KEMEROVO OBLAST MANDATORY HEALTH INSURANCE FUND

DEVELOPING AND TESTING METHODS OF ECONOMIC EVALUATION FOR ALTERNATIVE MEDICAL TREATMENT TECHNOLOGIES

PRACTICAL GUIDELINES

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I. The Need for Evaluation of Costs in Health Care

This manual is focused on one method of cost evaluation often called cost efficiency evaluation. This method provides for raising the following questions:

1. Should a specific medical service, procedure or clinical pathway be used instead of a medical activity in health care that would entail the same costs?

2. Does it satisfy us that health resources will serve to achieve the objectives set but not otherwise?

It is noteworthy that although cost evaluation provides valuable data for decision-makers, the latter consider only one side of the health-related decisions. Evaluation of costs is particularly useful if they are preceded by the other following three methods used for solution of various problems:

1. Will this work? The answer is given by the clinical effectiveness evaluation of a certain medical service, procedure or clinical pathway that show whether the specific service, procedure or clinical pathway will bring up more benefit than damage to patients.

2. Does this work? Does this service, procedure or clinical pathway brings up more benefits than damage to patients? This method of clinical effectiveness evaluation considering both effectiveness and acceptability of the specific service is called clinical effectiveness or appropriateness.

3. Will patients receive the medical service, procedure or clinical pathway they need? The answer is provided by evaluating access to service.

Cost evaluation is important because the resources are limited (personnel, time, facilities, equipment and skills). One has to choose how to use them. Neither past experience, nor common sense, nor informed intuition can replace the organized evaluation of the factors affecting decision making related to resource utilization. This is true for at least three following reasons:

1. It is hard to identify all alternatives without the regular conduct of analysis.
2. It is essential to know who is behind the cost evaluation. A clinical program that looks non-attractive from one point of view may seem better from the other one. An analyst may consider this issue at any angle:

    - individual patient
    - care provider (or group of them)
    - task consumer group
    - Ministry of Health (when it is its budget issue)
    - government (when it is a national budget issue)
    - local communities
    - various local institutions
    - society as a whole

3. It is necessary to evaluate costs quantitatively to avoid critically expensive proposals and recommendations. We will not have the basis for monetary evaluation without quantitative measurement and comparing costs and treatment outcomes. The actual cost of any clinical program will not be the amount of finance available but rather the health improvements that would have been achieved in case of an alternative program requiring the same costs. These are opportunity costs that should be identified and compared with the expected outcomes of the proposed program using the cost evaluation method.

Evaluation of utilization efficiency irrespective of where it is applied features two following specifics:

- firstly, both costs and treatment outcomes are evaluated
- second, cost evaluation is always linked to choice

Lack of funds and, therefore, lack of possibility to obtain the desirable treatment outcomes necessitate making choice regarding all walks of human activities. This choice is based on many criteria, both obvious and non-obvious.

Cost evaluation consists in identification and definition of criteria useful for making decisions related to funds distribution by various guidelines.

The above-listed specifics of cost evaluation lead us to defining cost efficiency evaluation as a comparative analysis of alternative actions, based on evaluation of costs and treatment outcomes. Therefore, the primary objectives of any cost evaluation effort are identification, measurement, evaluation and comparison of opportunity costs and treatment outcomes. These objectives, as well as the preceding identification of them, characterize all cost evaluations including those related to health care.

Table 1.1. Particulars of Cost Evaluation Methods in Health Care

Are both opportunity costs and treatment outcomes evaluated?

Two or more alternatives being compared?

	No	
No	Only treatment outcomes considered	Only costs
	1A Partial evaluation 1B	
	Description of outcomes	Description of costs

	3A Partial evaluation 3B	
Yes	Evaluation of clinical effectiveness or efficiency	Evaluation of costs

Yes
2 Partial evaluation Description of costs and treatment outcomes

4 Comprehensive evaluation
minimized costs method cost-efficiency method cost-effectiveness method cost-benefit method

We should note that none of the above0listed cases (1-3) meets in full the cost efficiency evaluation requirements. For this reason all these methods are called partial cost evaluation. One should not assume that these investigations are not important. They are vital intermediate phases in evaluation of costs and outcomes of provision of various medical services and programs. However, the term “partial cost evaluation” implies that they do not provide an answer as to their efficiency. To obtain this answer, we should study the methods in plane 4 “Comprehensive Cost Efficiency Evaluation”. Let’s consider now these four methods.

