Cost-Effectiveness of Mental Health Interventions in Estonia

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Content

Summary

The present study was conducted to economically evaluate several interventions affecting population mental health. The measurement of the effectiveness of an intervention is given in life years gained, years which originally were lost due to disease related premature death or decrease in life quality.

The field of mental health was chosen due to its important and ever increasing role in the entire world. In 2001, the percentage of psychiatric diseases, mental disorders and related conditions (including mental disorders caused by the use of addictive substances) in total burden of disease i.e. cause of health loss was 12% in the world and up to 25% in the European Union.

Depression and schizophrenia are psychiatric diseases which due to their prevalence and chronic development are the cause of substantial burden of disease. For instance, in Estonia, schizophrenia is the cause of 3% of the total health loss of the population, which makes it the fifth cause in the list of diseases for both men and women.

In Estonia, alcohol abuse is among the largest three risk factors causing health loss, together with smoking and physical inactivity, each of which is related to 7-8-% of total health loss of the population. Alcohol abuse increases the risk of cardiovascular diseases, breast cancer and other malignant tumours and various gastroenterological diseases (cirrhosis of the liver and pancreatitis). Alcohol is also an important risk factor of intentional and unintentional injury, and causes alcohol addiction, suicides and alcohol related psychoses.

Estonia implements effective treatment methods to decrease burden of disease caused by depression and schizophrenia and preventive actions to avoid health loss due to alcohol abuse. The current report evaluates the interventions used from the economical cost-effectiveness perspective and gives recommendations for the implementation of further measures in improving population mental health.

This study made use of the WHO-CHOICE methodology and computational tools, which are specially designed for evaluating the cost-effectiveness of interventions targeted at decreasing burden of disease. This methodology enables to establish the influence of currently used actions and interventions one by one and thus determine the combination that guarantees the greatest effect on health with optimal cost.

The discussed treatment methods for depression and schizophrenia encompass pharmacological treatment with two most important medication groups for both diseases, psychosocial treatment and case management of schizophrenia and proactive collaborative care for depression.

Interventions targeted at alcohol abuse are either preventive (e.g. taxation, limitations on availability and advertising) and decrease the number of new cases of alcohol abuse, or targeted at current abusers (e.g. breath testing on roads, counselling by GP, taxation) to decrease their alcohol consumption.

As an important part of the analysis, the health impact and cost-effectiveness of various interventions for all three conditions were modelled taking into account different levels of target group coverage and actual costs in current Estonian prices, including necessary costs of conducting the program and treatment and hospital costs directly related to the patient.

Evaluation of an intervention's cost-effectiveness was expressed by the total cost for gaining one year of healthy life and its relative amount to the average gross domestic product (GDP) per capita (90 472 EEK in 2004).

In the case of depression, implementing solely pharmacological treatment is least effective. The most cost-effective result in combating depression is achieved when combining pharmacological treatment with psychotherapy and proactive collaborative care. Then the cost of saving one extra life year is 43 003 EEK.

The treatment of depression used in Estonia today saves 1 743 life years every year and the cost of saving one life year is 52 411 EEK. When improving target group coverage and substantially increasing the implementation of psychotherapy and proactive collaborative care, 2 457 life years could be saved in Estonia with a cost of 43 004 EEK per life year saved as noted above.

In selecting treatment methods for schizophrenia, the least effective choice would be to use pharmacological treatment individually. The most cost-effective result would be to combine pharmacological therapy with psychosocial therapy and case management, whereby the cost for saving one extra life year would be 252 265 EEK.

The treatment of schizophrenia used currently in Estonia saves 161 life years annually with the cost of 611 509 EEK for saving one life year according to the prevalence and combining of different treatment methods. When improving target group coverage and substantially increasing the implementation of psychotherapy and case management, 417 life years could be saved in Estonia with a cost of 252 265 EEK per life year saved as noted above.

In the case of schizophrenia and depression, the cost-effectiveness and efficiency of current treatment methods is increased mostly by the optimal selection and combination of available treatment methods. Furthermore, although complementing pharmacological treatment with supportive activities requires larger resources, the joint effect of combined interventions on population health is far more cost-effective than that of single activities by themselves.

Of single interventions targeted at decreasing alcohol abuse, the most cost-effective way to decrease population health-loss is the taxation of alcohol, whereat the gain in health increases proportionally with the tax rate. According to cost-effectiveness, taxation is followed by limiting availability, limiting advertising and random breath testing on roads.

The current combination of interventions aimed at alcohol abuse in Estonia saves 3 613 years every year. Increasing taxation by 50% and increasing the prevalence of other interventions (e.g. limiting advertising and random breath testing on roads) the number of life years saved would be 8 350 with the cost of 3 368 EEK per life year. That would be the optimum outcome in population health with optimal costs.

In comparing the costs of saving one healthy life year with GDP per capita, all interventions aimed at depression and alcohol abuse turned out to be very cost-effective or cost-effective (3x GDP per capita or below). Of interventions aimed at schizophrenia, however, only the three most cost-effective were below the 3xDGP per capita limit.

Cost-effectiveness is not the only criterion in healthcare-political decision making, but the results of the current study provide insights into possible ways of improving population health and preventing a greater number of life years lost, with the resulting economical and social gains, by using various resources more efficiently.

Introduction

During recent years, burden of disease due to mental health disorders have begun to receive noticeable attention. According to the 2002 WHO world health report (1) 13% of years of life lost and 33% of years lived with disability are caused by various mental health disorders.

The amount of resources distributed on a global scale for decreasing the burden of disease due to mental health disorders is relatively small and insufficient. This is most clearly evident in developing countries (2). Keeping in mind the limits imposed by the scarcity of resources, the current distribution of resources between different services and methods should be re-evaluated in order to find the most efficient servicing scheme that would decrease the burden of disease most effectively.

The importance of mental health problems at the societal level in Estonia, just as in other countries, brought about this project. The high prevalence of mental health disorders is a burden to individuals and households directly effected as well as to society in general. According to various studies, the mental health of the population in Estonia is worse than in other Western and North European countries (3).

Mental health in Estonia has begun to receive more attention recently. For instance, during 4-5 October 2004 the WHO European Regional Bureau in cooperation with the Ministry of Social Affairs organized a conference for mental health and work life in connection with the WHO European Ministerial Conference on Mental Health in January 2005. Also, through the process of involvement, the base document of mental health (4) and an analysis of mental health funding and resource usage (5) were drawn up by the centre for policy studies PRAXIS. In addition, the non-governmental Healthcare Association is completing an overview document of the mental health system in Estonia.

The aim of the current project is to obtain more specific information about possibilities of decreasing burden of disease, based on mental health intervention costs, effectiveness and cost-effectiveness at various target group coverage levels, in order to plan a national mental health policy.

WHO-CHOICE (*Choosing Interventions that are Cost-Effective*) methodology and tools, that were created to evaluate the cost-effectiveness of interventions directed at decreasing burden of disease, were implemented in conducting this study. WHO-CHOICE has so far focused mainly on regional analyses, thus for national level analysis a further data gathering and specification (contextualization) took place as a part of this study.

The report gives an overview of health loss due to psychiatric diseases, depression and schizophrenia more specifically, and risk burden of alcohol abuse as a behavioural health risk. It also gives an overview of the method of cost-effectiveness evaluation used in the study, input data and the results of the cost-effectiveness analysis.

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Background

1 Mental health situation

Mental health disorders are a public health issue in all countries of the world, having a substantial impact on the people themselves, their families and the society as a whole. Psychiatric disorders, especially depression, cause considerable burden on the society all over the world. According to WHO estimates, depression accounts for up to 11% of the entire burden of disease in some regions of the world (6).

There are currently 450 million people in the world with psychiatric, neurological or behavioural disorders. 150 million of them suffer from depression, 25 million from schizophrenia and more than 90 million are addicted to alcohol or drugs. Approximately 873 000 people end their life in suicide every year.

Mental health disorders are a cause of disability and may thus inflict a substantial economic burden on society. According to the 1993 World Development Report, four mental health and/or neurological disorders are among the ten most important causes of disability. In 1993 depression was regarded as the fourth most important cause for disability, and if the current trends continue, by 2020 it may become the second most important cause for the entire population and the first for women.

Mental health is directly linked to people's physical health (8), economical productivity and employment (9). Psychiatric disorders could also be a cause of catastrophic expenditure in households, which may be a precipitating factor in falling into poverty. At the same time, it is the poorer part of the population that suffers more from mental health disorders (10). People with mental health disorders often become socially isolated, their quality of life dramatically decreases and they suffer from a greater mortality rate.

Mental disorders are a burden on health care as well as social sphere, creating a need for health care services as well as for other services e.g. social, economical and educational services. Every fourth patient visiting a health care establishment has at least one psychiatric, neurological or behavioural disorder, most of which are left without diagnosis and care. At the same time all these conditions have various corresponding interventions which can be used to improve the quality of life of people and restore their ability to work (11).

Similarly to the rest of the world, the situation of mental health in Estonia is worrisome – the main problems are the increased frequency of psychiatric disorders, stress and depression and their occurrence in ever younger age groups. 55 242 people were diagnosed with psychiatric or behavioural disorders in Estonia in 2002 (12), while the number of suicides remains at a worryingly high level (27-40 per 100 000 people per year). Suicide is also an important cause of death between ages 15 and 29 (4).

Mental health disorders in the Estonian population are distributed unevenly. Inequality in mental health is evident mostly in the frequency of occurrence among different socio-demographical population groups, where those with a lower income,

with a lower level of education and the Russian-speaking population are most vulnerable (13).

Additional problems are caused by the interaction of psychiatric problems with the consumption of addictive substances (14). According to the health behaviour study of the Estonian adult population, the consumption of wine, vodka and beer has been constantly increasing during the last 10 years among both men and women (15).

Despite the severity and gravity of consequences of mental health disorders, there are regions and countries in the world where the problem has not received adequate attention. The main problems are the under-emphasis on mental health, limited access to services, scarcity of alternative care methods and insufficient information about treatment possibilities.

Resources that do not correspond to the needs compose a major part of the problems connected to mental health in most countries; this is partly caused by a negative public and political attitude and the stigmatization of psychiatric diseases and the psychiatrically ill. The scarcity of resources in turn forces decisions to be made – to choose priority population groups, diseases or treatment methods. With the latter there is the possibility of basing decisions on the relative cost of interventions i.e. the ratio of costs and benefits.

The 1993 World Bank *World Development Report: Investing in Health* broadly uses the *burden of disease* concept to evaluate the population health condition, which in cooperation with the concept of *cost-effectiveness* enables priorities to be identified which improve population health most efficiently.

Cost-effectiveness analysis of interventions assessed at the population health, in addition to several ethical, social and political criteria and goals (figure 1-1) is an integral part of the decision making process. In addition to the cost-effectiveness criterion, the decision making process must also draw attention to the relative severity of the condition, externalities that accompany the disease and the protection of human rights (16).

The current cost-effectiveness analysis implemented a sectoral approach developed by the World Health Organization (WHO). The corresponding WHO project *CHOosing Interventions that are Cost Effective* (CHOICE) was founded with the purpose of providing decision makers with information about the effectiveness and cost-effectiveness of various health interventions.

