

## METHODOLOGY FOR DETERMINING THE CALCULATION OF THE STANDARD FOR THE NUMBER OF MEDICAL VISITS

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The author of article analyses out-patient care in the Republic of Belarus. There is considered the need for changes in primary health care to improve the efficiency of the health care system. Changes should be aimed at reducing costs and creating a model of managed care based on volume planning and resource support, taking into account the needs for medical services. There is proposed a methodology for determining the calculation of the standard of the number of medical visits, which will allow to optimize the work of outpatient clinics and fill the needs of the population for out-patient care.

**Key words:** outpatient and polyclinic care; health care system; medical visits.

## МЕТОДИКА ОПРЕДЕЛЕНИЯ РАСЧЕТА НОРМАТИВА ЧИСЛЕННОСТИ ВРАЧЕБНЫХ ПОСЕЩЕНИЙ

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Анализируется система амбулаторно-поликлинической помощи в Республике Беларусь. Рассматривается необходимость изменений порядка оказания первичной медико-санитарной помощи в целях повышения эффективности функционирования системы здравоохранения. Изменения должны быть направлены на сокращение издержек и формирование модели управляемой медицинской помощи на основе планирования объемов и ее ресурсного обеспечения с учетом потребностей в медицинских услугах. Предложена методика определения расчета норматива численности врачебных посещений, которая позволит оптимизировать работу амбулаторно-поликлинических учреждений и удовлетворить потребности населения в амбулаторно-поликлинической помощи.

**Ключевые слова:** амбулаторно-поликлиническая помощь; система здравоохранения; врачебные посещения.

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Today health care system is characterized by growing recognition of health care as a sphere that ensures national security of the country. Outpatient and polyclinic care has prior importance for medical service as the most popular medical servicing type. In this connection the most significant organizing and economical problems of outpatient and polyclinic care institutions activities come to the fore in the Republic of Belarus, solving of which will allow to organize for the population available medical and sanitary primary medical care system, which is less costly comparing with inpatient treatment. Therefore health care should transfer to developed countries pattern which means not less than 60 % of population undergoing medical treatment on an outpatient basis, i. e. in polyclinics. Correct and early diagnosis, treatment of a patient, timely hospitalization, conducting of necessary medical and preventive measures both a patient his-/herself and population depend exactly on outpatient care and doctor workmanship in outpatient and polyclinic institutions.

Central tasks of the Strategy of Development of Public Health Services of the Republic of Belarus until 2020 are as follows:

- improvement of guarantying high-quality medical care system on all levels of medical care with the leading role of primary medical care;
- priority primary medical care with the stress on implementation of general practitioner institution;
- further restructuring and development of inpatient medical care, development of resource-saving managerial technologies on an outpatient basis (day hospitals, outpatient surgery centers, one-day surgery);
- establishment of effective integration mechanisms and health care institutions cooperation on different levels of health care system, etc. [1].

Implementation of the state-run program will ensure:

- considerable increase of quality, effectiveness and availability of medical care (prevention and diagnostics, medical and rehabilitational activities), reduction of need in inpatient medical care and rationalization of bedspace usage;
- more rational allocation of health resources on the basis of medical and sanitary care reorganization and resource-saving technologies implementation.

The aim of the study is to analyse the performance of outpatient clinics, develop a methodology for determining the calculation of the number of visits per person a year depending on the population, the number of outpatient clinics work days per year and the shift rate per day.

Existing volumes of outpatient and polyclinic care analysis in dynamics and cost of its provision are important stages in effective management of country's and particular region's public health care sustainable development, which to some extent allows to evaluate availability and demand of the population in primary and specialized types of medical care, required health care resources.

In the medical aspect analysis is important for planning and optimizing network of territorial outpatient clinics structure; assessment of outpatient and polyclinic care adequacy comparing to the real needs of the population on a medical organization service area. In the social aspect needs determine accessibility, observance of social standards and state guarantees in receiving outpatient and polyclinic care. In economic aspect the analysis allows to give an estimation of medical organizations of a primary section activities economic efficiency; determination of the amount of financial, material, labour, information and other resources necessary for their development.

