ANALYTICAL REVIEWS

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Review

AVOIDABLE MORTALITY: APPROACHES TO ESTIMATION

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Strategic documents issued in the Russian Federation are now giving higher priority to health and life expectancy of the country population. Given that, special attention should be paid to monitoring and assessment of avoidable mortality as an indicator describing effectiveness of the healthcare system in Russia. This review covers evolution of approaches to defining avoidable mortality, considers its basic methodological components as well as highlights key differences between the existing criteria of avoidable mortality.

We performed an analytical review of research literature as well as approaches to defining avoidable mortality created by national or international organizations. Overall, 37 literature sources were examined; of them, five were methodologies developed by national and international organizations. At the same time, we examined studies focusing on avoidable mortality in Russia with relation to approaches to defining avoidable mortality, which were used in them. At present, there is no unified universal criterion of avoidable mortality. Instead, different approaches are being used, which differ from each other per three basic aspects: a way to group avoidable death causes (which interventions could have led to a death being avoided); the list of causes of death which are considered avoidable; and age limits, within which deaths due to a specific cause are considered avoidable. These criteria vary between scientific studies and official methodologies accepted in some countries. A trend can be traced involving wider age limits of avoidable mortality.

Avoidable mortality is therefore a dynamic concept reflecting both public health challenges and advances in healthcare. Flexibility of the concept makes it possible to further develop a national criterion for avoidable mortality based on both international practice and the specifics of the Russian population and the healthcare system in Russian Federation.

Keywords: *avoidable mortality, assessment methodology, healthcare system, preventive measures, life expectancy, healthcare, epidemiological transition.*

The Order by the President of the Russian Federation No. 309 dated May 07, 2024 On National Goals of the Development of the Russian Federation for the Period up to 2030 and Future Prospects up to 2036 sets a national goal 'to preserve the country population, to improve people's health and wellbeing, to support families'.

Non-trivial efforts are required to achieve fundamental improvement of people's health

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as well as a coordinated expert opinion about deaths that could be avoided. The latter cannot be achieved by using conventional medical and demographic indicators. This task is solved in world practice by assessing avoidable mortality.

Avoidable mortality is mortality due to several causes of premature deaths that could have been prevented or treated effectively [1]. This concept is widely used for measuring the quality of medical care in various countries across the globe [2].

The avoidable mortality concept fits in easily within the frameworks of the epidemiological transition theory [3], which describes changes in a demographic situation, including transformation of the mortality structure per death causes. In the mortality structure, deaths due to external causes are being replaced with those causes, which are to a greater extent associated with chronic non-communicable diseases developing with ageing. The first two stages in epidemiological transition involve taking control of communicable diseases. Here, the key role in mortality reduction belongs to children and young women (maternal mortality).

Most deaths occur at older ages due to a reduction in mortality caused by communicable diseases and this leads to a growth in life expectancy. However, longer life expectancy means that more people live long enough to be susceptible to age-related diseases. Therefore, by the third stage in epidemiological transition, chronic non-communicable diseases, primarily cardiovascular ones, prevail in the mortality structure. At the fourth stage in epidemiological transition, it is these diseases that are taken under control and this leads to declining cardiovascular mortality and mortality due to other age-related diseases; lifestyles also undergo positive changes [4]. Due to all this, deaths occur at older ages and life expectancy continues to grow. In future, the fifth stage in epidemiological transition involves longer healthy life, better quality of life and unprecedentedly long life.

Therefore, epidemiological transition means taking control of avoidable deaths gradually, which leads to a decline in not the total mortality but rather in avoidable mortality [5]. Therefore, studies on avoidable mortality make it possible to estimate how a population moves along epidemiological transition as well as speed of this transition and its differentiation between various territories or population groups.

Nevertheless, indicators that allow establishing what mortality can be considered avoidable are rather changeable due to a constantly changing economic situation and development of medical technologies. This involves changes in ideas about what deaths could be avoided as regards causes of death, healthcare instruments used to avoid them and ages at which these deaths would occur [6]. The concept is rather unstable and therefore this is difficult to make any scientific comparisons between various research works focused on investigating avoidable mortality; despite that, dynamism of the approach is a positive characteristic for public health since it means flexibility of a healthcare system within the context of the epidemiological transition theory. Moreover, due to this changeability, the avoidable mortality concept can also be investigated within the theory of the health transition. In contrast to the epidemiological transition theory, the theory of the health transition developed by J. Frenk and others in 1991 [7] encompasses not only the evolution of epidemiological patterns in mortality but also a response given by the society to these changes, which manifests itself, among other things, by changes in a healthcare system. In its turn, the society response leads to further changes in an epidemiological picture etc. Therefore, we suggest considering the evolution of avoidable mortality indicators as a social response to changes in population health and mortality patterns within the theory of the health transition.