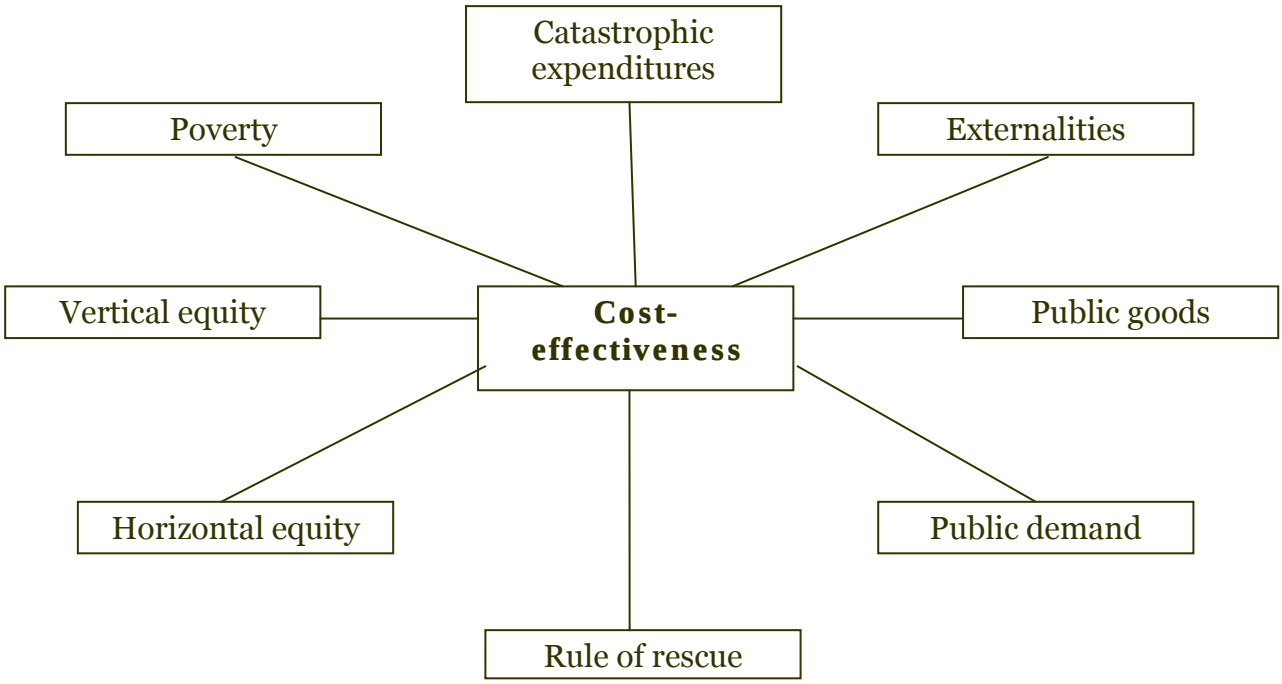


Figure 1-1. Different categories of criteria in a decision making process

2 Burden of Disease in Estonia

More than 300 000 healthy life years in Estonia are lost due to premature mortality and morbidity each year. For instance, 326 898 healthy years of life were lost in 2002, with the contribution of premature mortality and morbidity to this overall loss approximately equal (17).

In this report the concept *burden of disease* signifies the loss of population health and it is measured in healthy life years lost (DALY i.e. *Disability Adjusted Life Years*) which is found by adding the years lost due to deaths (*Years of Life Lost or YLL*) and years lived with impaired health (*Years Lived with Disability or YLD*).

Unlike conventional measure of health outcome, the DALY enables us to analyze the health loss due to both mortality *and* morbidity, combining them into one single indicator. The burden of disease methodology has been described for the Estonian audience in detail in the article "Population Health Loss i.e. Burden of Disease: Evaluation Methodology" by Vals, Lai and Kiivet (18).

Cardiovascular diseases, cancer and external causes make up the largest part of health loss of the Estonian population, with 210 000 life years lost. Illnesses belonging to the mentioned disease groups are a frequent cause of death and thus form a large part of the mortality loss of the total life years lost of the population.

The role of psychiatric diseases in the burden of disease is most evident in studying the health loss due to morbidity. The diseases of this category make up 10% of health loss for both men and women, as can be seen from table 2-1.

Disease group	Male	Female
Pulmonary diseases	7%	5%
Cancers	16%	19%
Genito-urinary diseases	1%	2%
Joint and muscle diseases	5%	9%
Infections	1%	1%
Neurological diseases	3%	3%
Psychiatric diseases	4%	5%
Gastroenterological diseases	4%	3%
Cardiovascular diseases	32%	37%
Other diseases and disorders	6%	9%
External causes and injuries	18%	6%
Congenital disorders and pregnancy related conditions	2%	1%

Table 2-1. Proportion of major disease categories in total burden of disease by gender

In the Estonian burden of disease study, individual conditions were formed by grouping single ICD-10 (International Classification of Diseases, Revision 10) codes based on similarity (19). 169 individual conditions were discussed in this study.

Schizophrenia was among the top 15 and depression among the top 50 of the most important causes of burden of disease. In the list of causes of burden of disease for men, schizophrenia ranked 15th with over 3% of total health loss, for women it was counted 8th with 4% of total health loss (table 2-2).

Male			Female	
1	Ischaemic heart disease	**28 198**	Ischaemic heart disease	**27 031**
2	Stroke	**11 748**	Stroke	**18 454**
3	Cancer of lung	**6 939**	Osteoarthritis	**6 297**
4	COPD	**5 546**	Hypertension	**6 246**
5	Suicide	**5 350**	COPD	**5 009**
6	Poisoning	**4 995**	Breast cancer	**4 159**
7	Hypertension	**4 718**	Colorectal cancer	**3 690**
8	Cardiomyopathies	**4 406**	Schizophrenia	**3 397**
9	Traffic injuries	**3 851**	Cirrhosis	**2 738**
10	Cirrhosis	**3 769**	Hearing loss	**2 349**
11	Pneumonia	**3 726**	Leiomyoma	**2 324**
12	Osteoarthritis	**2 650**	Cardiomyopathies	**2 299**
13	Colorectal cancer	**2 599**	Cancer of stomach	**2 189**
14	Cancer of stomach	**2 547**	Nephrosis	**2 186**
15	Schizophrenia	**2 389**	Cancer of lung	**1 738**

Table 2-2. Burden of disease caused by schizophrenia and it's ranking among other cause-categories by gender

In the list of conditions based solely on morbidity, schizophrenia is regarded 5th for both men and women with 5% of total health loss (table 2-3). In addition, depression is positioned 24th for women.

Male			Female	
1	COPD	**4 462**	Osteoarthritis	**6 297**
2	Ischaemic heart disease	**3 418**	COPD	**4 563**
3	Hypertension	**2 813**	Hypertension	**3 852**
4	Osteoarthritis	**2 632**	Stroke	**3 545**
5	Schizophrenia	**2 389**	Schizophrenia	**3 397**

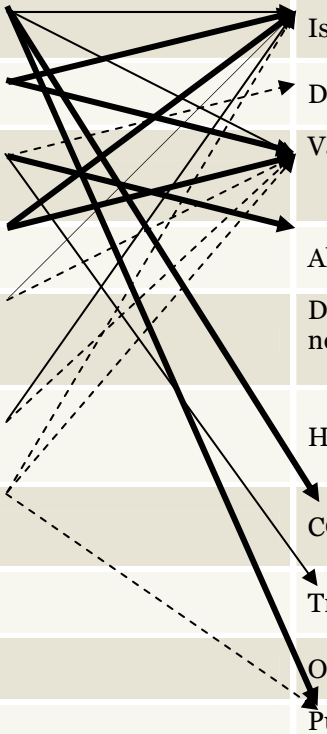
Table 2-3. Burden of disease from morbidity of schizophrenia and it's ranking among other sources of morbidity by gender

The results of Estonian Burden of disease study could potentially underestimate the importance of depression in Estonian population as these calculations are based on health care utilisation data. Current study relies mostly on population surveys as described in section 8.6.

3 Burden of disease and risk factors in Estonia

If the primary goal in evaluating burden of disease is to get an overview of population health as a whole, then in choosing actions to improve population health it is important to know the role of health risks contributing to diseases forming the burden of disease (20). Table 3-1 presents the effects of major risk factors on burden of disease showing the direction of the effect of the risk factor and its extent in developed countries.

Major risk factors and % of total DALY		Disease and % of total DALY	
Smoking	12,2%	Ischaemic heart disease	9,4%
Hypertension	10,9%	Depression	7,2%
Alcohol	9,2%	Vascular diseases of brain	6,0%
Cholesterol	7,6%	Alcohol dependency	3,5%
Obesity	7,4%	Dementia and other neurological disorders	3,0%
Inadequate use of fruits and vegetables	3,9%	Hearing loss	2,8%
Physical inactivity	3,3%	COPD	2,6%
Illicit drug use	1,8%	Traffic injuries	2,5%
Unsafe sex	0,8%	Osteoarthritis	2,5%
Iron deficiency	0,7%	Pulmonary cancers	2,4%



Attributable fraction over 50%
25-49%
1-24%

Table 3-1. Proportion of risk factors and diseases from total burden of disease in developed countries and causal effects of risk factors in disease development (21)

Thus the decrease of a risk factor's prevalence and its consequent effect on related diseases provides an avenue for improving population health. In risk factor analysis it is important to keep in mind the polyetiological character of common diseases, an example of which is the occurrence of one and the same risk factor in several different diseases. Because of these overlapping of risk factors, the burden of disease due to individual health risks can not be totalled because this may lead to an extreme overestimate of the role of a risk factor (22).

In 2004 the first risk burden study based on WHO methodology (20;23) was conducted in Estonia simultaneously with a general burden of disease study (24). The results of the mentioned study are shown in figure 3-1, which demonstrates the large role of alcohol abuse, smoking and physical inactivity in Estonian burden of disease. All three risk factors cause the loss of more than 20 000 healthy life years.

