and the most common infection (excluding COVID-19). Even though we've seen a drop in deaths caused by infectious illnesses, the year 2021 still recorded 2.5 million fatalities from these sources; that figure is, however, a reduction of 370,000 compared to the start of the 2000s. Concurrently, there's been a rise in deaths linked to non-communicable diseases. Mortality from lung and respiratory cancer increased from 1.2 million to 1.9 million cases, moving these diseases to sixth place among the leading causes of death. Alzheimer's disease and other dementias took seventh place, taking 1.8 million lives, mainly women (68%). Diabetes also shows a significant increase in mortality, increasing by 95% since

2000. At the same time, some diseases that were among the top ten causes of death in 2000 have lost their positions. HIV/AIDS, which was in seventh place, fell to 21st place due to a 61% decrease in mortality. Intestinal infections, which were sixth, moved to 19th place, reducing mortality by 45%. Kidney diseases, on the contrary, rose from 19th to ninth place due to an increase in mortality by 95%. In the first quarter of 2023, 40.4 thousand deaths were recorded with an overall mortality rate of 4.6 per thousand inhabitants of the country, which is one tenth of a per thousand lower than the previous year's figure (in January-March 2023, it was 4.7 per thousand) (*diagram 2*) [7;8;9;11].

**Diagram 2**



The main causes of death for this period were:

Cardiovascular diseases in 61.5%, accidents and poisoning - about 7.4%, malignant tumors - almost 5%, infectious and parasitic diseases - 1.5%, and other diseases accounted for more than 13%. The age gradation of recorded deaths was distributed as follows: under 20 years - 14.1%, from 20 to 60 years - 24.7%, over 60 - 61.2%. Based on data compiled through statistical examination, specifically covering the timeframe of January to September of the year 2022, it was observed that fatalities attributed to ailments of the circulatory system within Uzbekistan constituted 56.2% of the entire recorded death toll. This figure is placed in contrast to the 61.7% proportion witnessed during the year prior. The complete year of 2023 witnessed the registration of more than

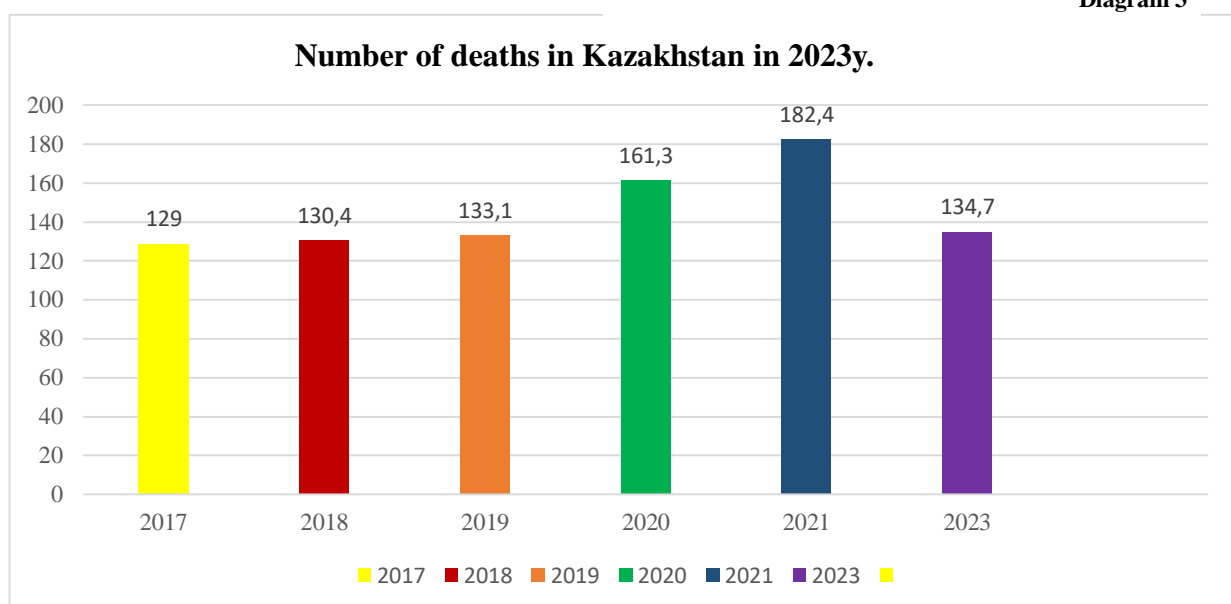


172 thousand deaths; within this context, the portion attributable to cardiovascular system diseases escalated, encompassing a minimum of 61% of the total deaths. Among the deceased, 95 thousand people were registered among men, and 77.8 thousand among women.

