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### **ALGORITHM FOR PROVIDING GERIATRIC AND GERONTOLOGICAL CARE BASED ON INTERNATIONAL EXPERIENCE**

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# Algorithm for Providing Geriatric and Gerontological Care based on International Experience

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## Abstract

The relevance of the stated topic of this research is conditioned upon the numerous problems of providing medical care to elderly people who suffer from chronic diseases characteristic of various disability groups, accompanied by a complete or partial loss of the ability to self-care, as a result of which there is a steady trend towards an increase in mortality among people of these age groups. The purpose of this research is to study the features of constructing an algorithm for providing geriatric and gerontological care in the Republic of Kazakhstan, considering the international experience accumulated in this field. The basis of the methodological approach in this study is a combination of a systematic analysis of the accumulated international experience in the field of geriatric and gerontological care, with an analytical study of the actual possibilities of constructing an algorithm for providing assistance based on this international experience. The main results obtained in the course of this study are the definition of the main stages of the algorithm for providing geriatric and gerontological care, and the definition of the main age groups of patients, more than other categories in need of this kind of assistance, formulated on the basis of accumulated international experience in this area. The results of this research work, including the conclusions formulated on their basis, have significant practical significance for disabled elderly people

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in need of medical care, and for social and medical service workers whose direct professional responsibilities include providing medical care to elderly people.

*Keywords:* gerontology; medical care; elderly persons; medical and social problems; geriatric care; senile age.

## Introduction

Geriatric care is a long-term social assistance for elderly people over the age of 60, often suffering from a number of chronic diseases and having certain difficulties with self-care. The main trends in the development of geriatric care in the world today are largely determined by the relevance of the scientific formulation of the problem of prolonging human life (Unikomb & Bell, 2016). In this context, the main task of modern gerontology is to prevent premature aging, which at the same time represents a significant social and biological problem of ensuring the safety of modern human life. The sphere of scientific interests of modern gerontology includes the study of the influence of formed human living conditions on the main aging processes, and the development of specific measures to eliminate the negative impact of environmental factors as much as possible in order to prolong the active and full-fledged phase of modern human life (Fillit *et al.*, 2016).

At the moment, the total number of elderly people worldwide is about 15%, which in numerical terms is approximately 400 million. In particular, in modern Russia there are about 30 million people of an age exceeding the officially established, corresponding to the established criteria of working capacity, and this indicator is expected to increase against the background of a general decline in the country's population.

It is noted that people who are of incapacitated age, including those belonging to even older age groups, often have various diseases, often occurring in acute and chronic forms (Touhy and Jett, 2016). At the same time, the older the patient, the greater the number of diseases he can be detected. This state of affairs, as a rule, can be explained both by the current age changes and the problems of therapy of patients in this category. In medical practice, it is not uncommon for cases when, due to pronounced polymorbidity, simultaneous administration of several medications that are poorly combined with each other is prescribed, in addition, often congestive disorders do not allow elderly people to take such medications correctly (Messina *et al.*, 2015). Also, the question may be in the price of a particular drug, which is simply not affordable for a pensioner. It is impossible to discount the problems of both clinical and clinical-organizational nature associated with the implementation of the sequence of geriatric care (Warshaw *et al.*, 2021).

The implementation of a comprehensive geriatric assessment based on various surveys and scales of evaluation of the data obtained during the survey is a

very important procedure, despite its duration and complexity. In the course of conducting such surveys, the lack of knowledge of doctors, various areas of modern medicine, whose immediate tasks include the development of a geriatric approach to a particular patient, is often identified. A peculiar vacuum in the field of information lying purely in the geriatric plane is explained by the lack of a well-structured and structured system of geriatric and gerontological education, which often turns into an inability to find the right approach to an elderly patient in a single case (Antimisiaris & Morton, 2017). At the same time, modern information technologies designed to monitor the health status of elderly patients are not being implemented qualitatively enough yet.

In this study, the task is to form an algorithm for providing geriatric and gerontological care, in relation to the realities of geriatric and gerontological practice of the Republics of Kazakhstan, based on the international experience accumulated in this area. Statistical data obtained as a result of research aimed at studying the state of geriatric and gerontological care in the world today are used.