Avoidable mortality is subject to state monitoring in many countries that use their own indicators for defining this avoidable mortality [8, 9]. On one hand, use of different approaches to avoidable mortality assessment in different countries makes it difficult to perform any comparative analysis between them

since any unified indicators are absent. However, on the other hand, avoidable mortality indicators specific for each country rely on estimating what deaths a healthcare system is able to prevent in this particular country. Therefore, it is quite justified to create specific avoidable mortality indicators for each country considering capabilities of its healthcare system.

The aim of this study was to examine existing approaches to defining avoidable mortality, their evolution and application as well as to systematize differences between avoidable mortality indicators.

Materials and methods. This work is an analytical review. We performed system analysis of both original research articles and reviews and Internet sources belonging to organizations responsible for mortality statistics. Original research works and reviews were sought in open access databases including PubMed, Google Scholar and eLIBRARY. The search relied on using combinations of the following keywords: 'avoidable mortality', 'amenable mortality', 'treatable mortality', 'preventable mortality', 'mortality prevention', 'mortality reduction', and 'prevention activities'. The following criteria were used to include a publication in our review: it was published either in Russian or English; it proposed a method for defining avoidable mortality or had at least one section that focused on analyzing avoidable mortality (for empirical studies) or described an avoidable mortality concept (for reviews); an empirical study should provide clear indicators for defining avoidable mortality. We also examined references in each found publication to search for additional sources not selected at the first stage. It is due to this that we managed to find Internet sources belonging to organizations that deal with avoidable mortality statistics. Such sources were included in case they had a methodological reference with clear indicators for defining avoidable mortality. At the final stage, empirical studies that referred to ready indicators for defining avoidable mortality were included in our review only if they dwelled on investigating avoidable mortality in Russia. Overall, we found 147 publications meeting the search criteria; the most relevant 32 of them were selected for further analysis. We also found five methodologies for defining avoidable mortality created by national or international organizations. Twelve out of 32 selected publications concentrated on investigating avoidable mortality in Russia.

Development of the avoidable mortality concept and its definition. The avoidable mortality concept was first introduced in a study by D.D. Rutstein and others [1] as an approach to measuring quality of medical care (in the broad sense of the word) based on the number of 'avoidable' diseases, disability cases and premature deaths. 'Avoidable' deaths were those, which could have been prevented or treated in ideal conditions. This study already presented an idea to divide deaths into those that can be prevented by using relevant measures and treatable ones.

The concept was later developed by other authors. A study by J.R. Charlton with colleagues [10] was the first to involve empirical analysis of avoidable mortality at the population level where the authors introduced age limits of avoidable mortality by investigating spatial differentiation of mortality due to treatable causes in England and Wales. A study by K. Poikolainen and J. Eskola [11] focused on mortality determinants; the authors divided death causes into those amenable to medical intervention (treatable), partially amenable and not amenable ones. In 1980s, a work team was created in the European Community (EC) to draw up a European Community Atlas of "Avoidable Death" [12–14]. Seventeen groups of diseases were selected as avoidable mortality indicators, mostly, from the list created by D.D. Rutstein with colleagues [1]. Among other things, the Atlas included groups of preventable death causes. Studies by J.P. Mackenbach and others [15] also relied on the list created by D.D. Rutstein with colleagues, although they used only death causes amenable to medical interventions and justified by a direct research object in their analysis. In addition, these studies did not consider age limits of avoidable mortality. The comprehensive list