In 2015, the healthcare system of the Republic of Belarus had 2325 outpatient and polyclinic organizations which is 21 % more than in 2000 (1843) (fig. 1).

In 2015 measures to improve the quality and accessibility of medical care in outpatient healthcare institutions, provide human resources, improve material and technical equipment, ensure priority filling of vacant posts of district physicians-therapists were taken. Activities on reorienting resources from an expensive stationary level to outpatient and outpatient facilities were carried out with a view to provide effective and high-quality medical care.

Proportion of funds allocated for the financing outpatient and polyclinic organizations is increasing (from 31.4 % of the amount of funds for health in 2008 to 40 % in 2015). This allowed to improve the material and technical basis of polyclinics, to reduce the number of unjustified hospitalizations for inpatient diagnosis, and to reduce the frequency of visits to patients of outpatient clinics by maximizing the gratification of their needs for one visit of medical institution [3].

The analysis of outpatient and polyclinic institutions activity volume over a 15-year period in terms of the number of medical visits revealed their fluctuations in different time periods (fig. 2). The highest indicator is to observe in 2007 (131 914 thousand), then the number of visits tended to decrease up to 2014 by 8 % (with the exception in 2010), then in 2015 there is a 3 % increase comparing with 2014. However the total number of visits in 2015 remained below the 2007 level by 6 %.

The most important factor in calculating the resources necessary for the development of outpatient clinics network is the average number of visits per capita, which characterizes the provision of the population with outpatient and polyclinic care.

In 2015 the number of outpatient visits and doctors' visits at home the Republic of Belarus was 13.1 per capita, which theoretically corresponds the national standard (13) (fig. 3).

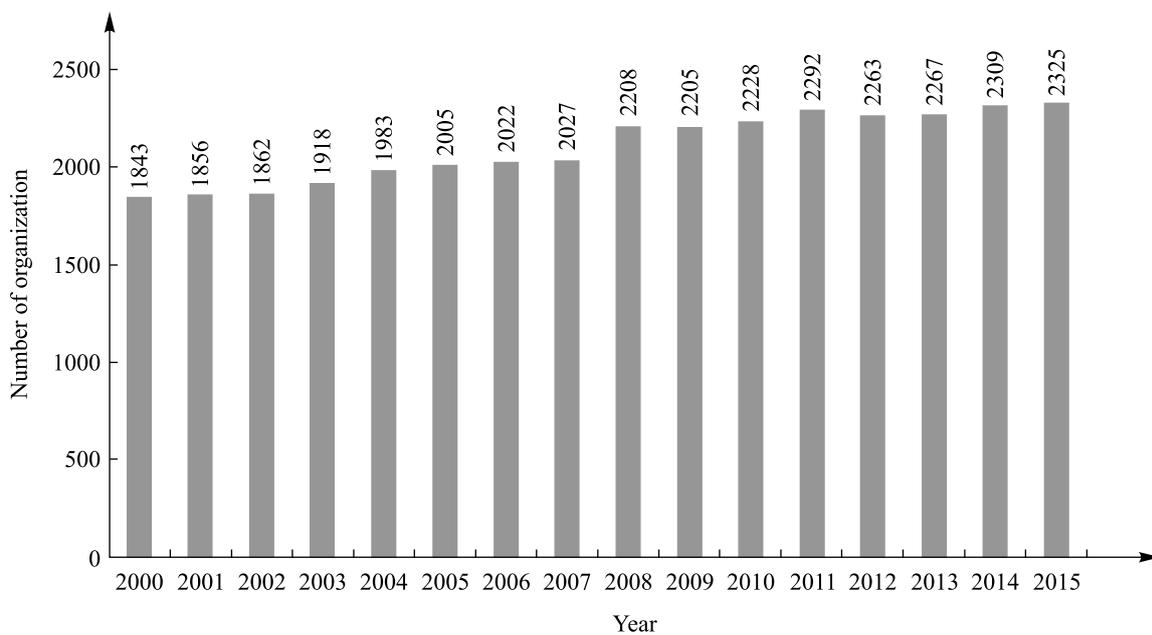


Fig. 1. Number of outpatient and polyclinic organizations in the Republic of Belarus (2000–2015).  
Source: author’s development on the basis of [2]