## **Methodology**

The basis of the methodological approach in this study is a combination of a systematic analysis of the accumulated international experience in the field of geriatric and gerontological care, with an analytical study of the actual possibilities of constructing an algorithm for providing assistance based on this international experience. The study of the main trends in the provision of geriatric and gerontological care in various countries of the world, considering the actual conditions of the formed demographic situation and the level of social and medical problems in society. Statistical data on the percentage of elderly patients who have lost the ability to self-care, obtained on the basis of the results of the population census in European countries, are provided, and a comparison of the accumulated experience in the field of gerontology and geriatrics in a number of European states.

The theoretical basis of this research is a scientific analysis of publications by domestic and foreign authors available within the framework of studying the issues raised in the subject of this research work, carried out to determine priority areas for studying the basic principles of geriatric and gerontological care, based on international experience. To ensure the highest quality and objective consideration of the declared subject of scientific research, and to facilitate the perception of the information provided, all materials taken from foreign sources and presented within the framework of this research have been translated into Russian. This study was carried out in several stages.

At the first stage of this research, a theoretical basis was prepared, which is the result of studying a number of available studies devoted to the study of issues of geriatric and gerontological care, based on international experience accumulated in this area. Also, at this stage of the research work, a systematic analysis of the

accumulated international experience in the field of geriatric and gerontological care was carried out.

At the second stage of this scientific work, an analytical study was conducted of the actual possibilities of constructing an algorithm for providing assistance, based on the international experience accumulated in this area. In addition, at this stage of the research work, an analytical comparison of the main results obtained during it with the results of other researchers of problematic issues of the organization of the process of providing geriatric and gerontological care was carried out. Conducting a detailed comparison contributes to obtaining results of higher accuracy and the most complete and qualitative disclosure of the declared subject of scientific research.

At the final stage of this research work, based on the results obtained during it, the final conclusions were formulated, acting as a logical display of these results and summing up the entire complex of scientific research performed. In general, the results obtained in this research work, including the conclusions formulated on their basis, can serve in the future as a qualitative methodological basis for further research in the field of gerontology and geriatrics, from the standpoint of assessing the prospects for the formation of new algorithms for providing geriatric and gerontological care, considering new aspects of the accumulated experience in this area.

## **Results**

The conducted study of the basic principles of creating an algorithm for providing geriatric and gerontological care in Kazakhstan, based on international experience, gave the following results. Geriatric care should be understood as long-term, specialised medical, socio-psychological care for patients in old age and old age, including often suffering from a number of chronic diseases. According to the provisions of the UN Madrid Plan of Action on Aging adopted in 2002, each State recognises the obligation to ensure a decent and safe old age for every person, combined with his active participation in all spheres of public life, by: (1) concerns about the health and welfare of the elderly; (2) establishment of conditions necessary for the qualitative individual development of elderly citizens; (3) adaptation of senior citizens to public life and their active participation in it.

International experience in providing geriatric care determines its following main features: (1) Organisation of timely medical care for the main diseases of specific age groups, with mandatory consideration of the mutual influence of these diseases; (2) The long-term and continuous nature of the provision of geriatric and gerontological care, with the provision of an elderly patient with a territory for living, including in inpatient conditions and at home; (3) Complete or partial replacement of interventions of a purely medical nature, which are based on the widespread use of medicines, with a complex of medical, and social and

psychological means; (4) Constant cooperation of geriatric service units with other institutions of the modern health system, and with organisations responsible for providing social services to the population.

According to the accepted international classification, an elderly person is considered to have reached the age of 65. To date, geriatric centers in Germany are equipped with modern equipment for the diagnosis and treatment of elderly people, including ensuring their high-quality relaxation. In particular, a special geriatric center has been set up in Bonn, which includes a day hospital for a wide range of elderly patients. The daily routine of the center includes medical consultations, in addition, medical and rehabilitation procedures are provided to elderly patients (Williams, 2019). In this context, the work of immunologists is of particular importance, because in old age, the immunity of patients is severely weakened and even a minor infection can be dangerous for the body. The rich practical experience accumulated by German gerontologists testifies to the effectiveness of the approach they have established to the care of geriatric patients.