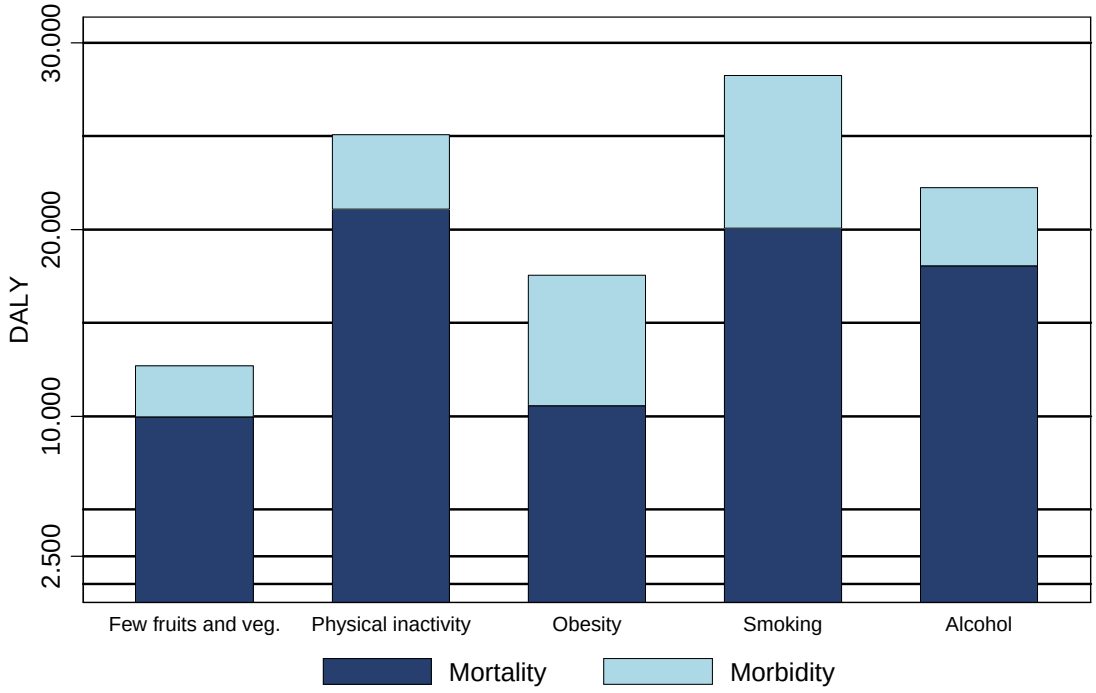


Figure 3-1. Major risk factors causing burden of disease in Estonia in 2002

In the case of alcohol abuse, the loss of about 2000 healthy life years is due to various psychiatric diseases, mostly the loss of life years spent in the condition of addiction (figure 3-2). At the same time, in health loss due to external causes caused by alcohol, suicides and suicide attempts play a major role (2000 life years), which according to several studies is closely related to depression (25;26).

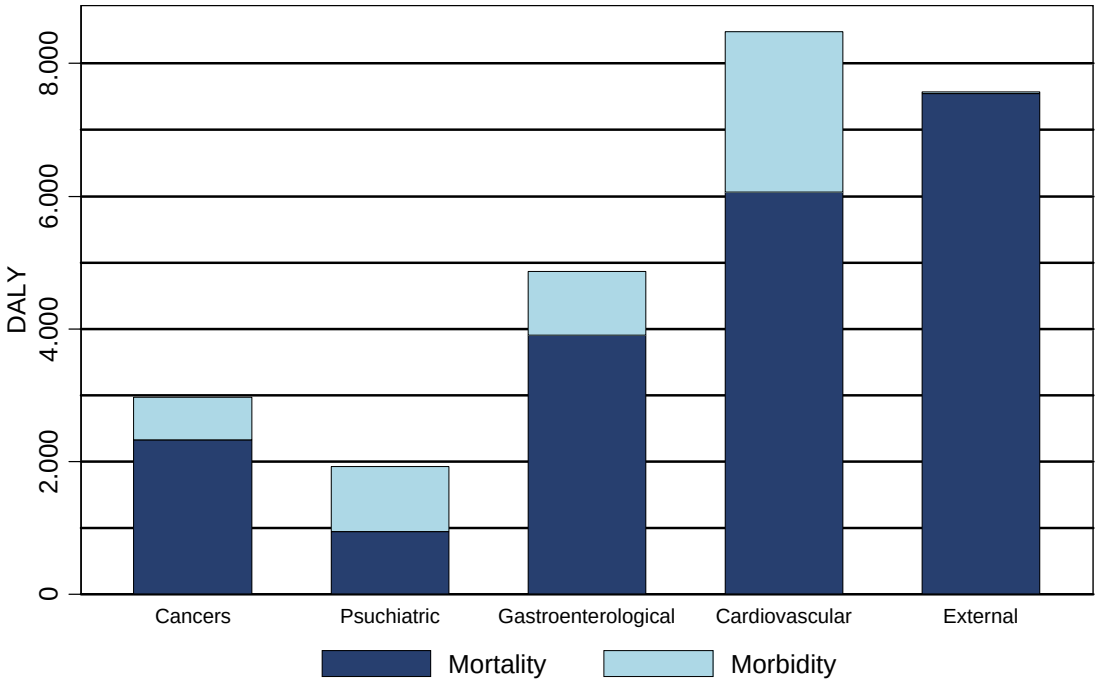


Figure 3-2. Alcohol as a cause of burden of disease by major disease groups

Methodology

4 WHO-CHOICE introduction

Cost-effectiveness analysis (CEA) is a widely implemented method in the discipline of health economics where the resources needed in monetary units are linked to the results in natural indicators. The indicators to measure the results can be the number of human lives saved, disease cases avoided or objectively measured improvements in quality of life. Cost-effectiveness analysis has been used in several countries to assess medical technology (27), including Estonia, for instance in composing a list of medicinal products and evaluating health care services.

Cost-effectiveness analysis is used alongside burden of disease studies to compare the resources needed to implement different interventions to the health improvement of the population resulting from the intervention. The total gain in health (i.e. how much health loss is avoidable) and the resources necessary to achieve the change are calculated for each intervention. With this ratio cost-effectiveness analysis helps link the health and economic outcome of interventions.

The first step in implementing cost-effectiveness analysis alongside burden of disease studies is defining the population health problem: what, why and when is desired to change. This is followed by defining possible interventions: which tools and actions can be used to reach the target and which measures are most effective and appropriate in achieving the goals.

Evaluating the necessary resources needed to implement the interventions is the next step. Thereby the expenses are viewed from the society standpoint. Coventionally, only additional actions and costs necessary for implementing an intervention that are added to already operating actions and spent resources are considered. For WHO-CHOICE, however, where the comparison point is no intervention, it is necessary to account for all program and patient level costs associated with the implementation of each intervention.

Thirdly, the change in population health, in years lived in full health, as a result of different interventions is found. Increases in the number of years lived in full health, in the number of years lived with disease, improvement in quality of life without an increase in life years and possible negative effects are all taken into consideration in the process.

The cost-effectiveness of an intervention depends on the number of healthy life years gained and the costs for gaining one healthy life year. The most cost-effective interventions are for example vaccinations against some contagious diseases (mumps, rubella, diphtheria) where the expenses for vaccination are tens of times smaller then the avoided expenses for treatment, not to mention the averting of enormous health loss.

So far, the cost-effectiveness methodology has not been widely used in determining national health priorities, mainly because of the scarce validation of different methodologies, problems with data access and poor generalization possibilities of

study results (28). Lately, to tackle this issue, WHO has begun developing cost-effectiveness methods that could be used on the national level. However, it should be noted once again that cost-effectiveness is only one of the decision making criteria (figure 1-1).

In order to simplify the use of cost-effectiveness analysis, to standardize the approaches used in member states and to create comparability, WHO has initiated the program WHO-CHOICE (*CHOosing Interventions that are Cost Effective*) (29).

WHO-CHOICE results can be used as an input in defining health care priorities and its theoretical advantages are connected to three major characteristics. Firstly, this methodology is a so-called 'generalized' approach, meaning that it is specifically aimed at escaping the usual confines of economic studies carried out in specific contexts. On the other hand, as a rule when selecting an intervention to solve a specific population health problem at a specific time, a more detailed cost-effectiveness analysis is required (30).

The second important quality is that WHO-CHOICE methodology evaluates the effectiveness of all interventions and their combinations based on a hypothetical "null-situation" in which interventions for the disease or risk factor in question are absent. This approach primarily enables the comparison of the cost-effectiveness of different interventions, in addition to giving a single evaluation on the efficiency of changing the current situation for each intervention.

Thirdly, all interventions are modelled as independent. Intervention results used in WHO-CHOICE framework correspond to a situation where there are no competing interventions similarly to the occurrence of only one single disease condition in the modelled situation.

Fourthly, the intervention impact is modelled for a period of 100 years where the intervention itself takes place only during the first 10 years. At the end of the intervention the trends preceding it return and they are used in modelling the change in population health during the following 90 years.

The results of analyses conducted in different regions all over the world in the WHO-CHOICE framework are gathered into a unified database but it does not differentiate information about single countries belonging to a region. In the WHO-CHOICE regional context, Estonia belongs to the WHO sub-region EurC with Russia and other former socialist countries. Cost-effectiveness data about regions can be found on the WHO-CHOICE website at www.who.int/choice. The gathered data enables the interpolation of a country's results according to the region's average demographical morbidity, mortality and economic indicators and the difference of the country's indicators' from the region's average.

The data from the interpolation can be used to specify the country-specific cost-effectiveness of interventions. The process of specification and harmonization with the local situation is referred to as contextualization. In the process of contextualization, appropriate electronic tools are prepared for each risk factor which includes formulae for the modelling of the prevalence of the risk factor, involved burden of disease and data connected with interventions which are based on the results of interpolation of the corresponding region.

5 Intervention impacts

In order to calculate the intervention impact, the first step is to estimate the health loss in the situation of no intervention, a hypothetical null-situation. In the case of no interventions morbidity, mortality, prevalence and other epidemiological indicators would differ from the current situation. Such differences in disease epidemiology would lead to the formation of a different population structure.

The current situation is used as a starting point in locating the null-situation and the process of reaching it largely determined by the set of currently implemented interventions. For instance if the intervention is prophylactic by nature a change will only occur in morbidity, however if the intervention comprises care, the duration of disease will shorten and the quality of life of the diseased will improve which also leads to a decrease in health loss of population (31).

Finding the impact of specific interventions is based on the natural course of untreated cases, clinical studies or expert evaluation. The first two possibilities are limited in developed countries due to the ethical obligation not to avoid treatment if one exists and thus the evaluative determination of intervention impact is most used.

The current epidemiological indicators are increased according to the intervention impact. For instance if a disease intervention decreases morbidity by 7% then to locate the null-situation the current morbidity measurement is increased by 7%. After having determined the morbidity, prevalence, case fatality, disease duration and mortality of the null-situation, the data is used to calculate the population health loss for the null-situation and also the intervention situation using the population model PopMod (32) (Figure 5-1).

PopMod describes the development of a population using information about births, deaths and information on the risk factor under study such as the incidence, lethality and remission of alcohol abuse.

Two basic scenarios are modelled for a 100 year period: (1) without interventions i.e. natural development and (2) the impact of the studied interventions on the natural course of morbidity by implementation for 10 years (after which the epidemiological rates of the natural course are restored). The difference between these two interventions depicts the health benefit from the intervention in life years. With WHO-CHOICE the gained healthy life years are discounted at a rate of 3% and age-weights are implemented similar to those used in the WHO global burden of disease and risk burden studies (23;33).