2. *Cost Analysis Method*

Identification of various costs and their monetary evaluation is true for all cost efficiency evaluation methods. However, the nature of the opportunity cost outcomes is, as a rule, vary different. To understand how the type of cost affects their measurement, evaluation and cost comparison, let us consider four methods of cost evaluation.

2. Minimized Costs Analysis

When comparing two alternative programs conditioned on the same outcomes, the cost efficiency evaluation will imply the choice of the least expensive opportunity. This analysis is called minimized costs analysis.

In reality, if the opportunity outcomes are identical (as they are too often assumed such in the minimized costs analysis), there is no difference in the methods. However, a comprehensive costs evaluation for this method requires certain arguments to summarize that there are no difference in the outcomes for various opportunity costs, either they are there or insignificant. For this reason such investigations are often conducted simultaneously with clinical approval tests or immediately after them.

2.2. *Cost-Efficiency Analysis*

The cost-efficiency analysis is one of the cost evaluation methods where both costs and clinical program outcomes are compared.

This method is applied for comparing various medical services with an indirect impact on health but allowing to achieve other clinical objectives directly associated with health status improvements.

When using the cost efficiency method, it is necessary to observe one of the following conditions:

1. Only one clear objective of medical intervention available (and a clear basis for cost efficiency measurement) or
2. Several program objectives available but implying that the opportunity costs program will also ensure their achievement.

2.3. *Cost-Benefit Analysis*

As a rule, we can not be sure that the opportunity program outcomes will be identical. It is often impossible to bring the outcomes of both alternatives to some common effect. We should not also be interested in the effects that, while being common for various alternatives, will have a complex structure. Or we can identify one of several effects not in coincidence for the alternatives under consideration.

The method of analysis measuring alternative costs and treatment outcomes in the monetary form is usually called the cost-benefit analysis. The results of such analysis may be expressed either as the ratio of monetary costs and benefit, or as a simple sum (possibly with a minus) reflecting the profits (or loss) of one program versus another.

The cost-benefit analysis evaluates the resources used by each program compared with the resources that the program may save or create. This viewpoint regarding the cost-benefit analysis implies that each program is compared with the doing-nothing alternative leading to neither costs or benefits. However, in reality, the cost-benefit analysis usually means comparison of costs and profits admitting an easy expression in the monetary form.

2.4. *Cost-Effectiveness Analysis*

The cost-effectiveness analysis represents a relatively new method of cost efficiency evaluation in health care. However, this method is considered as highly prospective because it may potentially allow to make adjustments for the quality of life for a certain set of treatment outcomes while ensuring the obtaining of the common denominator for cots and treatment outcomes compared by various programs. This common denominator is usually expressed in "healthy life days" or "quality-adjusted days of life" and obtained in each specific case by evaluating the additional life days ensured due to medical treatment considering the benefit (0 to 1 points) for the patient health status reached. Many researchers regard this approach to measuring treatment outcomes by various health-related programs as more efficient than the monetary cost evaluation.

The analysis using the benefit to measure the significance of the program outcomes is called as the cost-benefit analysis.

This method's effects are expressed through cost of a day of healthy life or as one year of this adjusted for its quality ensued from this specific program.

Various characteristics of these four methods of cost analysis (minimized costs, cost-efficiency, cost-effectiveness, cost-benefit methods) are shown in Table 1.2. It is necessary to underline two more important aspects. Firstly, the goal of this classification of the methods is to illustrate various analytical indicators of the research done but not to determine in advance which of them is recommended. It is more essential to understand whether the analysis complexity matches the broadness of the question set. As linked to the treatment outcomes evaluation, the cost-benefit and cost-effectiveness methods show better whether this treatment may be recognized as effective versus other alternative clinical programs.

The minimized costs and cost-efficiency methods imply indirectly that the treatment objectives are very similar. It is noteworthy that to understand whether a specific evaluation method is appropriate in a certain case, the consumer should know the differences indicated.

One should not overestimate the possibilities of these methods of evaluation. None of them is a magic formula relieving the decision maker of consideration effort, responsibility or risk, although each of the methods may improve quality or rationale for making a decision. In fact, they are the methods of critical approach to choice and often temporary refusal from a hard one to leave a question open for discussion. Although the methods of analysis allow to obtain high quality evaluations, cost values

and treatment program outcomes, they represent qualitatively only the frames for identification and expression of the economic factors affecting decision making. Whether the factors provided in the analysis will dominate decision making or limitations of the cost evaluation will limit essentially its benefit for a specific situation, this will ultimately remain at the discretion of the decision maker himself.