To date, the state standard of care for elderly patients has been approved in Russia, which has received the official name “professional standard geriatrician”. The main task of the specialist of this profile is the timely provision of medical care to patients aged 60-75 years and 75-90 years, to preserve or restore lost abilities for self-care, maintaining the general level of physical and functional activity, regardless of outside help in real, everyday life. The provisions of this standard provide for the mandatory routine examination of patients to diagnose, prescribe treatment and monitor the effectiveness of this treatment. Also, great importance is paid to the safety of providing emergency medical care to elderly people when they have crisis states. Table 1 presents data on the percentage of the total number of elderly and senile patients who have lost the ability to self-care, according to information received during the population census in Poland in 2021.

Table 1. The percentage of the number of elderly and senile patients who have lost the ability to self-care according to the data of the population census in Poland in 2021

Number of patients	60-75 years old	75-90 years old	90+ years
Residents of cities	22%	41%	47%
Rural residents	12%	33%	55%
Total	17%	37%	46

As follows from the data presented in Table 1, for residents of rural and urban areas of Poland, there is a tendency to lose the ability to self-service mainly when reaching the age of 90 years and above. This trend is also widespread in other countries, where there is a gradual decrease in the ability of older citizens to self-care with age, against the background of progressive diseases of various kinds (Hirakawa *et al.*, 2017). Factors of this kind should be considered when

planning a set of measures to provide geriatric and gerontological care to elderly and senile people.

According to available statistical data, the demographic indicator of total life expectancy in the Republic of Kazakhstan is significantly lower compared to the same indicator in Western Europe. The difference is on average 10.5 years, with an average life expectancy in Kazakhstan of 69.5 years. For comparison, the indicator of life expectancy among Kazakhstan in 2015 was 62.5 years among men and 74 years among women, as of 2020, these indicators are 64.2 years for men and 73 years for women, respectively. By 2025, it is planned to increase these indicators to 70 years for men and 80 for women, respectively. As of January 1, 2020, there are 45 medical social institutions in Kazakhstan, which contain more than 5,000 senior citizens of the country. 121 geriatric doctors have been trained in the country, another 4685 specialists have completed advanced training courses in the field of geriatrics and gerontology, including 350 medical workers and 46 employees of social services. As practice shows, at present this is not enough to fully meet the needs of the population in the field of geriatric care.

Geriatric and gerontological care should be provided, starting with the preparation of geriatric offices and the qualitative organisation of their work. For the full-fledged care of elderly and senile patients, it is necessary to train a team that will include a geriatrician, a general practitioner, and a psychologist, a social worker and a nurse. Such a team composition is dictated by the associated specifics of the condition of elderly patients in need of help. A geriatrician in a community with specialists of a narrow profile is able to provide such assistance. As of January 1, 2021, 20 active longevity centers have been opened in the Republic of Kazakhstan in the cities of Almaty, Shymkent, Nur-Sultan, as well as in Aktobe, Turkestan, Karaganda and Kostanay regions. Specifically, in the Aktobe region, there is one such center in the capital Aktobe, if there is a pronounced need for elderly citizens to provide them with this kind of assistance.

Table 2 provides information on the percentage of the total number of elderly and senile patients living in the Aktobe region as of 1.01.2021 and who have lost the ability to self-care.

*Table 2. Percentage of the total number of elderly and senile patients living in the Aktobe region*

Number of patients	60-75 years old	75-90 years old	90+ years
Residents of cities	15%	54	31
Rural residents	27%	48%	15%
Total	21%	51%	28%

As follows from the data presented in Table 2, in the Aktobe region, a significant number of elderly citizens aged 75-90 years need geriatric care, which the state

is not yet able to fully provide. In this context, the use of the world experience accumulated in this area is essential in the context of creating a highly effective algorithm for providing geriatric and gerontological care to elderly patients in need of it.

Figure 1 schematically presents in its structural relationship the main factors that should be considered when compiling an algorithm for providing geriatric and gerontological care in Kazakhstan, based on international experience accumulated in this area.