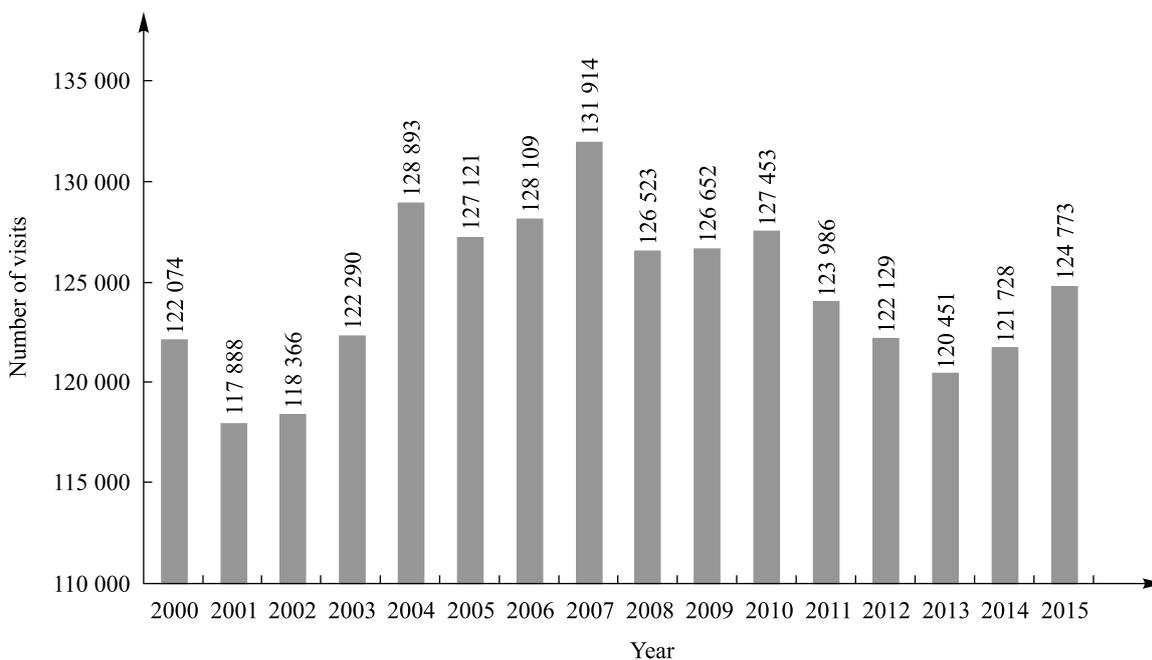


Fig. 2. Number of outpatient visits and doctors’ visits at home in the Republic of Belarus (2000–2015).  
Source: author’s development on the basis of [2]