Table 1.2. Measuring Costs and Treatment Outcomes under Various Cost Efficiency Evaluation Methods

Method of evaluation	Measurement and evaluation of costs by both alternatives	Identification of the outcomes	Measurement and evaluation of treatment outcomes
Minimized costs	Monetary equivalent	Identical by all aspects	No
Cost-efficiency	Monetary equivalent	Same final effect for both alternatives but various degree of achievement	In-kind indicators (additional years of life, reduced disability days, etc.)
Cost-benefit	Monetary equivalent	Resulting effects do not necessarily coincide by both alternatives; the degree of the outcomes achieved may vary by the alternatives	Monetary equivalent
Cost-effectiveness	Monetary equivalent	Resulting effects do not necessarily coincide by both alternatives; the degree of the outcomes achieved may vary by the alternatives	Days of healthy life or(more often) days of life adjusted for its quality

It is hard to consider what costs and program outcomes yield to all members of society. In reality, the “ruffles” from the program outcomes may spread very far so that certain consequences may be should not be taken into consideration. However, it is essential to understand that, given lack of resources, the position of the program contractor may be restricted so the issues should be looked upon more broadly. For instance, it may happen that a program is preferable for society but not for the contractor. In this case, the latter should be given chance to ascertain that the more society-oriented program is better.

3. *Discounting in Cost Evaluation*

When comparing long-term programs in health care, discounts are also applied, i.e. future costs are adjusted for the current ones.

Let's assume that the costs of the two programs are distributed by periods as follows (mln rubles):

	1st year	2nd year	3rd year	Total
Program A	5	10	15	30
Program B	15	10	4	29

In other words, the bulk of costs under Program A will go for the last two years, with the opposite situation for Program B.

Time adjustment in the distribution of costs is computed as follows:

$$P = 3\ Fn\ (1 + r)^{-n} = \frac{F1}{(1 + r)} + \frac{F2}{(1 + r)^2} + \frac{F3}{(1+r)^3};$$

$$n = 1$$

where:

P is final costs at initial prices;

F is following year costs;

r is yearly discount;

n is years.

$(1 + r)^n$ is the discount factor receivable from the special tables.

For example, w take the 5% discount.
Then, Program A costs will be 26,79 mln rubles or 26,81 mln rubles for Program B.

4. *Testing Cost Efficiency Evaluation Methods by Alternative Clinical Technologies*

Comparing alternative medical services is one of most interesting tasks of health economics. These tasks have to be solved by medical personnel and health economics to determine the guidelines for more efficient resource utilization (equipment purchasing, implementation of prospective patient examination and treatment programs).

Generally, this task is the one related to making choice amid lack of funds and the need for most efficient care delivery.

Simultaneously, similar evaluation have been given little attention in Russia, probably, because the particulars of the local health funding. The development of mandatory health insurance and the advent of new sources of funds (health insurance companies) responsible for costs control has called for drawing comparison between costs itemized. Given lack of funds, these evaluations are most burning because they allow to identify funding priorities and seek, if not to improve, but at least stabilize the main indicators of health facilities (birth, death and mortality rates, etc.)

This article studies three following options of alternative use of funds:

- mammography as alternative to manual examination of mamma
- comparing the Runo diagnostic express method efficiency for monitoring health status and screenings;
- evaluation of the anti-flu preventive measure efficiency versus total treatment costs.

4.1. *Evaluation of Costs Related to Mammography*

Example. *A cancer dispensary has purchased a mammograph. After one year of its operation, the Chief Doctor decided to determine the device cost-efficiency versus manual examination (for both his health facility and health sector as a whole).This question could have been put before the device was purchased, which also is not late now. Most important is that certain data have been stocked allowing to conduct this analysis for the dispensary.*

Phase 1 is to describe in detail medical services by alternatives. (This work should be performed by leading doctors much experienced and able to both evaluate the achievements and see the perspective.) This description should largely focus the technology and also draw a clear picture allowing an economist to see the structure of costs by each method and then calculate costs in adequate detail.

It is also necessary to note the particulars of treatment by both options that could essentially affect costs. It is appropriate to single out, as early as this phase, the effects that may be ensured and that should be carefully evaluated by economists.