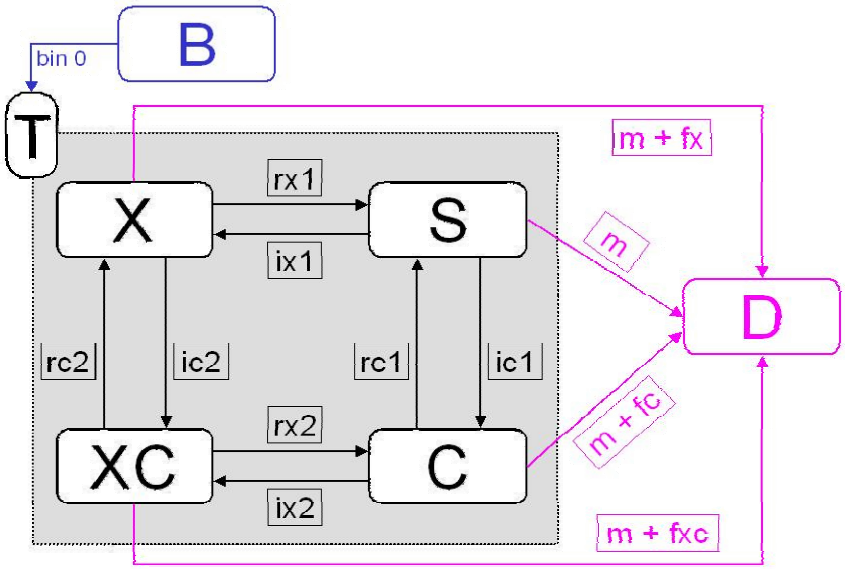
The reason for implementing the discount rate and age-weights is the wish to increase the socio-economical dimension of the results. Discounting i.e. decreasing the value over time is a regular method in economic analysis and is used in connecting burden of disease dynamics with its economical outcome (34;35) and analyzing the cost-effectiveness of long-term investments (36). The use of age-weights gives a different weight of the life years lost for people in different ages and is based on the widely accepted judgment that gives preference to the years lived as a young adult over old age and infancy.

The population model in use has up to five parts that enable the simultaneous modelling of up to two diseases and their combination in addition to healthy persons and deaths. Although PopMod allows for the modelling of two diseases it is commonly used just as a three part model to account for the effects of only one disease.

In addition to the mentioned epidemiological indicators, the modelling of the health loss also utilizes general population structure and mortality (with 1-year age groups), the overall number of births and disability weights for various conditions in the model.

In conclusion PopMod enables to evaluate the improvement in population health (or the avoided burden of disease) as a result of the intervention in comparison to the situation where nothing is done.

Figure 5-1. Population model PopMod



X – population with disease X
C – population with disease C
XC – population with diseases X and C
S – susceptible population
D – deaths
ix1 and ix2 – incidence of X
rx1 and rx2 – remission of X
ic1 and ic2 – incidence of C
rc1 and rc2 – remission of C
fx – fatality hazard due to X
fc – fatality hazard due to C
fxc – fatality hazard due to XC
m – background mortality
B – live birth
T – total population
bin 0 – population between ages 0 and 1.

6 Intervention costs

6.1 Cost evaluation principles

Determining intervention costs in the WHO-CHOICE project is based on three important principles: a common approach to all the costs of all interventions; a bottom-up, ingredients approach to costing; and full accounting of economic cost (in contrast to financial cost).

A common approach to a large number of diseases and the costs of their interventions by implementing the same methodology and analytical presumptions greatly increases the comparability of analysis results and a general use of price results. For instance it permits comparing interventions targeted at cardinally different diseases, which has so far been difficult (37).

WHO-CHOICE has implemented an ingredients approach to costing, i.e. bottom-up evaluation of resources to differentiate the amount of a resource used and the cost of one unit of resource, as it enables a more flexible description of total costs in contrast to the top-down approach of determining component costs from a total cost estimate.

The third main principle in determining the cost of WHO-CHOICE interventions is the economic perspective, i.e. attempting to evaluate the opportunity cost in using various resources, e.g. human resources, in the course of the intervention, whereas it is not important whether the usage of these resources involves monetary payments.

As the current analysis is based on the society as a whole, the model does not distinguish between the sources of a resource e.g. state budget, health insurance, patient contribution or other such sources. According to the same principle the analysis does not depict the change in tax money paid into the state treasury by interventions including the change in taxation because from the society's standpoint only the location, not the size of the resource has changed. In comparison, with financial costs only the strict monetary expenditure of the resource users is taken into account and the burden of the intervention on the society as a whole may not be apparent.

6.2 Division of resource cost units and prices

In the implementation of different interventions very diverse resources can be required. WHO-CHOICE separates the resources used according to their input, cost type, field and time of implementation, the level of the implementing organization and the origin of the resources. With international comparisons there is an additional classification according to the currency used.

In the case of input based division the resources are divided into recurrent and one-time resources. Periodical cost e.g. office supplies are used in one year, however, basic assets e.g. buildings etc last for more than a year.

According to cost type the costs can be divided into fixed and variable costs. The first include the costs necessary for initializing a program and keeping it running and do not depend on the amount of people involved. Such costs include central administration, basic monitoring, passing legislation etc. Variable costs i.e. cost depending on the number of people involved include cost connected with storage space, people communicating with the project target group, people observing the program process etc.

According to the third point, field of implementation, resource cost is divided according to the activities for which it is used such as planning, administration, media, training, monitoring etc.

In accordance with time, WHO-CHOICE distinguishes the cost necessary for initializing a project and for keeping it in progress. These two intervention periods are distinguished because on the average the preparation costs can greatly exceed later requirements. With start-up costs it is important that partly they be spread over the entire intervention duration in an annual discounted form.

As the cost and need for resources differs according to the scale of the intervention, it is important to divide the costs according to the level of the organization. Such levels can be administrative units (state, county, local government, etc) as well as various establishments providing healthcare services (the level of the establishment and the patient, the level of the program and the healthcare system or even a local or a regional hospital).

According to the aforementioned principles and resource division needs, WHO-CHOICE has created a software package for adding up the program costs of intervention called CostIt which is made up of a number of MS Excel templates (38).

CostIt software is meant for analyzing and saving cost related data. It is not a tool for collecting data but can be used as an example for developing a primary data collection system.

CostIt software is used for calculating the economic cost of interventions, but basically it can also be used for calculating the financial cost of interventions.

The two major categories for intervention resources and costs that input into CostIt software are costs connected to intervention management i.e. program costs and patient related costs which both require a separate input for the amount of resources and the cost of a resource unit as mentioned earlier.

Program related resource cost is incurred at a level above that of the units offering patient service (e.g. central planning, administration and legislation enforcement related costs). Requirements connected with personnel, technology, media and transport are specified, and even go down to the level of the number of paperclips (39).

The necessary resources on the level of establishments providing health services are described in calculation of patient costs (e.g. the number of bed days, medications, ambulatory patient visits and medications etc.) (40).

Although the intervention impacts are determined separately for each intervention, it is possible to combine the costs of different interventions. The availability of this possibility is extremely important to gain the accurate analysis of a real situation.

In the analysis of the cost of intervention combinations the common part of all interventions is determined, where it is possible to divide the cost among interventions, is determined. In WHO-CHOICE the most frequent common part is the work time of the administrative personnel. The sharing of office space and transportation mileage is also used. The use of resource sharing is possible only if one resource unit is also clearly definable in real life, e.g. the price of a vehicle of which for example 20% is covered by one intervention.

In addition to resource sharing, CostIt software enables to take into account their real scale of usage. Resource usage can be defined as the scale of productive time or space of the entire work time or workspace and direct expenses connected to that resource in the case of buildings, equipment or workers. For instance in the analysis of hospital costs the amount of costs on one sickbed varies depending on the time when the bed is in use.

For WHO-CHOICE interventions, the CostIt package enables to specify various rates of usage. This in turn generates possibilities for a more accurate evaluation of intervention related costs and finding ways of sparing expenses with better resource usage and thus make interventions even more cost-effective.

An important part in determining the total costs of an intervention is the adding up of the costs of various state levels. The necessary resources and prices for different state levels are described in intervention planning for a typical region. Thus training necessity is defined separately for the local municipality, county and the entire country with the trainer's salary on each mentioned level. The necessary resources for the country as a whole are thus found by multiplying with the number of regions.

The total costs also depend on the scale of the intervention, for instance the costs for the vaccination may become very high when the goal is to vaccinate 100% of children and special efforts are needed to convince parents who have so far refused to allow their children to be vaccinated.

The last important point in calculating intervention costs is the fact that currently the benefits from the increased productivity due to the decreased health loss of the work-aged population are not depicted in the WHO-CHOICE tools. The increase in tax income due to interventions including taxation is also not taken into account because from the society's standpoint it is not a matter of costs or benefits but merely a transfer in resource location.

7 Interpreting results

Using WHO-CHOICE enables us to talk about the average and incremental intervention cost-effectiveness. In the case of average cost-effectiveness the results are evaluated solely, i.e. the assessment of whether it is a cost-effective intervention or not is done according to the costs of gaining one healthy life year, relative to the situation of doing nothing.

The implementation of incremental cost-effectiveness indicators, however, is most appropriate in selecting a combination of interventions. In essence, the incremental cost-effectiveness expresses the cost-effectiveness of adding a new intervention to currently active interventions (41).

From the standpoint of implementation, interventions can be mutually exclusive or simultaneously usable. Every decision concerning the initialization of an intervention must therefore start from the question – whether the possible interventions can be simultaneously implemented or not. Examples of two simultaneously implemented interventions in the case of tuberculosis are sputum smear and vaccination, which can be carried out at the same time. However, the simultaneous implementation of different treatment principles may not be possible.

Assessments of incremental cost-effectiveness are best given by graphic presentation of cost and effect, when placing costs on the vertical and effects of the horizontal axis. In this case the cost-effectiveness is presented by the elevation angle drawn from the origin of axes to the crossing of cost and effect. The smaller the slope, the more cost-effective the intervention because the positive change in health is achievable with smaller costs.

Figure 7-1 presents a hypothetical situation with interventions A to C and lines showing their cost-effectiveness from a to c. On the bases of cost-effectiveness solely, the intervention with the smallest slope should be chosen. In this case intervention A is the best choice and it is followed by intervention B and finally intervention C.

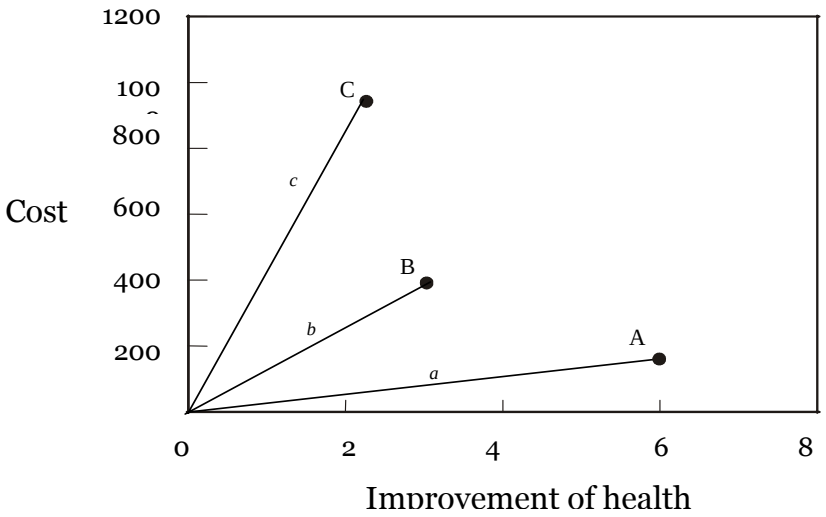


Figure 7-1. Cost and benefits of mutually compatible interventions

Figure 7-2 presents a hypothetical example of mutually exclusive interventions D1 to D5. Viewed from the origin of axes the most cost-effective intervention is D1, however the second most cost-effective intervention (D2) can not be implemented simultaneously with D1. Thus its cost and effect of themselves become irrelevant and the additional costs and effects when moving from D1 to D2, i.e. incremental cost-effectiveness, become important.