Compared to the same period last year, there is an increase in the mortality rate - 1,800 more people were registered in January-September 2023 compared to 2022. Since the beginning of the 21st century, the incidence of cardiovascular pathologies in Kazakhstan has increased two and a half times. By 2023, this figure reached 3,024 cases per hundred thousand of the population, which reflects a significant deterioration in the situation. This issue remains in the focus of the authorities, since people with such diseases are especially vulnerable to severe forms of other diseases. In 2023, the mortality rate in Kazakhstan returned to pre-pandemic levels. According to operational data, 134.7 thousand people died in January-December, which is 25% less than in the same period in 2022. The overall mortality rate has dropped to 6.77, which is even lower than the pre-COVID-19 level (7.19). The country has experienced excess mortality during the pandemic: in 2020, the number of deaths increased by 21.2% compared to 2019, and in 2021, by 37%. However, not all additional deaths were officially linked to COVID-19.

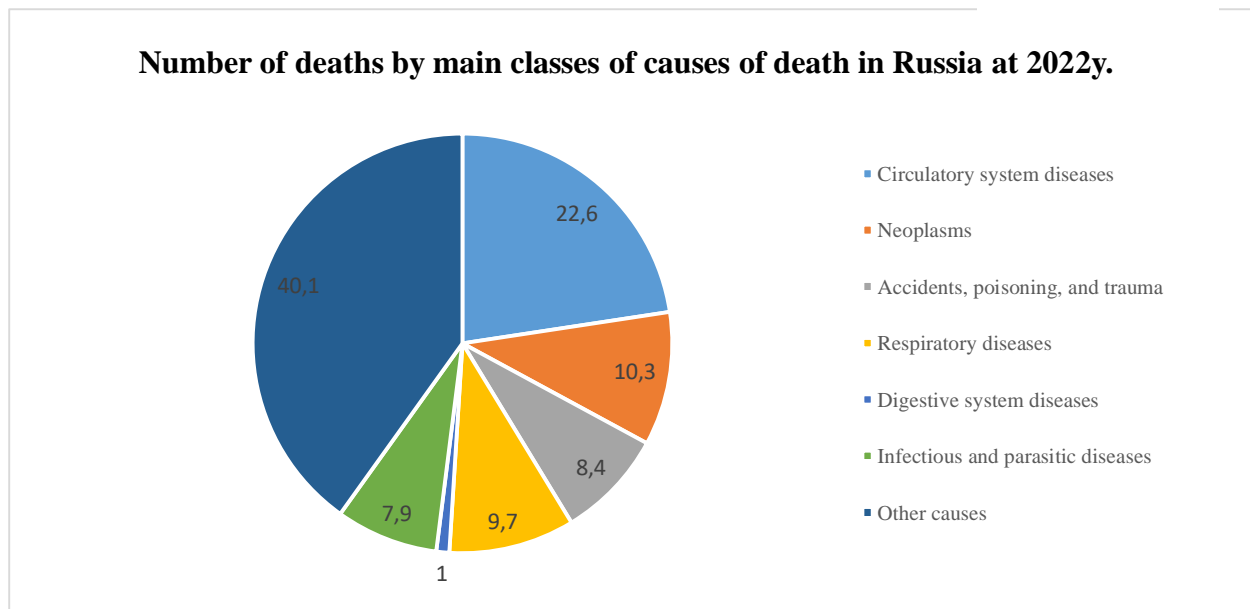
The mortality structure in 2023 has not changed significantly. The main cause of death remains diseases of the circulatory system (22.6% of all cases versus 23.7% in 2021). Next come oncological diseases (10.3%) and respiratory diseases (9.7%). Statistics of the ASPiR of the Republic of Kazakhstan, the causes of death are detailed for only 60% of cases. The remaining 40.1% (54 thousand deaths) are not specified in official statistics. At the same time, it was this group of "other causes" that showed the largest decrease in 2023 - by 24.9 thousand cases, which is half of the total decrease in mortality (48.6 thousand) (*diagram 3*) [10;11;12;13]

Diagram 3



In the Russian Federation, from 2019 to 2025, Russia outlines the trends and specific objectives for reducing mortality rates attributed to diseases of the circulatory

system (DSC). For the year 2019, the mortality rate stood at 573.2 per 100,000 individuals, translating to a total of 841,207 fatalities. In 2020, a significant jump in mortality rates due to diseases of the circulatory system occurred in the Russian Federation, with a sharp rise to 643.9 cases per 100,000 residents, marking the peak with 873,075 recorded deaths. For 2021, a reduction to 565 cases per 100,000 residents was anticipated, but the realized number of deaths stood at 801,307. The target for 2022 was set at 545 cases, yet the actual mortality figure stubbornly remained at 801,307 people. In 2023, aiming for 525 cases per 100,000, the actual number of cases was 657,770, with 801,307 deaths. By 2024, the lowest point in the period was reached with 450 cases per 100,000 inhabitants. To achieve these targets, an annual reduction in mortality of 71,768 cases is required from 2021, a total of 287,073 deaths must be prevented (*diagram 4*) [1;2;3;4].

**Diagram 2**

The above data indicate that pathologies of the nervous system are of great medical and social importance for countries and there is a need to update the list of drugs used in the treatment of cardiovascular diseases. Among the most vulnerable segments of the population are elderly people who need medication. In this group, such drugs as antihypertensive drugs, nootropics, cardiotonics and drugs with a sedative effect are often in demand [1;8;9].