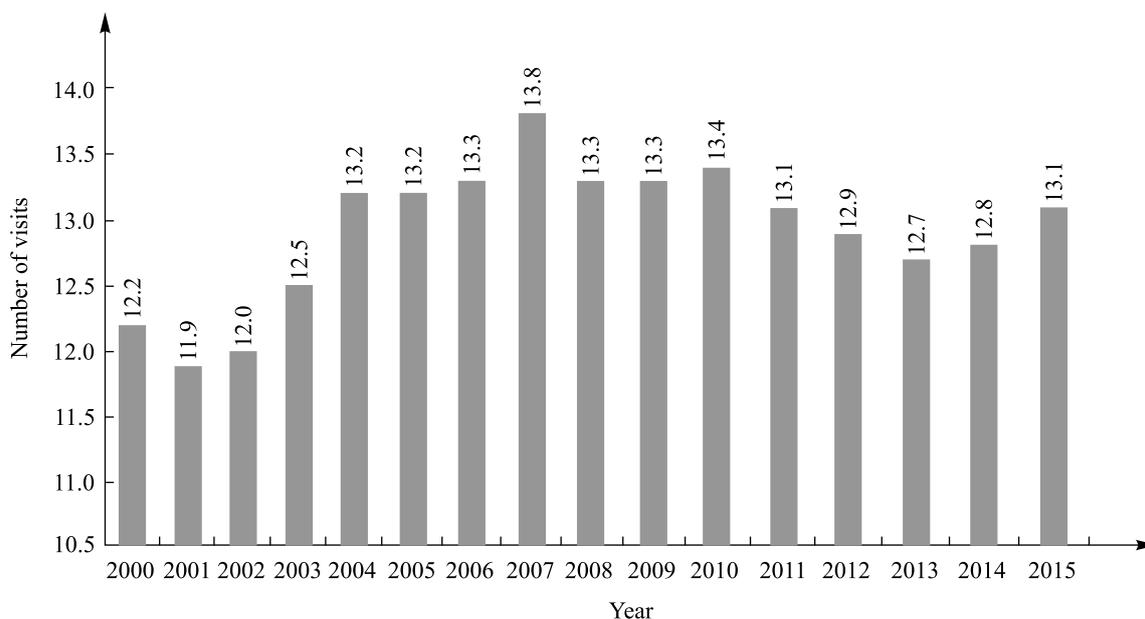


Fig. 3. Number of outpatient visits and doctors' visits at home per capita in the Republic of Belarus (2000–2015).  
Source: author's development on the basis of [2]

The traditional method when calculating the number of outpatient visits and doctors' visits at home uses the following formula (Methodological recommendations on the continuity in the provision of treatment and preventive care to the population management of the Ministry of Health of the USSR 1987) [4]:

$$\text{Average number of visits of doctor's} = \frac{\text{Number of visits in polyclinic and doctors' visits at home}}{\text{Average annual population}}$$

However, this formula does not take into account the capacity of outpatient and polyclinic institutions, the number of polyclinic work days and the shifts coefficient, which inevitably leads to their congestion, and as a result – one of the urgent health care system problems – a matter of priority. Thus the revision of the methodology for calculating this standard is particularly relevant.

Let's calculate the number of outpatient visits and doctors' visits at home in 2015, taking into account the capacity of outpatient and polyclinic institutions, the number of polyclinic work days and shift rate per capita (see table).

**Data for calculating the standard for visits of doctor's number per capita in 2015**

Calculation indices	Number
Population	9 498
Outpatient and polyclinic institutions	2325
Outpatient visits	124 773

Source: author's development on the basis of [2].

Let's determine average capacity of on outpatient clinic per year:

$$C_{\text{av. year}} = \frac{V}{q} = \frac{124\,773\,000}{2325} = 53\,665,$$

where  $C_{\text{av. year}}$  – average capacity of an outpatient clinic per year, number of visits;  $V$  – number of all visits per year;  $q$  – number of all polyclinics.

Provided that the outpatient and polyclinic institution works one shift (365 days per year) – 52 (days off in the six-day work week) – 7–8 (holidays) = 305–306 shifts per year, the capacity of the institution is

$$C = \frac{C_{\text{av. year}}}{306} = \frac{53\,665}{306} = 175 \text{ visits per day.}$$

Let's calculate the average population in the area:

$$P_{\text{ter}} = \frac{P}{q} = \frac{9\,498\,000}{2325} = 4088 \text{ people.}$$

We substitute the data into the formula

$$V = \frac{C \cdot W \cdot D}{P_{\text{ter}}},$$

where  $V$  – number of medical visits per capita per year;  $W$  – work shifts in a polyclinic (coefficient);  $D$  – number of polyclinic work days per year.  $V = \frac{175 \cdot 1 \cdot 306}{4088} = 13$  visits per capita when a polyclinic works in one

shift. If an outpatient clinic works in one and a half shift, then  $V = \frac{175 \cdot 1.66 \cdot 306}{4088} = 21$  visits per capita when a polyclinic works in one and a half shift.