The additional costs and effects in Figure 7.2 are presented by line d. Thus in the case of non-simultaneous interventions, the selection of the next choice depends on the level reached with previous interventions. In the current figure, intervention D1 is followed by interventions D2 and D3 that together form the interventions' expansion path i.e. the best combination of interventions for different levels of resources.

The interventions D4 and D5 presented on the same figure are not part of the selected combination and they will not be chosen if cost-effectiveness is the only criterion for intervention selection because when compared to the interventions on the expansion path they are less cost-effective. In real situations, decision making process also includes other circumstances e.g. various ethical and social conditions.

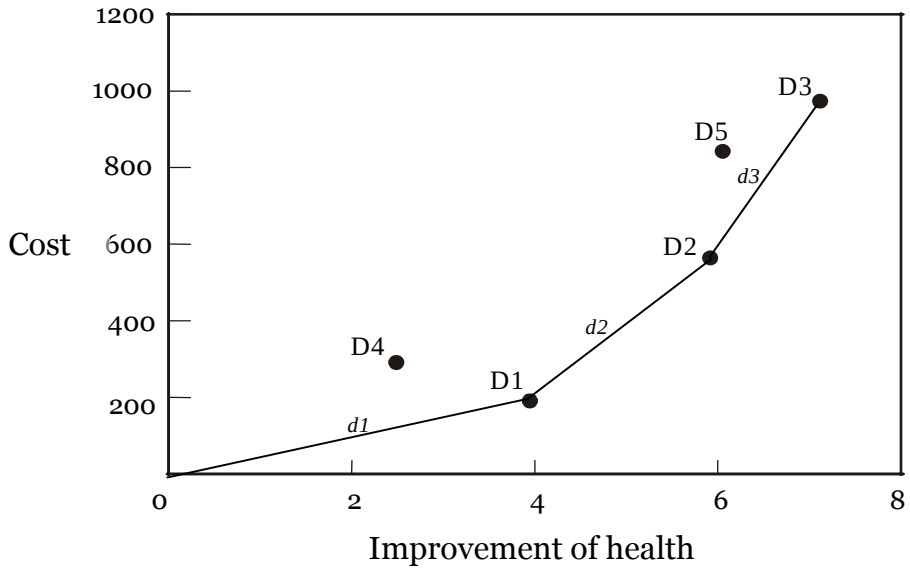


Figure 7-2. Costs and benefits of mutually exclusive interventions

If the interventions under study include both simultaneously implementable and mutually exclusive interventions, then the rules of the previously mentioned options must be combined. Figure 7-3 is a hypothetical example illustrating such a situation. The principle is still the selection of the interventions with the smallest elevation angle. In this case the comparison is between slopes drawn from the origin of axes (average cost-effectiveness ratio) and previously selected interventions (incremental cost-effectiveness ratio).

In the given example the first selection is intervention A. According to the cost-effectiveness of next choice is intervention D1 because compared to others the slope-d1 is the smallest. To select the third intervention, the slopes of lines b and c are compared to the slope of d2, which represents substituting intervention D1 with D2.

As line b has the smallest slope, intervention B is selected. Following the same logic, the next interventions are D2, C and D3.

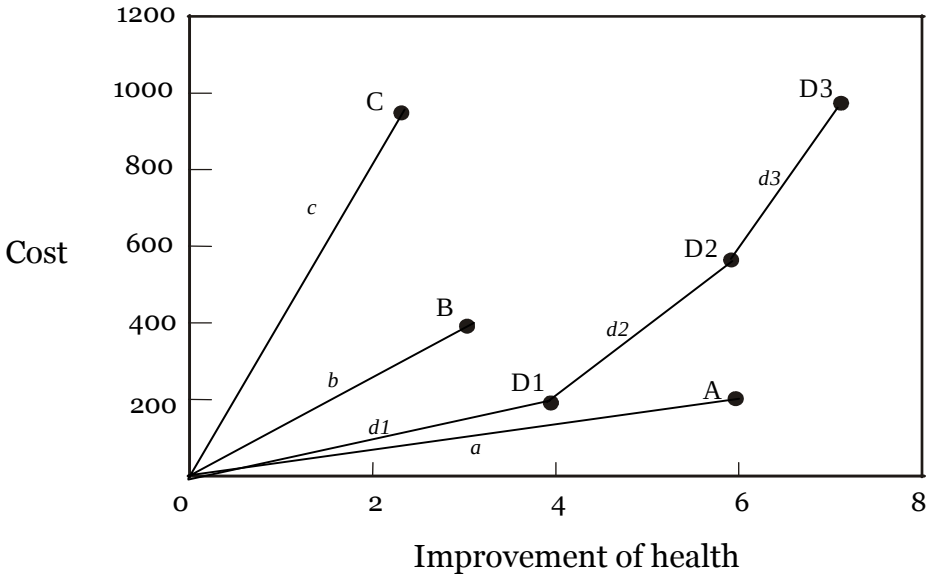


Figure 7-3. Cost and benefit of mutually compatible and mutually exclusive interventions

Dividing interventions into cost-effective and non cost-effective depends on society's judgments of value and commonly accepted limits based on the value assessments. According to recommendations of the WHO Commission on Macroeconomics and Health this division could be based on gross domestic production per capita, which in 2004 was 90 472 EEK (43).

According to this recommendation WHO-CHOICE discerns:

- very cost-effective interventions – the cost for one gained life year is smaller than GDP per capita (less than 90 472 EEK),
- cost-effective interventions – the cost for one gained life year is 1 to 3 times GDP per capita (90 472 – 271 416 EEK),
- non cost-effective interventions – the cost for gaining one life year is greater than 3 times GDP per capita (more than 271 416 EEK).

8 Contextualization

WHO-CHOICE methodology has so far been primarily used for analysis on the scale of global regions and its results also used to interpolate country-specific results. In order to get results that are in better harmony with the local situation, the input data is specified; this is known as contextualization and in the course of this study is composed of the following conceptual parts:

- getting acquainted with the methodology,
- gathering input data,
- an evaluation of the validity of data by an focus group with their supplementation according to the recommendations of the panel,
- data analysis and presentation of results.

At the first stage a seminar on the topics of cost-effectiveness analysis, WHO-CHOICE methodology and the available tools and the possibilities of contextualization was carried out in cooperation between the WHO, the Ministry of Social Affairs and the Department of Public Health of University of Tartu. During the seminar that took place in November 2004, Dan Chisholm and Shekhar Saxena from the WHO and Rob Baltussen from the Erasmus University in Rotterdam spoke about the aforementioned topics.

The two day seminar was composed of introducing the theoretical background of the method and using the WHO-CHOICE tools and country-specific data. By the time of the event, the WHO-CHOICE contextualization measures had been developed for evaluating interventions targeted at decreasing depression, schizophrenia, alcohol abuse and smoking, the three foremost are described in this report. The interventions targeted at decreasing smoking are covered in detail in the report “Burden of Disease in Estonia: burden of disease, health risks and cost-effectiveness of interventions” (20).

The electronic measures prepared for the contextualization handled different treatment methods as interventions both solely and in combinations with variations in the scale of their implementations.

During the primary seminar the data concerning Estonia used in WHO-CHOICE regional analyses was also discussed as a possible starting point in carrying out the contextualization.

The second stage of the study was the gathering of data in all fields necessary for carrying out the analysis, such as population demography, epidemiology of the conditions under study and program and patient costs necessary implementing the intervention. Sections 8.1 to 8.4 of this report describe the second stage of contextualization in detail.

In the third stage, an evaluation of the data gathered in the previous stage was given by the focus group made up of mental health experts. The focus group also defined the weights of single schizophrenia and depression interventions for the combinations based on them as described in part 8.5 of this report.

8.1 Epidemiological data

The data about demographical situation was based on official Estonian population statistics (44), according to which the gender-age structure of the population, the number of births and death rates in age-gender groups were specified for the population model PopMod.

The main inputs for the model were prevalence, disease case remission and mortality per 1000, average disability weight of disease cases and division of levels of severity for schizophrenia, depression and alcohol abuse. Main sources of information were the Estonian Health Insurance Fund database and scientific literature, where if possible Estonia-specific data was favoured.

The WHO assessments concerning the prevalence and the number of new cases of depression that served as the starting point of contextualization were based on the year 2000 Global Burden of Disease study (22). According to this study, the average duration of an untreated depressive episode was 6 months, according to which morbidity is two times the current prevalence (i.e. a person develops an average of two depressive episodes a year).

In order to determine depression and schizophrenia morbidity and prevalence requests for this data by 10-year age groups and both genders were made into the Estonian Health Insurance Fund (EHIF) database which holds records for almost every medical encounter in Estonia.

The data acquired from EHIF was compared to the results of international studies dealing with the epidemiology of depression and schizophrenia (45-47) or data from international literature, in case appropriate studies were lacking (48-50).

In WHO assessments the mortality due to depression was based on the 6% lifetime risk of adults suffering from affective disorders committing suicide (51). As the risk of suicide is greater at a younger age then the model used a 9% risk for people aged 15-45 and 3% risk indicator for people older than 45. However, according to study results depression does not increase the risk of mortality from natural causes (52).

For schizophrenia in Estonia WHO-CHOICE presents a remission rate of 10%. As this is for a period of 10 years, a 1% yearly remission rate was used. (53).

Determining the mortality rate of schizophrenia was based on WHO-CHOICE assessment that 3 out of 1000 deaths are due to schizophrenia, which includes both deaths from natural and external causes, e.g. suicide. According to the results of a meta-analysis of schizophrenia connected mortality (54) and other studies (55) one third of deaths are from violent and two thirds from natural causes.

The focus group was presented with WHO-CHOICE initial data as well as the results from the requests to the Health Insurance Fund database and values from disease-epidemiological specialized literature.

8.2 Disability weights

In WHO-CHOICE methodology the effectiveness of interventions is expressed in health loss averted. This is determined according to data about the prevalence of conditions and indicators describing the severity of conditions.

The severity of a condition is expressed by the drop in quality of life because of the disease i.e. disability weight, which according to the severity varies between 0 (perfect health, no loss in quality of life) and 1 (worst imaginable health, 100% loss in quality of life).

In the initial model the disability weights for depression varied between 0,14 and 0,76 (i.e. 14-76% of ideal health loss) (56), a unified composite weight of 0,63 was used for schizophrenia (22) and the variation in the case of alcohol abuse was between 0,11 and 0,33 (57). According to WHO-CHOICE assessments the population disability weights among adult population reached from 0,19 of younger age groups to 0,41 for people over 80 years old.

According to the disability weights data from the Estonian burden of disease study (24), the local disability weights for depression are between 0,19 and 0,46, for schizophrenia 0,31-0,74 and alcohol abuse 0,19-0,48. The average health related quality of life for Estonian general adult population is approximately 30% below the perfect health threshold ranging from 25% to 45% drop (corresponding to disability weights 0,25 to 0,45) in different age groups according to a 2002 population survey (58).

8.3 Interventions and their effectiveness

According to WHO-CHOICE, intervention is any action that enables to decrease or avoid health loss caused by the condition under analysis.

Intervention is included in the analysis if according to international literature its efficiency in decreasing health loss has been proven, its effect on the population or population group is of considerable size and it allows achieving great coverage of the target group.