Example. Manual examination in case of doubtful data or lack of them provides for a repeat examination of women after one, 6 and 12 months. In case of mamma cancer, this delay in accurate diagnostics and surgery will radically affect the short- and long-term outcomes of treatment reflected in reduced number of the cured, two- and five year survival and disability cases, which determines public costs of treatment of more common cancers, rehabilitation, disability benefits, costs incurred by relatives for medical services maintenance of patient with various treatment outcomes, etc. In other words, the earlier the treatment is started, the better the outcomes will be for both patients and society.

When implemented, mammography is expected to identify early cancer to cut surgery costs, improve the consequential quality of life, reduce post-surgery disabilities, costs of diagnostics and radical intervention in cases of the primary diagnosis cancer.

Further, it is necessary to identify whether the outcomes of the two treatment methods coincide and select the cost evaluation method.

Example. The proposed diagnostic methods feature both different costs at the implementation phase and lead to different clinical results (the mammograph allows to conduct examination more efficiently). So it is appropriate to use the cost-benefit method applicable when we are not sure that the program outcomes will be identical. In this example, this is confirmed by the expert opinion though not yet substantiated by statistically. The mamograph has been in operation for one year while a trustworthy evaluation, of which the data we could use, has not been conducted.

The collection, computation and adjustment of the indicators by the two diagnostic methods will initially require much work involving economists and leading medical expertise. Although this analysis can be conducted as non-provider specific using the data averages and information available from various sources. This phase looks to be most laborious because provider statisticians may not have the necessary data as not processed or processed using an inappropriate method. So the economist should decide what specific indicators he would like to obtain and what data he needs for the evaluation effort.

Costs and their efficiency should be separated in calculations. The former admit direct calculation or use of the data available.

For cost efficiency evaluation, it is necessary to compare diagnostic costs and treatment of breast cancer in women of close age groups:

- **determine costs of diagnostics of one breast cancer case using both methods;**
- **determine average costs of surgery using various methods.**

Cost of the mamma manual examination make 11,570 rubles/patient.
Cost of the mamma examination using the mammograph make 79,786 rubles/patient.

The mammography cost efficiency is found as follows:

11,570 - 79,786 = - 68,216 rubles/one case

For the primary evaluation, this method is expensive and low cost-efficient.

To determine this method cost efficiency, it is necessary to:

- **calculate the share in % of accurate diagnostics;**
- **share of disabilities by these groups;**
- **determine the quality of life indicator for these groups of patients;**
- **calculate the mammography efficiency considering all these indicators.**

The implementation in 1995 of mamography for breast cancer diagnostics at the cancer dispensary has led to the patients distributed by the cancer development stages.

(Sample of 230 cancer patients at various disease stages with no regard to age.)

	1994	1995
Stage 1	10%	15%
Stage 2a	20%	25%
Stage 2b	30%	20%
Stage 3	30%	30%
Stage 4	10%	10%

With the treatment specifics related to service combinations and share of each service considered, the cost of per case treatment by each disease stage was as follows given the payment rates as set (mln rubles):

Stage 1	2.02
Stage 2a	2.02
Stage 2b	4.198
Stage 3	4.468
Stage 4	4.468

Changed Costs of Treatment Resulted from Patient Status Stage Redistribution

Stages	1994		1995	
	patients	costs	patients	costs
1	23	4.646	35	70.70
2a	46	92.92	57	115.14
2b	69	289.66	46	193.11
3	69	308.29	69	308.29
4	23	102.76	23	102.76
TOTAL	230	840.10	230	790.00

E = 31 - 32; where

E is the effect of the patient redistribution by stages;

31; 32 are costs of treatment by years (identical samples);

E = 840.1 - 790.0 = 50.1 mln rubles

Thus, costs saved due to breast cancer diagnosed at early cancer stages were 50.1 mln rubles at Stage 1 or 217,800 rubles/case during the first year of the mammograph operation. If additional costs are considered for the mammograph examination (79,800 rubles), the direct per case benefitt will be:

217,800 - 79,800 = 138,000 rubles

The direct benefit is usually understood as costs saved due to program activities performed. However, not less but more often important are the indirect benefit found, as a rule, based on salary to evaluate reduced losses of work hours resulted from the treatment performed.

The cost-effectiveness analysis is more laborious and requiring creditable data and long-term research. Although this example did not allow to conduct such analysis, one may forecast the following:

- reduced disabilities
- reduced sick leave-related costs
- increased life span adjusted for its quality

This approach to measuring cost efficiency is more reasonable than the monetary evaluation of the clinical program efficiency. The results are expressed in terms of costs of each additional year of life extended, which are the consequence of the specific program implemented.

