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Technologies substituting hospitalization (outpatient surgery) in regional health: economic-organizing aspect

The article deals with technologies substituting hospitalization in the context of the overall structure of health care, discusses the prospects and problems of their introduction into medical practice of public health institutions of the Vologda region from the standpoint of economic efficiency.

Technologies substituting hospitalization, interface, public health, territorial state guarantees program, a method of costs minimizing, economic impact, region.



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The idea of technologies substituting hospitalization care forms¹ development, which are

¹ Technologies substituting hospitalization health care forms (technologies substituting hospitalization, TSH) – in the outpatient clinics providing specialized kind of health care delivery which are traditionally considered to be available only to twenty-four hour stay hospitals.

being discussed now in connection with the on-going health reforms, can be hardly characterized as original even in the Russian reality. Back in 1988 at the All-Union Physicians Congress E.I. Chazov, being the Health Minister of the USSR, said that the day hospital introduction to everyday practice of medical institutions is

important task for the near future [1]. Today, after more than 20 years since that moment, it is necessary to recognize that considerable progress in this direction has been practically not achieved. The statistical data show that for today there is an evident Russian regions differentiation on distribution indicators of low-cost forms of health care. For example, spread between the Russian regions is 60 times as far as providing the people with beds in day hospitals as in organization departments of outpatient clinics [5].

The day hospitals and hospitals in-home are more attractive than the traditional hospitals and the reason for this attraction is in the unity of three effects made by them - medical, economic and social; and analyzing the recent debates about the short-stay surgery in higher political circles, it seems that their utilitarian advantages award increasing attention. Development of short-stay surgery is considered today not only as one aspect of the restructuring of hospital management, but also as an instrument for balancing the Program of state free health care providing to citizens (establishing a correspondence between the planned services volume and the actual financing volume of the Program). At the same time the rationalization of expenses is made by partial replacement of the medical services practices in hospitals by medical care using the short-stay surgery that allows to overcome the existing imbalance between the amount of medical services at pre-hospital and hospital stages of treatment. Let's notice that the last has been declared as one of activity directions to modernize and develop health care services in The Concept of long-term social and economic development of the Russian Federation [2].

Considering the situation, we deem it advisable to analyze TSH functioning and development in key organizational-economic aspect. For this purpose we are going to consider the place and role of the short-stay surgery health care forms in the general structure of health care from the positions of the system approach, and also we are going to estimate those eco-