8.3.1 Depression

In the case of depression, the effects of seven interventions on population health were evaluated (59):

- Older antidepressants: tricyclic medication (TCA) e.g. imipramine, amitriptyline
- Newer antidepressants: selective serotonin reuptake inhibitors (SSRI) e.g. fluoxetine,
- Psychotherapy: short cognitive therapy
- Older antidepressants with psychotherapy
- Newer antidepressants with psychotherapy
- Proactive collaborative care with older antidepressants

- Proactive collaborative care with newer antidepressants

All discussed interventions are targeted at decreasing the duration of the depressive period and decreasing the severity of the patient's condition. In the case of an effective intervention the WHO-CHOICE disease model will express the first by an increasing remission rate and the latter is measurable as a change in quality of life.

In the case of depression, the most widely spread treatment method is pharmacological treatment, which in the current study is represented by tricyclic and serotonin reuptake inhibiting antidepressants.

A typical example of tricyclic i.e. older antidepressants is imipramine and for serotonin reuptake inhibitors i.e. newer antidepressants - fluoxetine. By their characteristics these two medications are typical examples of their groups.

In comparison to older antidepressants, the newer antidepressants are favoured due to a smaller number of side-effects and less burdening dosage on the patient. Despite an ever larger availability of newer medicines, older antidepressants still play a certain role, especially in more severe cases of depression.

Interventions involving psychotherapy include a group of treatment methods aimed at helping patients overcome their emotional and behavioural problems with non-pharmacological measures. In essence the treatment methods belonging to that group vary from simple supportive actions e.g. regular counselling to actively solution seeking actions e.g. cognitive behavioural therapy.

Treatment plans including proactive collaborative care consider depression as a chronic disease in contrast to classical episode treatment and during a symptom free period this approach requires supportive base treatment to avoid new disease episodes or decrease their effect.

In the context of this analysis, proactive collaborative care includes constant pharmacological base treatment for patients with frequent reoccurring depression episodes and infrequent medical visits during a symptom free period.

According to literature, intervention remission rates vary from 2,4 for psychotherapy to 2,8 for proactive collaborative care. In the WHO-CHOICE model these indicators are based on studies that enable to determine care duration according to different treatment methods (60-64).

The smaller remission rate of psychotherapy in comparison to other interventions is caused by a slower initial impact, especially in cases of severe depression. On the other hand, the difference in the remission rate of pharmacotherapy and the combination of pharmacotherapy and psychotherapy is negligible, although a difference in this case has been described in developing countries (65;66).

In the WHO-CHOICE model the extent of quality of life improvement as a result of interventions is regarded moderate if for a first time disease episode the change in quality of life measures up to 13-18% of the severity of the initial condition.

Unlike other interventions, the two interventions including proactive collaborative care also decrease reoccurring episodes of depression in addition to increasing remission and improving quality of life. In the WHO-CHOICE model this is expressed by the occurrence of episodes and this is decreased with the help of patient training and a larger role of medical support in treatment procedures (67).

The effect decreasing the occurrence of new episodes will surface only with reoccurring episodes, but of these cases up to 56% could benefit from the addition of efficient base treatment to episode treatment. The predicted effect on such people is the decrease of reoccurring episodes by half (68).

A direct impact of discussed interventions on the decrease in depression lethality and suicide risk has not been thoroughly proven yet (69-71) and there are references that the study of economic connections between antidepressants and suicides is impossible due to a small number of the latter (72).

The American Psychiatrists' Association also dealing with depression related suicide risk has noted that even with best possible therapy the cause of death for some patients is nevertheless suicide (73).

A conclusion of the effects on different disease aspects of interventions targeted at decreasing depression related health loss discussed during WHO-CHOICE contextualization is presented in table 8-1.

Intervention	Effectiveness		
	incidence	remission	quality of life
Current situation		8,0%	7,3%
Older (tricyclic) antidepressants		10,3%	9,0%
Newer (SSRI) antidepressants		11,5%	10,0%
Short psychotherapy		9,0%	11,0%
Older antidepressants + psychotherapy		11,8%	10,3%
Newer antidepressants + psychotherapy		12,6%	11,0%
Older antidepressants + proactive care	-12,6%	14,4%	11,0%
Newer antidepressants + proactive care	-13,4%	15,4%	11,7%
Combination of all interventions	-1,0%	10,9%	10,4%

Table 8-1. Effectiveness of interventions targeted toward depression induced burden of disease compared to null-situation by areas of effect

In the WHO-CHOICE model, the greatest impact on increasing remission is achieved by using newer antidepressants with proactive collaborative care, which also improve quality of life and decreases the occurrence of reoccurring episodes of depression.

In addition to the intervention impact, its effect on the population is also determined by its prevalence in the target group and the following of treatment instructions. According to this, the WHO-CHOICE model implements intervention on only 50% of all people suffering from depression (74), which is further decreased according to old

and new antidepressants (70% and 73% accordingly) and the precise following of psychotherapy treatment (76).

In conclusion, the greatest impact of the discussed interventions can be achieved by proactive collaborative care with newer antidepressants, which with 60% target group coverage allows for avoiding up to 40% depression related health loss. The second most effective intervention is using older antidepressants according to proactive collaborative care.

In case of proactive collaborative care the mentioned interventions highlight the additional effect on the impact of pharmacological treatment which reaches up to 19%, in turn more than half of this is related to the effect decreasing the occurrence of new episodes of depression.

8.3.2 Schizophrenia

In the case of schizophrenia, the effects of seven interventions on population health were evaluated:

- Older antipsychotic medication (classical neuroleptics)
- Newer antipsychotic medication (atypical neuroleptics)
- Older antipsychotic medication (classical) with psychosocial treatment
- Newer antipsychotic medication (atypical) with psychosocial treatment
- Older antipsychotic medication with case management
- Newer antipsychotic medication with case management

All WHO-CHOICE schizophrenia related interventions are targeted at improving patients' quality of life through relieving symptoms and decreasing the general severity of the condition.

The most prevalent treatment method of schizophrenia is pharmacological treatment, which in the current study has been modelled separately for newer and older antipsychotic medication.

In the current study, older antipsychotic medication refers to so called typical medication e.g. Haloperidol and Chlorpromazine. Newer antipsychotic medication refers to so called atypical antipsychotic medication e.g. Clozapine and Risperidone.

With both medicine groups, the treatment is continuous with the aim of primarily avoiding exacerbations and relieving developed symptoms. In everyday treatment the most suitable medicine for a certain patient is often found through trial and error, however in most cases, newer medication is more suitable due to fewer side effects disturbing the person's motions.

A frequent problem in treating schizophrenia is the discontinuance of treatment by the patient which is caused by schizophrenia symptomatic, long term pharmacological treatment and likely side effects of long term use of medicines. Classical treatment support services such as psychosocial treatment and case management are used to increase adherence to care and increase the efficiency of pharmacological treatment.

In the case of psychosocial treatment (rehabilitation) the patient is directed to further communicate e.g. in schizophrenia support groups. Training patients to notice early symptoms and improving patient-doctor cooperation, which without training is disturbed due to the nature of the disease, are also part of psychosocial treatment.

When a mental health worker or social worker is in continuous contact with patients and help them remember their appointments with the doctor and make sure the patients do not discontinue pharmacological treatment, it is referred to as case management. When necessary, in case of more severe cases case managers can also help their patients with everyday needs and communicate with public offices on their behalf.

In WHO-CHOICE the decrease in psychotic symptoms and disorders is modelled according to the impact size of different interventions (77). In calculating intervention impact it is important to keep in mind that this can be implemented only with the population group receiving treatment (up to an estimated 80% of the people suffering from the disease).

The impact of schizophrenia interventions on disease remission has not been taken into account in the WHO-CHOICE model, although according to studies carried out in developing countries 20-30% of patients in long term therapy have shown remission (78;79). On the other hand, based on the mentioned studies it is not possible to distinguish natural and therapeutic remissions, which is the cause of not modelling this impact.

Intervention	Effect on quality of life
Current situation	2,1%
Older antipsychotics (classical neuroleptics)	2,3%
Newer antipsychotics (atypical)	3,9%
Older antipsychotics + psychosocial care	5,8%
Newer antipsychotics + psychosocial care	7,6%
Older antipsychotics + case management	6,6%
Newer antipsychotics + case management	8,6%
Combination of all interventions	5,3%

Table 8-2. Effectiveness of schizophrenia interventions (on quality of life compared to null-situation)

Of the interventions targeted at decreasing schizophrenia related burden of disease, using newer antipsychotic medication with case management had the greatest impact allowing a more than 8% increase in the quality of life of patients in comparison to a situation with no treatment.

When comparing the effectiveness of interventions, it is apparent that using psychosocial treatment together with the case management in addition to pharmacological treatment has an important effect on improving patients' quality of life – a 3-4% additional effect in the case of psychosocial treatment and 4-5% effect in the case of case management.

8.3.3 Alcohol abuse

Unlike with schizophrenia and depression, the focus group handling the data of alcohol abuse interventions took place with the November 2004 seminar introducing the methodology. The recommendations of the workgroup evaluating alcohol abuse data are found in this chapter and will not be dealt with in chapter 8.5 that deals with the later work of the mental health focus group.

WHO-CHOICE analysis deals with alcohol abuse defined as a daily dosage of absolute alcohol of 20g for women and 40g for men.

The focus group handling alcohol abuse was presented with data concerning the lethality of alcohol consumption and relative death risks of abusers (2,5 times for men aged 15-44, 1,3 and 1,4 for older aged men and women respectively) in comparison to moderate users, which originates from a comparative cross regional cost-effectiveness study of global alcohol abuse interventions (57).

The same source was used for remission rates (7,92% for men and 8,18% for women) which are based on the average duration of alcohol abuse – 10,9 years. The 0,76 disability weight of alcohol abuse necessary for calculating burden of disease originates from the evaluation carried out by Estonian burden of disease study disability weights workgroup in 2003 (80).

Interventions targeted at decreasing alcohol abuse can be divided into four separate intervention types, which are:

- counselling;
- legislation enforcement (e.g. random breath testing);
- legislative interventions (e.g. alcohol taxation, banning drunk driving, limiting access to alcohol sales, controlling advertising);
- public awareness increasing media campaigns.

Taxation of alcoholic beverages mainly decreases the number of new cases of abuse and thereby decreases the total use of alcohol.

The effect of taxation on consumption is expressed by price elasticity (the percentile change in consumption after a 1% rise in prices). The values of price elasticity in the WHO-CHOICE model vary from –0,3 to –1,5 for the most and least preferred beverages accordingly.

In interventions including taxation of alcoholic beverages the current tax level, as well as 25% and 50% increased tax levels were modelled. In cases of a rise in the tax level, an increase according to price elasticity in black market turnover was also taken into account.

Random breath testing on roads and banning drunk driving enable to influence the amount of traffic injuries and deaths of both alcohol consumers and other people in traffic.

If fully enforced the legislation of banning drunk driving can decrease the number of lethal traffic accidents up to 7%. A constant widespread testing of random breath

decreases mortality by 18% in comparison to a situation of no testing. According to WHO-CHOICE the effect of random breath testing on non-lethal injuries is up to 15%.

The availability of alcohol can be dramatically reduced by bans and limitations but that includes significant problems with the implementation and enforcement of these measures. The main problems are an increase of the black market and more frequent poisonings by self made alcohol.