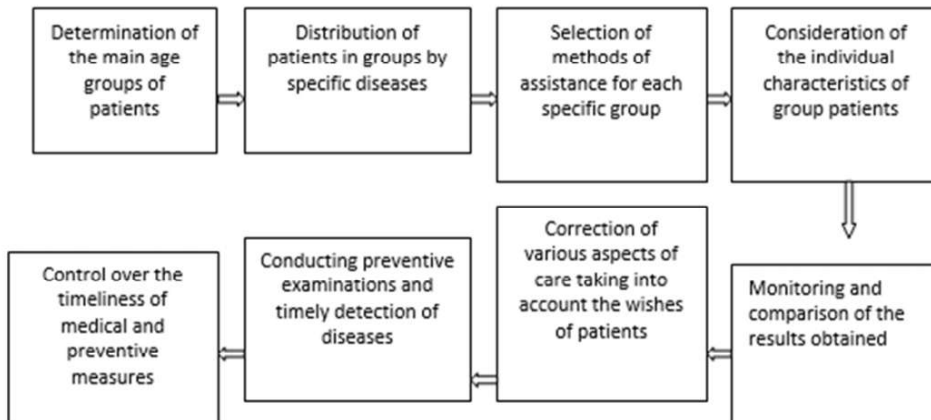


Figure 1. The main aspects of the algorithm of geriatric and gerontological care

When providing geriatric and gerontological care, it is necessary to consider the obligation to comply with the principle of timely monitoring of the condition of patients and continuity of care, to timely identify new diseases and possible prevention of the development of existing ones. In addition, it is important to build a clear system of accounting for the health status of older people, with an analysis of the trends taking place to change their health status and the possibility of taking timely measures to correct the situation in case of its deterioration.

In case of emergency medical care should be provided by specially trained medical personnel. According to the data obtained during the analysis of the main emergency conditions among patients registered at the geriatric center in Bonn, patients with heart and vascular pathology had a pronounced pain syndrome in 28.6% of their total number, in case of exacerbation of diseases of the gastrointestinal tract, pain was noted in 16.5% of patients, and joint pain in 15.4% of the total number of patients. At the same time, patients were subject to emergency hospitalisation for acute forms of these and a number of other diseases, to carry out a number of therapeutic and preventive measures planned for such cases.

Thus, the construction of an algorithm for providing gerontological and geriatric care based on international experience accumulated in the field of gerontology



should be carried out considering the individual characteristics of patients due to the presence of certain chronic disabling diseases, including with mandatory compliance with the principles of timely provision of medical care to patients of this kind and continuity of monitoring their current condition. To solve this kind of tasks, it is advisable to introduce into practice institutions providing gerontological care, digital database accounting systems designed to implement an integrated care approach for elderly citizens, including referral of employees of medical institutions and healthcare system enterprises in the screening process of elderly people who are most at risk of dependence on society, conditioned upon disability and the ability to self-serve, and conducting an individually oriented assessment of the needs of elderly patients in the field of health and social care, as well as care of a purely individual nature. Similar digital systems already exist, in particular, we are talking about the WHO ICOPE Handbook App, an –innovative interactive mobile application of the World Health Organization, designed specifically for algorithmising the process of caring for the elderly.

## Discussion

To date, there is an acute problem with the provision of medical care to elderly people, and the early prevention of a number of diseases directly caused by age-related changes in the organisms of elderly patients. In addition, there is an acute shortage of information among people with medical education on options for effective solutions to medical problems in senile and elderly people, and this applies to both professional information and information of a popular scientific nature devoted to the consideration of issues of geriatric and gerontological care. Notably, even if there is a high assessment of the role of medical professionals in the treatment of elderly people, elderly patients, like their relatives, suffer from significant problems when seeking help in medical institutions (Kiselevich *et al.*, 2009). The demographic situation that has developed today in many countries of the world tends to increase the average life expectancy, which leads to an increase in the number of elderly people in modern society. At the same time, the number of citizens seeking medical care in many countries of the world is steadily increasing (Assylkhanova *et al.*, 2017). Such trends determine the high relevance of the problems of prevention of diseases characteristic of elderly people, and the need for them to receive timely and high-quality medical care, in accordance with their current needs (Proschaev *et al.*, 2008).

Among the numerous medical problems that elderly people suffer from, a number of pathologies occupy a separate place, such as senile dementia, osteoporosis in combination with its various consequences, including impaired vision, hearing, problems with urination and often diabetes mellitus (Akhmetova *et al.*, 2020). A detailed range of problems of elderly people attracted the attention of medical specialists before, but they did not have such a spread as at the present time,

and also did not have such a low effectiveness of treatment by pharmacological methods as today. Employees of the geriatric service were asked to develop new comprehensive medical and social approaches to the effective resolution of such problems. This means that in modern geriatric practice, in addition to pharmacological treatment, numerous types of rehabilitation are used, including social type (Vafeas and Slatyer, 2021).