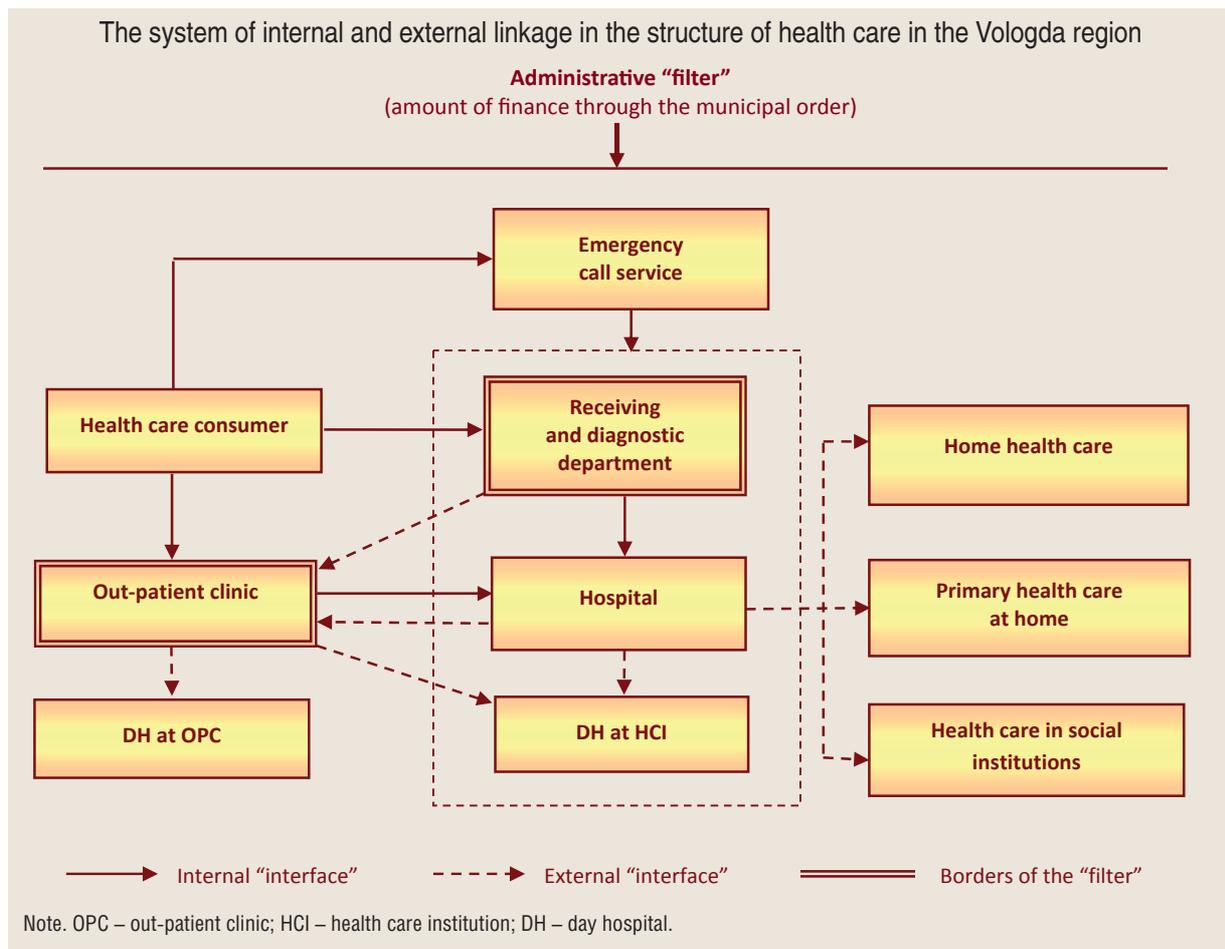
nomical benefits which have been really reached by means of distribution of day hospitals in the Vologda region.

1. Technologies substituting hospitalization in the light of the theory of "interfaces"

The successes of scientific and technological progress, changing public opinion and reforms in the sphere of health care have led to noticeable transformations in the traditional system of views on the structure of health care and, in particular, the relationship between its inpatient and outpatient kinds. Now the boundaries between the main sectors of health care have become less clear and more moving at the same time, but in this structural mobility we can see hidden potential and a significant factor of improving health care.

In this context, in the science and health care practice, beginning in the second half of XX century, there is an update of scientific interest to the theory of links, the main element of which is the notion of interface ("interface") – transition border of patients from one type of treatment to another, or point of intersection between different levels of health care [7]. In the here presented *figure* are shown two types of such linkage: 1) internal, directed from the consumer of health care to its supplier, and 2) external, directed from inpatient care to treatment in the conditions of short-stay surgery and out-of-hospital health care. In this case there are two types of system mechanisms: restricting the flow of patients to the hospital ("filters"), and compensatory mechanisms through which health care is provided to patients not requiring to be admitted to hospital.

Interfaces contain the boundary points, allowing reorientation and filtering patients, and they are regarded as organizational platforms for creating filters to control the level of hospitalization on the basis of evaluation of its validity. Organizational mechanisms called also as filters, mark the boundary of transition to a stationary link of health care, where the control of hospitalization applicability is being realized. These filters are the out-patient departments, in which responsible for referring the patient



to hospital are the first contact physicians and departments of diagnostic (DD) formed on the base of hospitals and receiving patients which are admitted to hospital, bypassing the clinics. Finally, administrative and financial barrier serves as a filter reducing the spread of hospital health care: the volume of health care provided in health facilities of the region is paid only in the extent limited by the municipal order of health care, which is based on general federal standards for key resource indicators [3]. In the presented scheme the compensatory mechanisms are technologies substituting hospitalization (in this case – day hospitals – DH) and also social assistance providing in the specialized facilities etc.