A more moderate and realistic possibility is limiting sale times e.g. on weekends and banning 24-hour sales, measures that have decreased consumption and alcohol related health problems in Scandinavia. Based on studies carried out in Scandinavia, the WHO-CHOICE model estimates that by limiting access to alcohol, the number of new cases of abuse decreases by 1,5-3,0% and the number of lethal injuries in traffic decreases by 1,5-4,0%.

Public interest in banning alcohol advertising has been constantly increasing; however its impact on alcohol consumption is moderate at best. According to WHO-CHOICE estimates, alcohol abuse decreases by 2-4% as a result of banning advertising.

The only intervention of all alcohol related interventions under study that includes the patient cost component is counselling by G.P. The intervention is composed of psychosocial counselling and four medical visits during which alcohol related health problems are discussed.

The counselling is targeted at decreasing alcohol abuse by shortening the duration of an abuse episode and improving the condition of health. The WHO-CHOICE model estimates a 22% decrease of alcohol abuse achieved with the help of the mutual impact of these two actions.

The impact on burden of disease of interventions decreasing alcohol abuse is determined as a result of the data for WHO-CHOICE contextualization and focus group evaluations is presented in table 8-3.

Intervention	Effectiveness
Current level of taxation	-7,1%
Increased taxation (25%)	-8,1%
Increased taxation (50%)	-8,9%
Advertising ban	-3,0%
Random breath testing, male lethal injuries	-2,6%
Random breath testing, female lethal injuries	-1,1%
Random breath testing, all lethal injuries	-1,7%
Reduced access to retail outlets	-2,5%

Table 8-3. Effectiveness of alcohol interventions on incidence of alcohol abuse

The greatest impact on alcohol abuse of the assessed interventions is achieved by increasing alcohol taxation by 50% in comparison with the current tax level.

Unlike interventions including taxation, limiting access to alcohol in addition to decreasing the number of new cases also decreases alcohol related deaths, which vary from 0,01% to 0,5% according to age and gender.

As the intervention including brief advice by G.P. is directed to people already consuming alcohol, its effect is expressed as an increase in the probability of cessation and improvement in quality of life. According to the focus group dealing with alcohol abuse interventions, counselling by G.P. improves quality of life by 4% and remission rate by 18,4%.

As WHO-CHOICE assesses intervention impact in comparison to the situation where there are no intervention then for instance in the case of taxation the effect of additional intervention can be expressed as the result of subtracting the effects of different levels of taxation: additional taxation of 25% causes a 1% decrease (8,1-7,1=1%) in new cases of alcohol abuse a year.

8.4 Cost data

Most important cost data are bed day, reception and medication costs at different organisational levels. The calculations of medication costs are based on medicine prices from the electronic databases of TopMed and Magnum Medical (81;82) and the average daily dosage recommended by the medication manufacturers.

The salary scale of the full-time officers of the Ministry of Social Affairs implemented according to the education level of the workplaces presumed in the model (83), the average personnel needs of national health programs and average market prices of various goods units were used in order to determine program costs.

8.4.1. Bed day cost

In the WHO-CHOICE model, bed day costs are determined for three different levels of medical establishments. At the same time the development plan for the Estonian Hospital Network (84) describes a four level system of medical establishments. In the current study the two lower level groups of health care establishments are merged according to their salary rates. Thus WHO-CHOICE and Estonian medical levels correspond in the following manner:

- primary – Estonian general and local hospital
- secondary – Estonian central hospital
- tertiary – Estonian regional hospital

The division above is extremely important in calculating the average bed day cost for schizophrenia, as according to the Estonian Health Insurance Fund list of healthcare services (85) two price limited bed days with different resource cost exist for this condition:

- acute psychiatry bed day
- psychiatry bed day.

In the case of acute psychiatry bed days, the costs for medical staff as well as expenses on various technical equipment e.g. means to prevent physical assaults, are greater.

According to the year 2003 data by the Ministry of Social Affairs concerning the occupancy of bed therapy (86), acute psychiatry forms about 20% of all bed days of tertiary level psychiatry, while it only counts for 3% of secondary level bed days. More accurate bed day cost calculations have been carried out in this study according to the abovementioned division.

The necessary components have been considered in calculating bed day costs:

- staff costs (doctors, nurses, care takers)
- general expenses of a medical establishment (administration workforce costs, space and inventory costs etc.)
- costs related to the space, equipment, etc. necessary to offer the service
- patients' catering costs
- patient management related costs (e.g. laundry, patient info management, information technology etc.)

Personnel costs calculations are based on the study of the hourly wage of healthcare workers (84) by the Ministry of Social Affairs, which was conducted in March 2004. In addition to salary costs, personnel costs include the medical establishment's costs directly related to workers e.g. training and office costs.

Bed day costs do not reflect the expenses on medications, medical supplies, caretaking appliances and laboratory research as in the WHO-CHOICE model these are considered independently and are taken into account according to the treatment plan.

According to the abovementioned, Estonian bed day costs are 449EEK, 504EEK and 596EEK on the primary, secondary and tertiary level accordingly.

8.4.2 Reception cost

The second important part of patient costs are costs related to visiting a doctor. Similarly to bed day costs, the WHO-CHOICE model distinguished between three levels of reception.

In calculating reception costs, the workforce costs of medical staff, costs related to space and equipment necessary to provide services and costs related to patient management e.g. costs related to patient info management and IT solutions, are taken into account on all three levels. In addition, 2003 Estonian Health Insurance Fund data about total G.P. help costs and the number of visits was taken into account in calculating reception costs for the lowest level.

According to the abovementioned, Estonian reception costs are 175EEK, 204EEK and 218EEK on the primary, secondary and tertiary level accordingly.

8.5. Resource use

Implementing resource use into determining total costs of interventions is important as it allows taking into account different sizes of intervention coverage in the population. A varying coverage can be caused by partial intervention implementation and problems by the doctor in following treatment plans or partial adhering to guidelines by the patient in the case of pharmacological treatment.

Based on the null-situation logic, where all interventions are compared to the situation of no intervention, WHO-CHOICE considers the current situation also to be one of many interventions. Thus, from the analysis standpoint, a most accurate description of the combination of interventions forming the current situation is necessary. In the current study, excerpts from the Estonian Health Insurance Fund database were used as the source for the required data.

In the case of depression, the current resource use was described for light, moderate and severe disease course. In the case of schizophrenia related resource use, five disease groups formed on the bases of condition severity and cost type, were

distinguished. A more precise formation of disease groups according to ICD-10 codes is described in table 8-4.

The usage percentages of different services and medication types in view of the abovementioned disease groups were described with the help of excerpts from the Estonian Health Insurance Fund database. With depression the discussed medication types were newer and older antidepressants (cyclic and non-cyclic), with schizophrenia, newer and older neuroleptics.

The percentage of patients who had had hospital care in establishments providing acute psychiatric, psychiatric or care therapy or used services such as psychotherapy, encephalography, etc. was also found.

Depression
Mild – F32.0; F33.0; F32.8; F32.9; F33.8; F33.9
Moderate – F32.1; F33.1
Severe – F32.2; F32.3; F33.2; F33.3
Schizophrenia
Remission after one episode – F20.*5
Partial remission after one episode – F20.*4
Episodic, remittent – F20.*3
Episodic, stable or progressive – F20.*1; F20.*2
Continuous – F20.*0

Table 8-4. Principles of disease grouping for resource use description (ICD-10 sub codes marked by * were not used in grouping).

Resource usage determined in this way was input into the focus group work just like the resource usage described with costs related to disease epidemiology and interventions.

8.6 Focus group

The goal of the third stage of the study was the validation of data and the formation of a data package suitable for analysis.

In order to achieve the specified goal, a mental health focus group was organized as a two-day event in February 2005, which was presented with the initial data in WHO-CHOICE tools as well as all input parameters calculated on the bases of Health Insurance Fund, national and international surveys about the epidemiology, resource use and other fields of the conditions (described in chapters 8.1-8.5).

Based on the panel's consensus, in later analysis of depression and schizophrenia the remission and mortality rates and duration of a depressive episode recommended by the WHO were used.

A data package including the default data of the WHO-CHOICE model and Estonia-specific data concerning disease epidemiology, intervention costs and general resource use was prepared in order to simplify the work of the focus group.

The data used in the analysis concerning depression prevalence originates from the Estonian Health Interview Survey of 1996 (88;89) for younger age groups and from a study concerning depression prevalence in Estonia (90) for older age groups (aged over 65 years) as recommended by the focus group.

In this case the data from the Estonian Health Insurance Fund is not applicable because according to the focus group's opinion, only little more than half of the people suffering from depression visit a doctor and thus only part of the needs are visible.

Unlike with depression, this problem did not exist with schizophrenia as because of the nature of the condition most people suffering from it end up in a healthcare establishment sooner or later, however there is the question of the severity of the disease at the time of reception. According to the mental health panel, and also international literature, the Estonian Health Insurance Fund figures for overall prevalence and morbidity for schizophrenia correspond to the current situation (91).

At the same time the gender-age distribution of schizophrenia based on the data from the Estonian Health Insurance Fund needed correcting according the opinion of the focus group. The correction was based on the gender-age distribution included in WHO-CHOICE tools.

While considering various disability weights' data packages, the focus group recommended using the results from the Estonian burden of disease study as the most suitable for the current study for both schizophrenia and depression.

In discussing resource usage the focus group was faced with a two-part assignment: evaluating current resource use and determining the goals of the analysis. Determining analysis goals mainly comprised of assessing the possibility and scale of implementing the studied interventions, which was based on the principle that the levels be realistic and achievable in the near future.

A patient's adherence to treatment and doctor guidelines is defined as the rate to which the patient adheres to medical guidelines and takes medication according to the doctor's prescription. Following guidelines does not depend only on a patient's adherence to treatment instructions but also the doctor's or healthcare service provider's adherence to instructions and his capableness and skill in clarifying to the patient the necessity of adhering to treatment guidelines (92). The efficiency of treatment measures is directly dependent on the measure of adhering to instructions – the more accurately the instructions are followed by the patient and the medical worker, the more effective is the treatment plan.

The assessment on adherence to guidelines in Estonia (table 8-5) was given by the focus group by decreasing some of the preset values in the model. A patient is least likely to adhere to treatment instructions in case of using older schizophrenia medication due to their severe and unpleasant side-effects.

The goal in adhering to treatment instructions was a 5% improvement in the case of schizophrenia and 5-10% improvement depending on the intervention in the case of depression. Adhering to instructions is primarily promoted by training and awareness building.