from the European Community Atlas of "Avoidable Death" was used in studies by R. Westrling with colleagues [16–18], that is, the authors considered not only mortality amenable to medical interventions but also preventable mortality and took the age of 65 years as the age limit of avoidable mortality. A study by L. Simonato and others [5] focused on investigating differences in dynamics of preventable mortality and all-cause mortality in European countries; the authors considered their own list of preventable death causes created on the basis of the above-mentioned studies by D.D. Rutstein with colleagues [1], J.R. Charlton with colleagues [10], as well as the European Community Atlas of "Avoidable Death". This list was divided into three groups: deaths amenable to primary prevention, deaths amenable to early detection and treatment, and deaths amenable to prevention provided better treatment and medical care. M. Tobias and G. Jackson [19] presented a descriptive investigation of avoidable mortality in New Zealand in their study; to identify avoidable death causes, they used the list created by J.R. Charlton with colleagues [10] with extensions and modifications, including a rise in the upper age limit of avoidable mortality up to 75 years. In this study, the authors also divided avoidable death causes into three groups per primary, secondary and tertiary prevention. Deaths were distributed into these three groups for each avoidable cause using proportions created by expert opinion. In another study, E. Nolte and M. McKee [20] investigated avoidable mortality in Europe; the authors relied on the foregoing studies by J.R. Charlton with colleagues [10] and Tobias M. and Jackson G. [19] to create their own list of avoidable death causes considering the latest achievements in medical sciences and technologies. The upper age limit of avoidable mortality was taken at 75 years in this study as well.

The avoidable mortality concept is used in many studies as an indicator that describes quality of a healthcare system. In this manner, for example, a comparison was made between effectiveness of the healthcare system in the USA and other countries of the Organization for Economic Cooperation and Development [21, 22]. The same approach was used to examine changes in the quality of the healthcare systems in the Czech Republic and Slovakia after Czechoslovakia was split [23]. M.E. Kruk with colleagues conducted a large-scale investigation of avoidable mortality in 137 middle-income and low-income countries [24]. Within the authors' methodology, not only avoidable deaths were divided into those preventable and amenable to medical intervention; the latter also included deaths that occurred due to poor availability and low quality of medical care. Therefore, this study did not simply measure the quality of healthcare using the avoidable mortality concept; instead, it showed a direct contribution made by healthcare to avoidable mortality in middle- and low-income countries. Avoidable mortality was viewed not as a measure of healthcare quality but as a goal to be achieved by a healthcare system in a study by C. Frick with colleagues [25]. The authors calculated years of life lost due to 36 types of neoplasms, which were considered amenable to prevention or treatment, for 185 countries. In addition, this study considered a relationship between years of life lost due to avoidable neoplasms and the human development index per countries to analyze inequality in mortality rates due to preventable cancers. Although the goal for using the avoidable mortality concept is different in these studies from that in conventional ones (where it is used to measure the quality of healthcare systems), avoidable mortality itself is interpreted and defined in the same way.

Avoidable mortality is being studied within monitoring activities performed by relevant institutes in many countries. For example, the Australian Institute of Health and Welfare is responsible for that in Australia [8]. Avoidable mortality is used as an indicator of achieving a goal, which is to reduce differences in life expectancy within the country. Mortality analysis relies on using a list of causes drawn by experts in the country in conformity with global practices. It includes

causes, deaths due to which are considered avoidable (between 2010 and 2014, divided into preventable and amenable to medical intervention; since 2015, without any division). Avoidable deaths are ones that occur at the age below 75 years (excluding some nosologies with a lower age limit). Eurostat used its own methodology and list of death causes to monitor avoidable mortality in Europe [26]. However, in 2018, Eurostat and the Organization for Economic Cooperation and Development (OECD) together with an expert group made a new list of avoidable causes of death based on previous studies and experience gained by Eurostat and OECD countries [27]. The OECD methodology divides avoidable mortality into preventable and amenable to medical intervention and 75 years are the age limit of avoidable mortality for all causes of death. The Office for National Statistics, Great Britain, also deals with monitoring of avoidable mortality[1]. Till 2020, the British organization used its own list of avoidable death causes but switched to using the avoidable mortality definition by OECD in 2020. The Canadian Institute for Health Information is another example of national monitoring [9]. The Institute uses its own list of death causes for analysis (divided into preventable and amenable to medical intervention), which is based on the lists drawn up in Australia and Great Britain, with further expert estimation and substantiation for including each diagnosis. The Institute considers avoidable mortality as a key performance indicator for a healthcare system.