All filters created on the internal interfaces and operating in the system of external relations serve for the same purpose – to streamline medical care, reviewing some of the patients to

the outpatient agency profile hospitals. However, despite the unity of objectives, principles of internal and external filters operation are different. Internal filters allow to restrict admission to hospital in the pre-hospital stage, by the permanently-situational assessment of the validity and usefulness of hospitalization in the special case of the patient treatment to the hospital. It solves one of the issues: has a patient to undergo hospital treatment, or will a set of outpatient procedures be quite sufficient for his clinical case. The subject of such admission system, as a rule is a primary care clinician (general practice doctor), acting as an interpreter of medical information and a porter at the border of transition "primary – secondary care".

Western experience of health care demonstrates a great economic attractiveness of this model: empirically it is proved that the level

of costs in the system, where the patient can the right to appeal directly to the specialist, is higher than in the systems characterized by the existence of the separation level (presided by general practice doctor) between patients and a specialist. However, if not all researchers and persons who are responsible for decision making in health care policy have reached a consensus in the issue that some of the patients are being provided with treatment in hospital unnecessarily, then virtually all experts associate themselves with possibility and necessity of reducing the in hospital stay length by increasing the intensity of health care and attracting modern technologies of diagnosis and treatment [7].

In this context, more perspective and probably associated with less risk of social tension emergence it seems to create external interface filters. Their function is to reduce the unreasonable long periods of stay in hospital for persons who are already patients of hospitals. Despite an unpopular color of this wishes, it means the intensification of the therapeutic process and improvement of health care efficiency, that does not contradict the principles of social justice². Moreover, the development of medical technologies and new tools for diagnosis and treatment provides wide opportunities for this.

It is known that the application of the TSH is aimed to limit the inefficient health care expenditures associated with expensive hospital treatment. In particular, the use of the TSH can reduce costs by increasing the bed turnover, reducing the labor costs of medical personnel (for the abolition of night duty medical personnel), reducing the cost of housing and communal services and food in the organization of shift work day in the hospital [4]. But are these advantages so great? And can an outpatient care be a real competitor to hospital care at least in a part of economic success? Using an economic

² We are talking about the growing expectations of citizens for the quality and conditions of health care. And this trend will intensify in the future, as economic development is accompanied by increasing citizens' welfare and the expansion of the category of middle class, which will raise fundamentally new demands on the level of treatment and medical services.

assessment tool and based on data from Vologda region, we will try to answer these questions.

2. Assessment of the economic impact by using technologies substituting hospitalization in the region: "CMA" method

Traditionally, economic analysis is reduced to a comparative evaluation of several alternatives for resource allocation when we estimate invested money and anticipate the expected results, and then we conclude what scenario of decision making is more preferable. However, if the costs have quite concrete expression in the currency, effects in particular the social effects are measurable, but more difficult. Ultimately, the success of economic calculations in health care is determined by that how effectively achieved results will be determined.

In this article, as a basic means of investments inpatient treatment is considered, as an alternative – the TSH, which economic effect is calculated in terms of costs which are avoidable due to the particulate substitution of hospital care to outpatient day hospitals care.

In fact, this is a proper economic analysis using the classical method of minimizing the cost (*Drummond M., – cost-minimization analyses, CMA*). It reflects one of the key principles of health economics: in making managerial decisions regarding the preference of a particular treatment (medical programs, business operations, etc.) of two or more "competing" alternatives, then the choice falls on the option, which is associated with the lowest expenses, provided that their achieved effects are equivalent, in addition to economic [6]³.