Thus, taking into account policy change aimed at redistributing the types and amount of medical care from the inpatient to the outpatient level, it is necessary to revise the standard of the number of visits per capita a year depending on population, number of outpatient clinics work days per year and coefficient of shifts per work day, since the standard calculation according to traditional methods does not meet the needs of the population.

In connection with further health care system policy aimed at the priority of outpatient care, which is planned to increase by 30 %. This standard should be revised in the nearest future. The ability to meet the population's needs for outpatient care will depend on the size of the patient flow and the capacity of the healthcare institution.

Using the trend equation (fig. 4) we forecast the number of visits to outpatient clinics for 2020 (using sta-

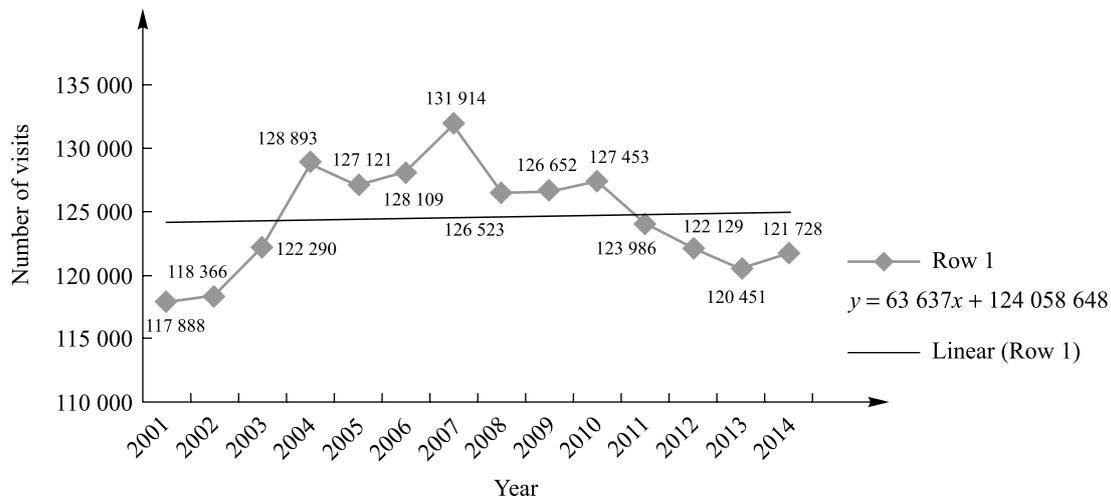


Fig. 4. Graph of trend equation, thousand.  
Source: author's development on the basis of [2]

tistics on the number of physician visits for 2001–2014).

Thus, the forecast for 2020 taking into consideration a 30 % increase in the outpatient care plan will constitute

$$y = (63\,637 \cdot 20 + 124\,058\,648) \cdot 1.3 = 161\,277.7 \text{ visits.}$$

Consequently the need to change the standard number of medical visits is confirmed once again. Since the increase of the polyclinic network capacity is possible only through improving of outpatient care management.

Outpatient and polyclinic institution can be considered as a queuing system, which has incoming patient flow, outpatient clinic itself, where this flow is served and where the main parameter is the service time and the outflow of patients who got outpatient care. Figure 5 schematically shows this system. If the system, in our



Fig. 5. Management of outpatient care system  
(the option of incomplete satisfaction of needs for outpatient care)  
Source: author's development on the basis of [5]

case an outpatient institution, can not meet the needs of all those who apply to it – queues emerge. It should be noted that the system of outpatient care is not fail-safe.