The actual needs of elderly patients should be determined during an outpatient appointment, and a geriatric assessment of the patient's needs should be carried out at least once a year, and if the patient is aged 90 years and older, then twice a year. Based on the results obtained, the issue of hospitalisation of the patient in a geriatric hospital, or in providing him with other types of assistance, including social (Meiner and Yeager, 2018), should be resolved. At the same time, an important aspect is the timely identification of high-risk groups of patients who need geriatric care more than others.

Numerous geriatric syndromes significantly reduce the quality of life of elderly and senile patients, while increasing their dependence on others, and the likelihood of hospitalization and sudden death. At the same time, geriatric syndromes are often not recognised by doctors, especially at the early stages of their manifestation, which greatly hinders their prevention and correction (Doszhanova & Abduldayeva, 2017). In particular, cognitive impairments that are widespread in the elderly are most often detected already at the stage of severe dementia, when the patient's dependence on others is already clearly expressed. This aspect is the key feature of the geriatric approach, expressed in the holistic perception of human needs, both medical and functional, and social (Chaki *et al.*, 2020).

In a number of countries, a significant part of medical services for patients of senile and elderly age is provided directly at the stage of primary care, it is provided by assigned district therapists and family doctors. Moreover, family doctors who have all the necessary skills to conduct examinations of elderly patients, and those who are able to build high-quality relationships with them, have great opportunities to provide patients with high-quality care, compared with narrow-profile specialists (Zozulya *et al.*, 2023). The use of a comprehensive geriatric assessment is favorable from the standpoint of the prospects for identifying geriatric symptoms at an early stage, which implies a comprehensive and interdisciplinary assessment of the current state of physical and mental health of elderly patients, their formed social relationships, including the degree of satisfaction with their quality of life (Bery *et al.*, 2020; Chrysostomou, 2022). An assessment of this kind is carried out to determine the full range of problems existing in patients, the qualitative and timely correction of which is required to prolong subjective well-being, the final consequence of which is the active longevity of a person who is currently in the elderly and senile age.

The most important task that needs to be resolved when providing geriatric care is to identify groups of patients who are at special risk for health reasons and

require close attention (Dobrovanov *et al.*, 2023). The solution to such a problem is to conduct a so-called geriatric assessment of patients, which acts as a criterion for determining the overall dynamics of their condition, and allowing to develop a rehabilitation programme for each individual patient and care for him and acting as a reliable basis for determining the basic needs of elderly citizens in providing them with medical and social assistance (Qin *et al.*, 2020).

Medical examination of patients in the elderly and senile age often reveals numerous pathological changes in the body that take place in its various physiological systems (Kudabaeva *et al.*, 2016). The causes of their occurrence may be different, and they are all closely related to physiological age-related changes. The mutual influence of a whole list of diseases, combined with the processes of natural aging of the body and simultaneous administration of a number of medications that have a negative effect on the body in their combination, affect changes in the clinical picture of diseases, including their course, significantly impairing the patient's quality of life and the process of diagnosis with the appointment of treatment (Mitsutake *et al.*, 2021).

Conducting a geriatric assessment involves mandatory attention on the part of a medical professional to those problems that patients forget about or are simply embarrassed to talk about. In particular, older men are often embarrassed to talk about problems with urination, including problems with sexual function. An elderly patient may incorrectly believe that such manifestations are as natural as hearing and vision problems, which are considered to be manifestations of the natural aging process of the body (Akgun-Citak *et al.*, 2020).

To qualitatively improve the working conditions of medical workers at the stage of outpatient examination of patients, as well as to minimise the time and money spent on conducting this examination, a programme for optimising the structural approach to assessing the problems of examining elderly patients has been developed and successfully implemented in a number of countries (Erci *et al.*, 2019). This web programme includes a description of all the major serious conditions of elderly patients, including their main syndromes that should be corrected during treatment and specifically for which treatment programmes are being developed.

Polymorbidity is characteristic for patients in the elderly and senile age, which determines a variety of physical, mental, as well as social problems (Kosmuratova *et al.*, 2021). Gradual improvement of the quality of life of patients of this category, especially those with chronic progressive diseases, is currently one of the key tasks of palliative care. As a rule, this kind of assistance is associated with patients suffering from oncological diseases, however, the current situation in the field of medicine and demography contributes to the development of an urgent need to provide assistance to this kind of patients who do not have oncology, but are at the same time in old age or old age (Huang *et al.*, 2021).