Savings from reduced treatment costs by short-stay surgery using are calculated as the difference between the value of comparative medical technologies (in this case uses the cost per bed-day in the day-and-night hospitals and

³ It may seem that this approach is close to the analysis of "cost-benefit" because the achieved effects are expressed in value terms, but the latter implies the assessment of not only and not as much saving money but possible economic impact of the project (for example, productivity and disability maintaining by using minimally invasive technologies of interventions or by outpatient treatment).

Table 1. The scale of economic benefits from the technologies substituting hospitalization use in the Vologda region

Source of financing	Indicator	2004	2005	2006	2007	2008
CHI	Difference in value	227.77	289.31	492.11	562.5	681.78
	$Q_{p.d.}$ total	361,760	428,960	490,280	536,760	767,840
	$\sum E_e$, roub.	82 398 075.2	124 102 418	241 271 691	301 927 500	523 497 955
	Share E_e of \sum TPSG, %	2.3	3.1	5	5	8
Budget	Difference in value	132.35	111.81	99.95	468.19	530.45
	$Q_{p.d.}$ total	100,800	102,200	109,760	108,080	103,600
	$\sum E_e$, roub.	13,340880	11,426982	10,970512	50601975.2	54,954620
	Share \mathcal{J} of \sum TPSG, %	0.4	0.3	0.2	0.8	0.8
Total, budget + CHI	$Q_{p.d.}$ total	462,560	531,160	600,040	644,840	871,440
	$\sum E_e$, roub.	95 738 955.2	135 529 400.0	252 242 202.8	352,529475	578 452 575.2
	Share \mathcal{J} of \sum TPSG, %	2.7	3.4	5.2	5.8	8.8

Where: $Q_{p.d.}$ – a number of patient-days in the day-hospitals; \mathcal{J} – economy effect size; TPSG – state guarantee territory program size.
Source: It is calculated according to the Health Department of the Vologda region.

patient-day⁴ – in the day hospitals) per volume of actual cases of medical care assistance during the reporting period:

$$E_e = (C_{b.d.} - C_{p.d.}) \times Q_{p.d.},$$

where E_e – economic effect;

$C_{b.d.}$ – average cost per a bed-day in the day-and-night hospital;

$C_{p.d.}$ – average cost per a patient-day in the day hospital;

$Q_{p.d.}$ – the number of patient-days in day hospitals for the year.

As the cost of bed- and patient-days in the budget and insurance varies, the analysis of the economic TSH effect is realized in two sections to reflect the existing channels of funding. *Table 1* shows the results of these calculations: the size of the economic effect is presented here as in absolute value and as a share on the total amount of funding TPSG (hereinafter – the territorial program of state guarantees). For example, in 2008 due to the work of day hospitals in regional health facilities, it was succeeded to save public funds (about 9% from all the finances of TPSG) predominantly due to the

⁴ Hereinafter, the term “patient-day” is used as a unit of medical care in DH (as opposed to the term “bed day” traditionally applied to the day-and-night hospitals).

costs of compulsory health insurance – CHI. In general, in the Vologda region TSH functioning provided substantial savings in public resources and strong growth trend throughout the analyzed period.

But it is more important to show not only effect from the use of new technology and also its economic efficiency, so to express the effect relation to the costs with which its accomplishment is entailed. To do this, there is the coefficient of technology efficiency (profitability): it expresses the effect in the form of savings generated by each unit of invested funds. In this case, reducing the cost to implement the therapeutic process through the SSS opportunities (alternative technologies) is regarded as an effect; the cost of the technology application itself has the cost:

$$K_e = \frac{C_{b.d.} - C_{p.d.}}{C_{p.d.}},$$

where K_e – index of efficiency;

$C_{b.d.}$ – average cost per a bed-day in the day-and-night hospital;

$C_{p.d.}$ – average cost per a patient-day in the day hospital.