Thus, indicators that allow defining what mortality can be considered avoidable are not constant; they change over time and are established differently by different experts [6]. The very concept of avoidable mortality is usually interpreted in the same way, but basic differences in its definition are as follows:

1) division of avoidable mortality into groups depending on a way used for its possible prevention (for example, deaths avoided due to prevention or deaths avoided due to treatment);

2) lists of causes, deaths due to which can be avoided;

3) age limits, within which a death is considered avoidable.

Next, we are going to compare approaches to defining avoidable mortality separately for each basic difference.

Approaches to defining avoidable mortality: differences. ***How deaths can be avoided.*** As mentioned above, avoidable deaths were first divided into preventable and treatable ones by D.D. Rutstein with colleagues [1]; the division remained in avoidable mortality atlases in the EC [12–14], in studies by R. Westerling and others [16–18], in AIHW (till 2014), ONS[1] (since 2020) and CIHI monitoring, as well as in the joint methodology by OECD and Eurostat [8, 9, 27]. Some other authors considered a death preventable only in case it could be avoided due to timely treatment [15]. Another approach divides overall mortality into three groups: amenable to medical intervention (treatable), partially amenable and not amenable [11]. In other studies, avoidable mortality is divided into three groups: deaths amenable to primary prevention, amenable to early detection and treatment, amenable to prevention provided better treatment and medical care [5] or groups of primary, secondary or tertiary prevention [10]. Another approach divides avoidable deaths into preventable and treatable, but the latter are divided again into those occurring due to low quality of healthcare and those due to failure to apply for medical aid [24].

It should be noted that the same death cannot be assigned into several groups. For example, we cannot say that this specific death can simultaneously be avoided by prevention and by timely treatment. However, we can say that a proportion of deaths due to a specific cause should be considered preventable whereas the remaining deaths should be con-

[1] Avoidable mortality in England and Wales Statistical bulletins. *Office for National Statistics*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/avoidablemortalityinenglandandwales/previousReleases (July 01, 2024).

sidered treatable. Thus, for some causes, deaths can be divided into preventable and treatable in specific proportions; for example, the OECD/Eurostat methodology [27] divides deaths due to tuberculosis in equal proportions into preventable and treatable ones. Similarly, a study by J.R. Charlton with colleagues [10] divided avoidable deaths due to each cause into groups of primary, secondary and tertiary prevention using proportions obtained by expert estimates.

Avoidable causes of death. An original study by D.D. Rutstein and others [1] specified more than 90 diseases and states, deaths due to which could be avoided by either prevention or timely treatment. J.R. Charlton with colleagues [10] used a list of 14 groups of diseases; K. Poikolainen and J. Eskola [11] suggested a list containing 70 states amenable to medical intervention and 20 partially amenable ones. Different groups of diseases based on the list provided by D.D. Rutstein and others were used to measure avoidable mortality in European Atlases [12–14]: 17 groups in the first edition, 25 in the second and 16 in the third. Many following studies [5, 15–18, 23] relied on the existing lists when selecting causes of death to define avoidable mortality. Although M. Tobias and G. Jackson [19] were guided by previous studies when drawing up a list of avoidable causes of death, all appraisals on assigning a death cause into a specific category of avoidable mortality were analyzed and clarified by a group of experts and epidemiologists. E. Nolte and M. McKee [20], being guided by previous studies, made their own list of avoidable causes of death taking the latest achievements in medical sciences and technology into account; it was used in their further studies [21, 22]. M.E. Kruk with colleagues [24] also made their own list of avoidable causes of death supplementing the lists drawn up by E. Nolte and M. McKee [20–22] with death causes included in key performance indicators of Sustainable Development Goals. There are some studies that investigate avoidable mortality due to one specific class of death causes, for example, neoplasms [25].

Therefore, death causes as avoidable mortality indicators are selected in most studies by combining expert opinion, modifying some existing lists (for example, J.R. Charlton and others [10]) and adapting them to regional specifics (for example, M. Tobias and G. Jackson [19]).