Global demographic processes are characterised by the presence of a tendency to the progression of population aging. The World Health Organisation for the nearby (2016-2021 and remote (2021-2030) time periods has chosen as its general line the development of an action plan for senior citizens, which involves the consideration by the organisation's experts of a range of major problems of the elderly population, increasing over time, and the development of comprehensive measures for elderly and senile patients, with mandatory consideration of their current functional abilities (Akgun-Citak *et al.*, 2020). In this aspect, the key directions should be considered a consistent study of the individual viability of elderly people, their current needs, the provision of comprehensive medical and long-term care, with mandatory consideration of the main age-related features of the life environment, which can lead to an increase in the functional ability of elderly people.

The international experience accumulated in the field of gerontology indicates that when examining elderly patients, special attention should be paid to identifying depressive states in them (Latka *et al.*, 2019). The accumulated statistical data of scientific studies indicate that depression in elderly patients is observed in about 25-30% of cases, with patients over the age of 65 years. Notably, in the case of concomitant somatic diseases, this figure can reach 50%.

Depressive states in elderly patients can occur atypically and are often masked by a number of somatic disorders and cognitive impairments manifested against the background of concomitant diseases. To determine the real state of the patient, it is recommended to conduct simple surveys on the general state of his health, the results of which reflect real changes in the psychological and emotional state (Liu *et al.*, 2021).

A comprehensive geriatric examination involves considering the main features of social activity, and the availability of social support for an elderly person, factors determining his partial or complete dependence on others. This largely depends on his mobility limitations, hearing and vision loss, including the presence of cognitive impairments. Moreover, the latter represent one of the most common geriatric syndromes. According to a number of international studies, from 4 to 20% of people over 65 years of age suffer from severe forms of cognitive impairment. At the same time, in about 25% of elderly patients, they are expressed in mild form, and in about 17.5% of patients in moderate form.

To date, conditioned upon the lack of clear, developed criteria for assessing the degree of needs of an elderly person in gerontological care, the decision to provide such care is often delayed until the patient no longer needs it (Suwa *et al.*, 2020). In addition, problems with decision-making of this kind reduce their objectivity, which is reflected in a significant decrease in the quality of care provided to elderly people and inefficient use of public resources in general.

In general, a well-thought-out and effective system for the development of an assessment of the health status and real functional capabilities of elderly people is

very important from the standpoint of the general orientation, the level of provision and timeliness of such assistance, is also important from the standpoint of planning gerontological care in a targeted manner, including in general for the consistent development of the system of assistance of this kind.

## Conclusion

The conducted study of the prospects for creating an algorithm for providing geriatric and gerontological care based on international experience accumulated in this area led to the following conclusions. The issues of organising the process of providing timely medical care to elderly people, who often have completely or partially lost not only their ability to work, but also the ability to self-serve, lie in the plane of ensuring the timeliness of such care and its continuity. The elderly are characterised by unforeseen and unexpected deterioration of their general health, which, in case of untimely provision of medical care or elementary delay of such, can lead to a fatal outcome. Thus, in many ways, the construction of a qualitative algorithm for the provision of gerontological and geriatric care is conditioned by the ability of medical professionals responsible for its practical implementation to create a system for recording the conditions of patients, with constant monitoring and tracking of key indicators, including their systematic updating.

The world experience accumulated in the field of gerontology shows that without the introduction of a qualitative screening system for elderly patients, considering the risk of exacerbation of their chronic diseases, and the implementation of measures for the prevention of diseases of this kind, the construction of a qualitative algorithm for providing geriatric and gerontological care is simply impossible. Medical clinics and gerontological centers in various countries of the world have at their disposal modern equipment designed to provide high-quality and timely solutions to issues of ensuring high-quality preventive examination of elderly patients and timely prescribing adequate and high-quality treatment to them if such a need arises. A modern algorithm for providing geriatric and gerontological care, based on international experience, should include mandatory systematisation of data on the current condition of elderly patients, indicating the measures taken at the moment to alleviate their condition, and those necessary to be taken in the future, in case of its sudden and sharp deterioration.

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