According to a 2008 investments to the short-stay surgery are in 1.7 times more effective than to day-and-night hospitals, and in 3 times more effective when it comes to health care costs in the CHI funds.

Thus, *ceteris paribus* (especially in achieving equal health outcome), technologies substituting hospitalization are more effective than the stationary ones. Similar calculations for a number of years show the rise in the TSH efficiency for the Vologda region health care, particularly in regard to insurance resources (*tab. 2*).

Speaking on the method of cost minimizing, however, we must recognize that the comparison of two alternative methods of treatment based only on cost indicators conceals important methodological assumption of the quality and health outcomes equivalence of considered alternatives. In other words, realizing economic assessment, we assumed that the provision of medical care in day-and-night hospitals and day hospitals will not vary in the quality and treatment outcomes. In practice, this can be achieved by such means as standardization and development of practice to protect patients' rights, etc.

However, such a simple but reliable way of estimating the economic benefits of the TSH, in our opinion, can be used as a tool to assess the executive authorities activities of Russian subjects, the basic methodology of which were approved in 2007 by the Commission under the President of the Russian Federation on the improvement public administration and justice, pursuant to Decree of the President of the Russian Federation on June 28, 2007 № 825 [3].

In our opinion, the development of new health care forms is much more significant factor to improve health than to reduce hospitalization incidence or simple to reduce bed resources and the number of ambulance calls, which were included in the practical part of this technique. Moreover, the development of the TSH has not only the substitute or compensatory role, but also an important social function, as it meets many changing expectations of patients, which are less interested in a prolonged stay in hospitals, being separated from familiar social and consumer protection. This is a socio-psychological effect of the TSH.

Conclusion

In "The economic way of thinking" the American economist P. Hayne noted that by the economic analyzes of costs it is important to take into account not only economic but ethical and also political aspects. The truth of these words is particularly evident in relation to expenses for protection and strengthening of population health. Therefore, it is important for those people who are responsible for decision making in health care, to achieve a balance between the principles of economic viability and social justice in their activities. It seems that the low-cost forms of health care discussed in this article can play a positive role in this tendency, because with proper methodological and technological support they meet both requirements.

In summary, we think it is very important to consider some of the use complexities of the TSH in Russian practice. Among them a special place is occupied by low availability of these technologies for the rural population living in conditions of transport distance from

Table 2. The treatment costs in day-and-night and day hospitals (roub.) and the effectiveness factor DH

Indicators	2004		2005		2006		2007		2008	
	Budget	CHI								
$C_{h,d}$	254.91	397.89	240.03	462.59	281.06	669.59	744.87	762.27	843.17	909.25
$C_{p,d}$	122.56	170.12	128.22	173.28	181.11	177.48	276.68	199.77	312.72	227.47
K_p	1.08	1.34	0.87	1.67	0.55	2.77	1.70	2.80	1.70	3.00

Source: It is calculated according to the Health Department of the Vologda region.

major cities and district centers. A low level of road infrastructure and transport development makes difficult the access to health care in day hospitals, so as always, hospitalization remains the only available way of treatment for residents of the Russian countryside. We cannot ignore such nuance as the difficulty in providing with free medicine to preferential categories of citizens, who will receive medical care at the outpatient stage of treatment in the new conditions.

Finally, it is difficult to agree with the view, which is widespread among officials that the main function of technologies substituting hospitalization is only to substitute. To confirm this only Russian specificity let's remember that in

foreign medical practice there is not any term like “technologies substituting hospitalization” (although some domestic authors often translate it in this way or “hospital-replacing technologies”), they use the following terms: “day care surgery”, “short-stay surgery”, “major outpatient surgery”.

In this connection it is worth emphasizing that the real aim of TSH in the short term should be the development and widespread use of modern diagnostic equipment and advanced technologies outpatient surgery, which can be a revolutionary improve health care, and not just "redistribution" of patients from one level of health care to another, albeit less costly.

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