Thus, we will reflect as the efficiency indicators in the cost-benefit analysis the following: extended life span (lower death rate) and improved quality of life (lower morbidity rate). The cost efficiency in this case will be represented as more years of survived per unit of costs.

The quality of life indicator is relatively new among other indicators of the efficiency of medical services. Only the pursuit by the clinical personnel for prolonged survival or disease cured may motivate the choice of high clinical effectiveness methods but aggravating certain aspects of patient life.

For example. As to survival and extended period of treatment, chemical therapy, as a cancer treatment method, is equally effective at smaller costs as radiation therapy and, therefore, should seemingly be given priority. However, given the quality of life indicator, the evaluation of the comparative clinical effectiveness of the two methods changes to consider negative by-effects available in most patients.

The quality of life criteria may radically change the primary intuition-based evaluations when selecting the medical procedure.

For example. Clinicians were sure that breast cancer patients at early disease stages would have opted for removal of only the damages areas for further radiotherapy but not the entire breast to mitigate the moral burden in the post-surgery stage. However, some patients gave preference to radical surgery to avoid radiotherapy and preclude possible disease progress. Quality of life indicators were about the same in both cases.

Surveys on quality of life may find a wide spread. Under long-term studies, data are collected regularly, with the number of questions put to, for instance, breast cancer patients to range from 6 to 22.

Tentative questions are given hereunder:

Please encircle the appropriate:

	No	Yes
1. Is it physically hard for you to, for instance, carry a heavy bag with purchases or a suitcase? 2. Do you need help when at meals, clothing, etc.? 3. Did you have pains? 4. Did you lose appetite? 5. Does your physical status or medical treatment troubles your family life? 6. How would you estimate your physical condition last week (from 1 to 7)?		

4.2. *Cost Efficiency Compared of Patient Examination and Express Diagnostic Tests (modern Acabane method version)*

Summary of the Runo method (modern version of the Acabane method)

The Runo method is based on identification of latent pain thresholds during thermal treatment of the finite acupuncture meridian points and implemented using the task software.

The Runo method allows to identify the human body response to pathology, certain pathology status (acute, chronic), pre-clinical forms of diseases, vulnerable functional body systems, diagnose pathology at the body organ and system levels, show in numbers and graphs the outcomes obtained, perform control of treatment effectiveness and keep examination outcomes records.

The data received using the Runo method and the clinical diagnosis coincide fairly exactly with the paraclinical test outcomes. See hereunder the respective data provided by the Bakulev Cardiovascular Surgery Institute:

Cardiovascular organ pathology	97.6
CV surgery functional pathology	97.6
Bronchi-lungs pathology	97.1
Large intestine pathology	93.3
Thin intestine pathology	95.5
Hormonal system pathology	92.9

To evaluate the cost efficiency of the approaches presented, it is necessary to identify the time and human resources used for usual regular screenings and the Runo-based examination.

When comparing them, the following evaluation methods may be used: cost-benefit and cost-effectiveness methods.

If implemented, the Runo method will:

cut costs:

1) of diagnostics due to a) electronic data processing; b) lower cost of this examination method versus screenings;
2) due to more targeted diagnostic search during further tests;
3) future costs due to early diagnosis and obtaining more in-depth results than when using the traditional screening;
4) of data processing (PC showing numbers and graphs);

and

5) perform this examination repeatedly in a year (due to lower costs incurred) and, therefore, more carefully monitor and forecast patient health status.

1. Cost Efficiency at Diagnostics Stage

Diagnostic method	**Time/patient**	**Personnel**	**Qualification**	**Total costs, rubles**
Screening	3 min.	8 persons	Physician + nurse	71,861
Runo method	6 min.	1 person	college nurse	310

Total costs estimate may be based on population of 50,000 (minimum number of policy holders/insurer), actual examination costs and other indicators for an industrial facility of about 6,000 workers in Kemerovo.

Total costs of 50,000 examinations by the Runo method (TCR).
Total costs of 50,000 screenings (TCS).
Cost of one Runo-based examination (CRE).
Cost of one screening procedure (CSP).