Although specific wordings and classifications of death causes (including use of ICD-10) can differ in different studies, several groups of such causes are very frequent in lists of avoidable deaths available in research publications. The most frequent groups include communicable diseases (such as tuberculosis and meningitis, whooping cough, measles and some other acute respiratory diseases), some malignant neoplasms (in particular, cervical cancer, Hodgkin's lymphoma, breast cancer, as well as tracheal, bronchial and lung cancer as a preventable cause of death), some diseases of the circulatory system (for example, hypertension), diseases of the respiratory system (including asthma and some respiratory infections), diseases of the digestive system (for example, ulcer, cholecystitis and appendicitis), external causes of death (traffic accidents in particular), maternal mortality and some causes of perinatal death.

A nosologic indicator of avoidable mortality was created within drawing up common monitoring methodologies considering previous research and through internal discussions in organizations responsible for making a list of avoidable causes of death [27]. Great Britain uses avoidable mortality indicators created by OECD and Eurostat[2] in its national methodology. Canada and Australia have their own lists of avoidable causes of death [8, 9].

Age of avoidable mortality. Age is another indicator for assessing avoidable mortality; however, it is established in a different way in different studies. D.D. Rutstein and

[2] Avoidable mortality in England and Wales Statistical bulletins. *Office for National Statistics*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/avoidablemortalityinenglandandwales/previousReleases (July 01, 2024).

others established the age indicator only for five death causes out of the list in their original study and therefore it is not universal. For example, deaths due to acute respiratory infections, flu, pneumonia and bronchitis were considered avoidable up to the age of 50 years; cholecystitis, up to 65 years; stomach or duodenum ulcer, up to 55 years. J.P. Mackenbach and others [15] did not establish any age limits of avoidable mortality either. They explained it by lack of any evidence that age limitations existed for any effect on incidence and mortality. However, there are some exceptions from avoidable causes of death: diabetes mellitus (avoidable till the age of 24 years), kidney cancer (14 years) and leukemia (14 years). J.R. Charlton and others [10] fixed age limits for all avoidable causes of death and not only upper but also lower ones, which were 5 years for all avoidable mortality except from maternal mortality, for which 10 years were set as the lower age limit. Upper age limits established in this study were more heterogeneous per causes of death: between 34 years for Hodgkin's lymphoma and 64 years for most other causes of death (for example, for hypertension and tuberculosis). K. Poikolainen and J. Eskola [11] did not fix a lower age limit in their study but an upper age limit was set for all avoidable causes of death and was equal to 65 years, except from seven death causes with the age limit of 50 years (for example, diabetes and flu). Age limits for avoidable mortality were also established for the entire list of death causes in European Atlas [12–14]. R. Westerling and B. Smedby [16] used the same list of avoidable causes of death and, accordingly, the same age limits. R. Westerling [17] was the first to establish the universal age limit of 65 years for the entire avoidable mortality. The same universal upper age limit was fixed in a study by R. Westerling and others [18], although it contained the lower age limit as well, equal to 21 years, which was determined by the study design rather than avoidable mortality definition. L. Simonato and others [5] used both the lower age limit of 5 years and the upper one of 65 years to analyze avoidable mortality in their study; both limits were universal for the entire list of avoidable causes of death. M. Tobias and G. Jackson [19] raised the upper age limit to 75 years substantiating this by growing life expectancy and more effective establishment of the initial cause of death for those who died in elderly age. E. Nolte and M. McKee [20–22] were guided by the same logic when they established the same upper age limit in their study; still, other age limits were fixed for some specific causes of death (for example, 14 years for intestinal infections and 44 years for cervical and endometrial cancer). Some light differences from this list but with the same upper age limit of avoidable mortality can be found in some other studies [24]. Still, other authors relied on lower age limits based on the European Atlas in their research [23], or on completely different age limits, for example, 30–69 years [25]. All known national methodologies for avoidable mortality monitoring have the same upper age limit equal to 75 years[2] [8, 9].

Therefore, evolution of research with its focus on avoidable mortality is consistent with the general growth in life expectancy per its age indicator: from 65 to 75 years for studies with one established universal age limit. This reflects changes in how capabilities of a healthcare system are perceived as countries move along the epidemiological and health transition. In other studies, an age limit was fixed not for every cause of death; it varies in most studies depending on a death cause.