Along with subjective factors associated with the management disadvantages of outpatient clinic work, and objective factors that reduce the capacity of an outpatient clinic are also significant: deficiencies in reception areas, staff and personnel problems, scarce funding, deterioration of fixed assets, which cannot be properly planned without the standard of the number of medical visits per capita a year.

Revision of primary medical and sanitary care is necessary in order to increase the health care system functioning effectiveness. The revision should be aimed at the shortening of expenses and the formation of manageable medical care model based on output planning and its resources provision; development of less costly forms of medical care management.

Planning should ensure rearrangement of resources inside and between sections, stages and levels of health care with a view to involve the best and the least costly decisions subject to changing medical service needs. The planning should promote redistribution of bankroll from inpatient care sphere to outpatient and polyclinic care one.

One of the priority lines of health care system development is calculation of the standard for the number of medical visits upgrading, it will allow to optimize outpatient and polyclinic activities.

## References

1. Стратегия развития здравоохранения Республики Беларусь до 2020 года [Development strategy for public health services of the Republic of Belarus until 2020]. URL: <http://krupki-erb.by/poleznye-materialy/209-prioritetnye-napravleniya-razvitiya-zdravo-okhraneniya> (date of access: 22.05.2017).
2. Statistical Yearbook of the Republic of Belarus, 2016. URL: [http://www.belstat.gov.by/en/ofitsialnaya-statistika/publications/statistical-publications-data-books-bulletins/public\\_compilation/index\\_8025/](http://www.belstat.gov.by/en/ofitsialnaya-statistika/publications/statistical-publications-data-books-bulletins/public_compilation/index_8025/) (date of access: 05.16.2017).
3. Обслуживание в поликлиниках: каких изменений ожидать пациентам? [Service in polyclinics: what changes patients should expect?]. URL: <http://www.belta.by/onlineconference/view/obslyuzhivanie-v-poliklinikah-kakih-izmenenij-ozhidat-patsientam-811/> (date of access: 13.06.2017).
4. Вальчук Э. А., Гулицкая Н. И., Царук Ф. П. Основы организационно-методической службы и статистического анализа в здравоохранении Минск : Харвест, 2007 [Valchuk E. A., Gulitskaya N. I., Tsaruk F. P. Fundamentals of organizational and methodological service and statistical analysis in health care. Minsk : Harvest, 2007 (in Russ.)].
5. Боев В. С. Систематизированные подходы к решению проблемы очередей в амбулаторно-поликлинических учреждениях // Поликлиника. 2011. № 4(2). С. 38–39 [Boev V. S. Systematized approaches to solving queue problems in outpatient and polyclinic institutions. *Poliklinika*. 2011. No. 4(2). P. 38–39 (in Russ.)].
6. О республиканском бюджете на 2017 год : Закон Респ. Беларусь от 18 окт. 2016 г. № 431-3 [On the Republican budget for 2017 : The Law of the Repub. of Belarus, 18 Oct., 2016, No. 431-Z]. URL: [http://www.minfin.gov.by/upload/bp/act/zakon\\_181016\\_431z.pdf](http://www.minfin.gov.by/upload/bp/act/zakon_181016_431z.pdf) (date of access: 21.05.2017).
7. Об итогах работы органов и организаций здравоохранения в 2016 году и основных направлениях деятельности на 2017 год : постановление коллегии М-ва здравоохранения Респ. Беларусь от 25.01.2017 г. № 1.1 [On the results of health institutions and organizations work in 2016 and the main lines of activity for 2017 : resolut. of the Board of the Minist. of Health of the Repub. of Belarus, 25.01.2017, No. 1.1]. URL: <http://med.by/normativ/index11.php> (date of access: 05.07.2017).
8. Health System Performance Comparison. An agenda for policy, information and research. URL: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0009/244836/Health-System-Performance-Comparison.pdf?ua=1](http://www.euro.who.int/__data/assets/pdf_file/0009/244836/Health-System-Performance-Comparison.pdf?ua=1) (date of access: 19.05.2017).

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