TCR = CRE* 50,000 = 310*50,000 = 15,500,000 rubles
TCS = CSP*50,000 = 71,861*50,000 = 3,593,050,000 rubles

Costs saved at the diagnostic stage:

S = CSP - CRE = 3,577,550,000 - 15,500,000 = 3,577,550,000 rubles

2. Costs saved due to early diagnosis and reduced future treatment costs

With much probability (95.5%), we could assume that 100% of the primary diagnoses are the diseases at their initial stage. The morbidity rate reported is as follows:

Respiratory 3%
Urinogenital 6%

Blood circulation 2%
Endocrine system 1.5%

Since this growth is accounted for by early stage diseases, it admits to assume that the inpatient treatment of early-diagnosed diseases may be avoided in almost 100% cases.(Of course, if the appropriate medical procedures are of high quality and timely. This is not being considered as not being the objective of the current research.) So we think that the reduced morbidity rate is the Runo method effect, with the efficiency achieved due to the usual screening and Runo-based examination combined. However, since these methods duplicate each other to a certain extent, the actual effect of the Runo method will be even higher (considering at least the cost of screenings).

The costs saved can be found using the Kemerovo Oblast data.

We should first determine the incidence by the nosologies for 50,000 of the population:

Nosology	**Incidence/ 100,000**	**Incidence/ 50,000**	**Increase, %**	**First diagnosed/ 50,000**
Respiratory	28,560	14,280	3	428
Digestive	58,200	29,100	6	1,746
Blood circulation	820	410	2	8
Endocrine	29,300	14,650	1.5	220

Further, if know the cost of outpatient and inpatient treatment, we can find costs saved by each nosology and on the whole (1,000 rubles):

Nosology	Incidence	Cost/case at polyclinic	Total costs	Cost/case at hospital	Total costs
Respiratory	428	37.1	15,878.8	155.6	66,596.9
Digestive	1,746	57.6	100,569.6	159.6	278,661.6
Blood circulation	8	39.8	318.4	319.3	2,554.4
Endocrine	220	81.1	17,842	226.4	49,808.0
Total			134,608.8		397,620.8

Costs saved from early diagnosis and outpatient treatment are:

costs saved = 397,620,800 - 134,608,800 = 263,012,800 rubles

If required, the value for each nosogoly can be found.

Costs saved from lower incidence due to screenings are unclear. However, it is logical that the incidence rate would have been higher without them.

AR = ER - %
AR - actual rise in incidence rate.
ER - Estimated rise in incidence rate without screenings.
% - lowered morbidity rate due to screenings.

With the respective data on hand, we can find the costs saved.

4.3. *Comparative Estimate of Costs Saved Due to Anti-Flu Preventive Measures and Traditional Treatment Costs*

Preventive measures are taken during epidemics and provide for dispensation of interferon.

To compare the costs saved, the following data should be available:

- population covered by preventive measures;
- cost of interferon treatment (7 to 20 days);
- cost of traditional treatment.

Also, the following survey is necessary among the sample receiving the same interferon treatment:

- whether the patient takes interferon regularly;
- patient attitude to similar activities; its efficiency evaluation.

According to statistics, interferon lowers the morbidity rate by 30 to 40%.

For comparison, the cost-benefit and cost-efficiency methods may be used.

Costs Compared of Anti-Flu Preventive Measures and Medical Treatment

Cost of one interferon preventive treatment period, rubles (CP)	Cost of one flu polyclinic treatment case at polyclinic, rubles (CT)
4,000	48,175

The flu incidence (I) in epidemic (about 90% of all cases by all diseases in a year) reaches 70 cases/100. Thus, the flu incidence/year/50,000 will be:

50,000*0.7 (share of cases)*100%/90% = 38,889 cases
TCP is total preventive costs

TCP = CP*I = 4,000*38,889 = 155,556,000 rubles = 155.6 mln rubles

For calculation purpose, we assume that preventive care lowers flu incidence by 35%, i.e. cases will make 38,889 - 35% = 25,277 cases

TCT is total polyclinic treatment costs.
TCT = CT*I = 48,175*25,277 = 1,217.7 mln rubles

Thus, costs saved from interferon treatment will be:

Efficiency 1 = TCT - TCP = 1,217.7 mln rubles - 155.6 mln rubles = 1,062.1 mln rubles

Also, the reduced morbidity rate resulted form flu prevention will entail reduction of such costs as disability benefits. For this purpose, it is appropriate to use the following data:

Reduction in flu incidence	13,612
Average length of disability	7 days
Average salary in health sector	950,000 rubles
Average work days/month	22

Efficiency 2 = 13,612*950,000 rubles : 22*7 = 4,114,536,400 rubles = 4,114.5 mln rubles.

The cost efficiency from this medical program will total:

E = E1 + E2 = 1,062.1 + 4,114.5 = 5,176.6 mln rubles