Research on avoidable mortality in Russia. The first Russian study on avoidable mortality, namely the methodical guidelines issued by the Ministry of Health of the Russian Federation[3], defined avoidable mortality relying on indicators provided in the European Atlases [12–14]; age limits of avoidable mortality were set as 5–65 years for most

[3] Opredelenie prioritetov razvitiya zdravookhraneniya na federal'nom i regional'nom urovnyakh na osnove obobshchennoi otsenki prezhdevremennoi i predotvratimoi smertnosti naseleniya [Establishing Priorities in Public Health Development at the Federal and Regional Levels Based on Generalized Assessment of Premature and Avoidable Mortality]: Methodical Guidelines. Moscow, Ministry of Health of the Russian Federation, 2001 (in Russian).

causes of death. Reasons for a difference in life expectancy between Russia and other countries were analyzed relying on the European Atlas [14], but with modifications by J.P. Mackenbach with colleagues [15] and avoidable mortality divided into preventable and treatable [28]. However, several following studies went on using European Atlas indicators and division of avoidable mortality per three levels of prevention [29–33]. T.P. Sabgaida and A.Yu. Mikhailov [34] divided the list of death causes taken from the European Atlas into several groups not per a level of prevention but per subjects responsible for managing avoidable causes of death (depending on the extent they were influenced exactly by the healthcare system).

Lists of avoidable death causes provided in the European Atlas have long been evidenced to never lose their effectiveness over time; despite that, more up-to-date indicators of avoidable mortality have been employed in more recent studies with their focus on population mortality in Russia [35]. Thus, A.E. Ivanova with colleagues [36] not only showed the expert society's attitude towards avoidable mortality indicators described by E. Nolte and M. McKee [20, 21] in their study but also analyzed dynamics of avoidable mortality in Moscow using these indicators and dividing avoidable mortality into preventable and treatable. When studying avoidable cardiovascular mortality, A. Zubko with colleagues [37] were also guided by the avoidable mortality indicators developed by E. Nolte and M. McKee [20], but with modifications described in studies by M. Tobias and G. Jackson [19] and L. Simonato with colleagues [5]. OECD/Eurostat indicators [27] were used in the latest study on the subject, namely, research by Z. Nikoloski and others [38].

Discussion. ***Age limits.*** Age limits as an avoidable mortality indicator should reflect realistic capabilities of a healthcare system and show that until a certain age is reached, a death is more likely to be avoidable than beyond it. However, a possibility to avoid a death due to this or that cause declines rather gradually with age. Therefore, any age group is rather tentative as an avoidable mortality indicator and when this limit is based on rates of life expectancy at birth for the general population, sex-related differences in mortality are neglected [20]. In addition, when the same avoidable mortality indicator is fixed for various regions in the same country, this leads to neglecting inter-regional differences in mortality structures per causes of death and in life expectancy at birth. A universal age limit for different death causes can also be rather disputable: for example, deaths due to many external causes are rather preventable at an age beyond the upper age limit.

Prevention and treatment. Mortality avoided due to prevention is mortality that can be avoided by keeping certain diseases from onset in the first place due to primary prevention. Mortality avoided due to treatment is mortality that can be avoided by not allowing already existing diseases to develop, that is, due to secondary prevention and treatment. Assigning this or that death to a specific category is not obvious. For example, mortality due to homicide, which is not only subject to prevention, but also is beyond responsibilities of a healthcare system, can decline, among other things, due to development of medical technologies and healthcare services [39]. Nevertheless, it is quite possible to predominantly assign certain causes of death to a specific category. Still, no cause of death can be avoided only partially within all the approaches to defining avoidable mortality discussed in this paper.

Changeability of a methodology. We have shown the evolution of the avoidable mortality concept: from study to study, age limits were moved to older ages; new causes of death were added to lists of avoidable ones; changes appeared in dividing death causes per categories of avoidable mortality. Further development of the avoidable mortality concept should involve its constant changes in accordance with changing challenges and capabilities of healthcare systems.

Conclusion. Avoidable mortality is an important indicator that describes quality of a

healthcare system. Different approaches to its definition have been developed and there is a common trend involving adaptation of indicators in accordance with changing medical care conditions and epidemiological situation; in particular, we can observe how avoidable mortality indicators evolve as a response to growing life expectancy. Flexibility of the concept makes it possible to further develop avoidable mortality indicators according to aims of analysis and a stage in a healthcare system development. In future, it seems possible and even necessary to develop a national criterion for avoidable mortality based on both international practice and the specifics of the Russian population and the healthcare system in Russian Federation.

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