#### IV. DISCUSSION

To reduce the level of mortality, morbidity and disability due to cardiovascular diseases (CVD), cardiology services must implement a number of comprehensive measures[5;8;9].

1. Organization of systemic control of risk factors at the state level, including early prevention and detection of latent forms of CVD.



2. Ensuring that primary healthcare services include the delivery of preventive measures, precise diagnoses, and efficient treatments, along with the required availability of essential medications.

3. Equipping cardiology departments and primary health care facilities with state-of-the-art diagnostic and therapeutic tools.

4. Expanding access to high-tech medical care (HTMC), including conducting on-site consultations with specialists and the use of air ambulances.

5. Improving the qualifications of health workers working in the primary care and specialized cardiology teams providing HTMC.

6. Providing training and continuous professional development for cardiac surgeons to enhance the quality of specialized medical care.

7. Expanding and improving the infrastructure of cardiology, interventional cardiology, and cardiac surgery services.

8. Introducing modern, evidence-based methods for the prevention, diagnosis, treatment, and rehabilitation of patients with cardiovascular diseases (CVD). Vascular diseases often develop covertly, without showing obvious signs until serious complications occur, such as a heart attack or stroke, which can lead to death. A heart attack is characterized by a set of distinctive symptoms, which often include[14;13]:

- a profound, constricting, or searing discomfort in the chest, particularly in its central region.

- a sensation of tightness, pressure, or a burning feeling that can radiate to the arms, focusing on the left side of the body, extending to the shoulder, forearm, jaw, or even the back.

- experiencing breathlessness or a feeling of suffocation.

- gastrointestinal distress such as nausea and vomiting, along with feelings of disorientation or dizziness, and in severe cases, fainting or loss of consciousness.

- pallid skin tone accompanied by a clammy, sweaty feeling.

In women, the presentation of a heart attack can be more nuanced and less typical, complicating diagnosis. Women experiencing a potential stroke might report several key symptoms. These can include sharp pain in the lower back and jaw area, difficulty breathing, and gastrointestinal issues like nausea and vomiting. Often, the initial stages of a stroke manifest through:

- an abrupt weakening or paralysis of the face, arm, or leg, generally affecting one side of the body.

- a swift development of numbness or a tingling sensation, often on one side of the face or limbs.

- problems with either speaking clearly or comprehending what is being said.

- a marked change in vision, which may manifest as blurred vision or a decrease in sight in one or both eyes.

- a feeling of instability, dizziness, or a lack of coordination in movements.

- the sudden and intense onset of a headache, lacking any obvious cause.

- unforeseen instances of fainting or loss of awareness.



Recognizing and responding to disease symptoms early on can significantly improve treatment success rates and patient outcomes. In 2013, the World Health Organization's member states collaboratively developed the "Global action plan for noncommunicable diseases" a wide-reaching plan that covered the period from 2013 to 2020. The primary goal of this global strategy was to decrease the global impact and mortality rates associated with noncommunicable illnesses. Specifically, the plan's main ambition included the reduction of premature deaths caused by these diseases by 25% by the year 2025 [10;11].

Including 9 global targets, two of which directly affect cardiovascular diseases (CVD) [9;10]:

1. Achieve a 25% reduction in the prevalence of hypertension by 2025 compared to 2010 figures.
2. Guarantee that at least half of patients at risk for heart attacks and strokes receive drug treatment and specialized support, including regular glucose monitoring.
3. Ensure that 80% of public and private healthcare institutions have access to cost-effective technologies and essential medications, including generic drugs, for managing major non-communicable diseases (NCDs).

To accomplish these objectives, it is necessary to improve healthcare infrastructure and secure additional funding. The World Health Organization (WHO) is focused on updating clinical guidelines for the treatment of acute coronary syndromes and strokes to enhance the quality and efficiency of medical care in these critical areas.

## V. CONCLUSION

The analysis of CVD statistics in Uzbekistan, Kazakhstan and Russia for the period from 2019 to 2025 revealed both general trends and specific features for each country. A notable observation across all three nations was the consistent persistence of elevated rates of both illness and death attributed to cardiovascular diseases. This finding underscores the continuing significance of this health challenge and its impact on the respective healthcare systems.

Despite differences in the level of economic development and access to health care, all countries have seen an increase in CVD cases associated with risk factors such as a sedentary lifestyle, poor diet and stress. Uzbekistan has seen a moderate increase in morbidity, which may be due to improved diagnostics and expanded coverage of health care. Kazakhstan demonstrates similar dynamics, while in recent years there has been an increase in preventive programs and public awareness. In Russia, despite the implementation of national programs aimed at reducing cardiovascular disease (CVD) mortality, the rates remain persistently high. Across the board in the three countries analyzed, a key characteristic was the stubbornly high incidence of cardiovascular diseases, which manifested in both elevated morbidity and mortality figures. This pattern highlights the enduring nature of this specific health threat and the considerable burden it places on each nation's healthcare infrastructure. Important areas remain the development of prevention programs, improvement of the quality of medical services and increasing public awareness of risk factors. Further study of the dynamics of morbidity



and the effectiveness of the measures being implemented will allow for a more accurate adaptation of health strategies to the real needs of society.

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