		Current situation		Target situation	
		Service provider	Patient	Service provider	Patient
Schizophrenia	Older antipsychotics (e.g. Haloperidol)	80%	35%	85%	40%
	Newer antipsychotics (e.g. Risperidon)	80%	60%	85%	65%
	Older antipsychotics with psychosocial care (e.g. family therapy)	80%	50%	85%	55%
	Newer antipsychotics with psychosocial care (e.g. family therapy)	80%	65%	85%	70%
	Older antipsychotics with psychosocial care and case management	80%	55%	85%	60%
	Newer antipsychotics with psychosocial care and case management	80%	70%	85%	75%
Depression	Current situation	70%	60%	70%	70%
	Older (tricyclic) antidepressants	75%	63%	75%	73%
	Newer (SSRI) antidepressants	80%	65%	80%	75%
	Short psychotherapy	75%	65%	75%	75%
	Older antidepressants + psychotherapy	80%	70%	80%	75%
	Newer antidepressants + psychotherapy	75%	75%	75%	80%
	Older antidepressants + proactive care	80%	75%	80%	80%
	Newer antidepressants + proactive care	70%	60%	70%	70%

Table 8-5. Compliance of patients and service providers for different interventions currently and in target situation

The focus group also evaluated the distribution of different interventions based on data from the Estonian Health Insurance Fund in order to describe the current i.e. null-situation. According to the focus group assessment, 50% of all people suffering from depression and 61% of people suffering from schizophrenia are currently

covered with some kind of intervention. The division of single interventions in order to achieve such coverage is presented in table 8-6.

Simultaneously to the null-situation the goal of modelling for various combinations of single interventions was defined. Together these single interventions should guarantee 60% coverage of people suffering from depression and 65% coverage of people suffering from schizophrenia. The division of single interventions in order to achieve such coverage is presented in table 8-6.

In WHO-CHOICE models the amount of people suffering from a disease covered by single interventions is 60% for depression and 80% for schizophrenia as described above in the part discussing the effectiveness of interventions.

		Current situation	Target situation
Schizophrenia	Older antipsychotics (e.g. Haloperidol)	45,0%	5%
	Newer antipsychotics (e.g. Risperidon)	5,0%	10%
	Older antipsychotics with psychosocial care (e.g. family therapy)	5,0%	10%
	Newer antipsychotics with psychosocial care (e.g. family therapy)	5,0%	25%
	Older antipsychotics with psychosocial care and case management	0,3%	5%
	Newer antipsychotics with psychosocial care and case management	0,3%	10%
	Total coverage of combination	**60,6%**	**65%**
Depression	Older (tricyclic) antidepressants	10,0%	20%
	Newer (SSRI) antidepressants	33,0%	24%
	Short psychotherapy	2,0%	4%
	Older antidepressants + psychotherapy	0%	1%
	Newer antidepressants + psychotherapy	5,0%	8%
	Older antidepressants + proactive care	0,0%	0%
	Newer antidepressants + proactive care	0,0%	4%
	Total coverage of combination	**50%**	**60%**

Table 8-6. Proportions of single interventions in current and target intervention combinations and total coverage of the combinations (outside the combinations single interventions for depression were modelled using 60% and for schizophrenia using 80% coverage)

Unlike with the interventions targeted at schizophrenia and depression, alcohol abuse interventions do not require the composing of a resource use profile as they are

general legislative interventions that cover the entire population and there is no adhering to treatment problem characteristic of pharmacological interventions. With brief advice, the only intervention including personal involvement, possible adherence problems have been accounted in determining intervention effectiveness.

8.6 Conclusion of contextualization

In conclusion, in order to achieve better coherence with local conditions, changes were made in all input data concerning cost-effectiveness in the WHO tools that the contextualization was based upon – demographic data, epidemiology of conditions, evaluations on the severity of these diseases and the coverage of treatment methods in use were all specified.

Medicine prices, bed day and medical visit costs and the amount of resources necessary for implementing and administrating interventions, with unit cost, were all brought up to date.

The greatest difference between the data acquired by the WHO-CHOICE regional analyses and the specified input data was the decrease in resource cost. This change was mainly because the interpolations based on regional data are calculated on the world scale according to the average country population (50 million inhabitants), which greatly overestimates the amount of resources necessary for intervention administration in a country the size of Estonia.

Results

9 Schizophrenia

The current analysis modelled the effectiveness and cost-effectiveness of schizophrenia related interventions in comparison to other interventions according to WHO-CHOICE methodology. The interventions discussed were rather general and with a relatively large coverage and included two medicine groups, psychosocial treatment and case management in various combinations as discussed in chapter 8.3.

Intervention effectiveness is expressed in health loss averted i.e. gained healthy life years. Loss of healthy life years is caused by premature mortality and disease related decrease in quality of life.

Of the analyzed single interventions targeted at schizophrenia, the combination of newer antipsychotic medications and case management principles had the greatest impact (figure 9-1) – 675 healthy life years gained per year, which is followed by the combination of newer medications with psychosocial treatment – 596 healthy life years gained, and the usage of older medications with case management – 522 healthy life years gained per year.

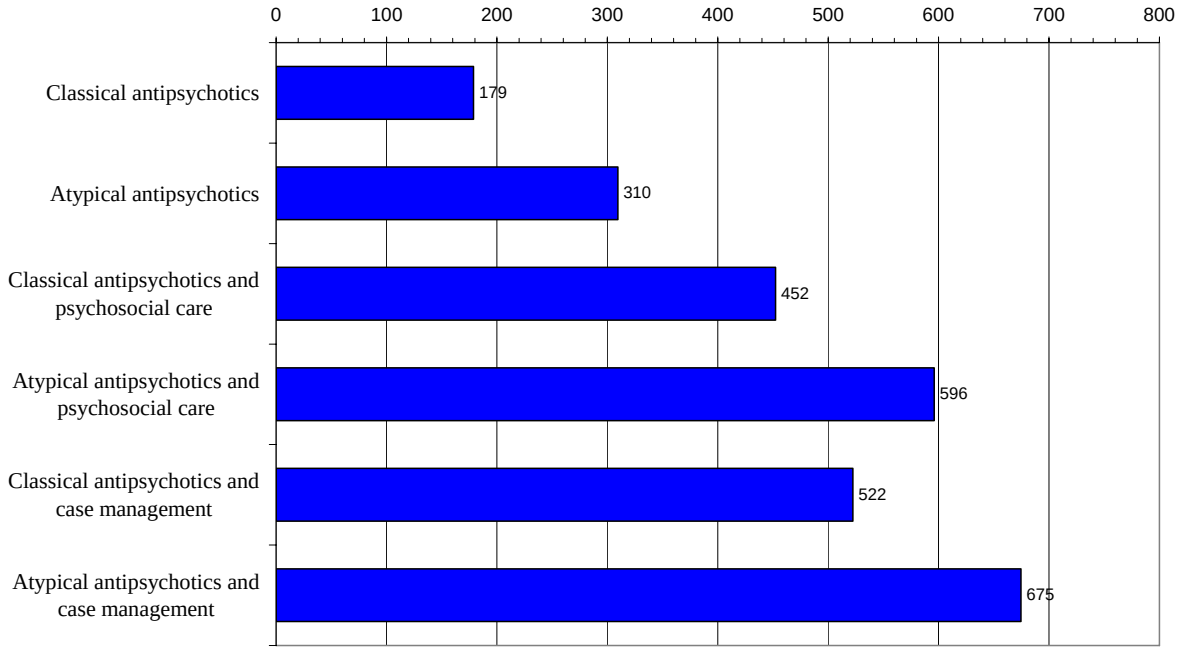


Figure 9-1. Effectiveness of single interventions for schizophrenia presented as a number of healthy life years gained (DALY's averted) in one year

The smallest impact of single interventions is using antipsychotic medications without the support of psychotherapy or case management as is presented by the 179 healthy life years gained with classical medications and 310 healthy life years gained with newer medications.

By comparing the results of the current and target intervention mix (figure 9-2) we can see that the target set by the focus group is more efficient with 417 healthy life years gained per year compared to the current gain of 161 life years.

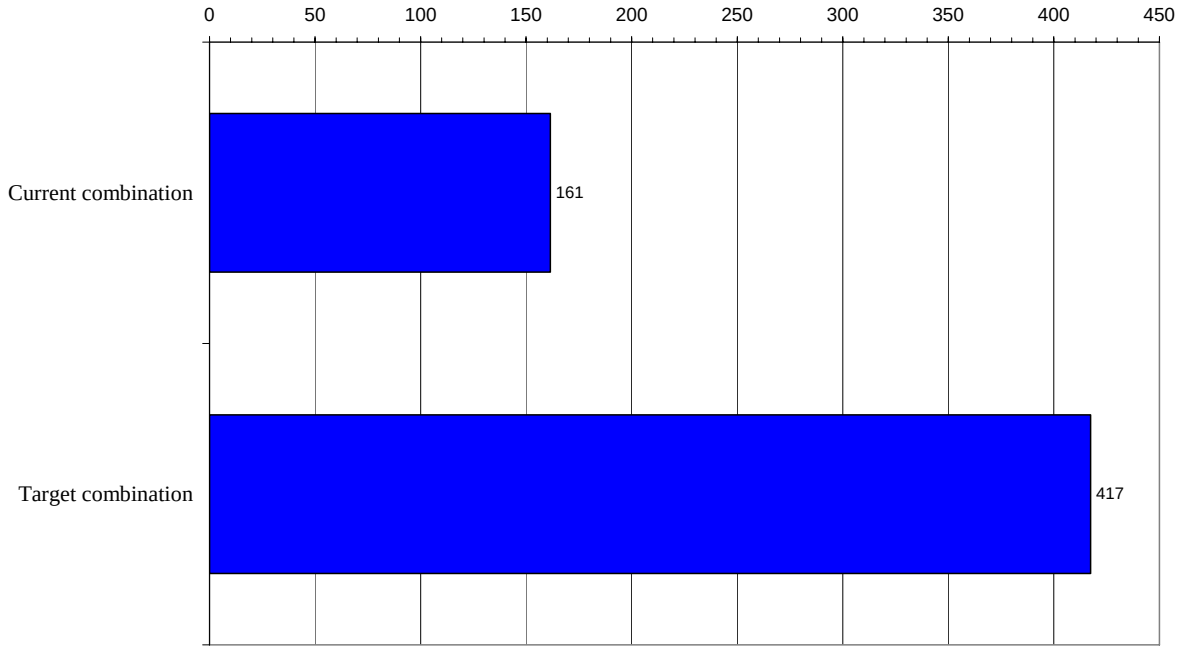


Figure 9-2. Effectiveness of intervention combinations for schizophrenia presented as a number of healthy life years gained (DALY's averted) in one year

When comparing the two abovementioned combinations of interventions with single interventions, it should be kept in mind that in modelling, the coverage was about 60% for combinations and 80% for single interventions among all those in need of treatment.

By comparing the effectiveness of schizophrenia related interventions it can be concluded that when combining pharmacological treatment with other actions, the greatest additional effect is achieved with case management. This can be explained by a positive change in the rate of adherence to treatment plans, which improves when the case manager helps the patient follow the treatment and directs them to seek help from health care service providers in time.

From the standpoint of this study, the cost-effectiveness of interventions, which was evaluated by comparing the impact with related costs, i.e. the amount of resources spent on gaining one healthy life year, is more important than their effectiveness.

The most cost-effective single interventions are the use of atypical or classical antipsychotics supported by case management with 312 332 and 316 613 EEK per one life year saved (figure 9-3).

The most cost-effective intervention is the combination of all single interventions with 252 265 EEK per one life year (figure 9-4) with the percentages of single interventions recommended by the focus group (table 8-6).

The difference in implementing atypical or classical antipsychotic medications with case management is minimal because in the cost-effectiveness analysis the greater efficiency of newer medications is not apparent due to the smaller total cost of treatment with older medications.

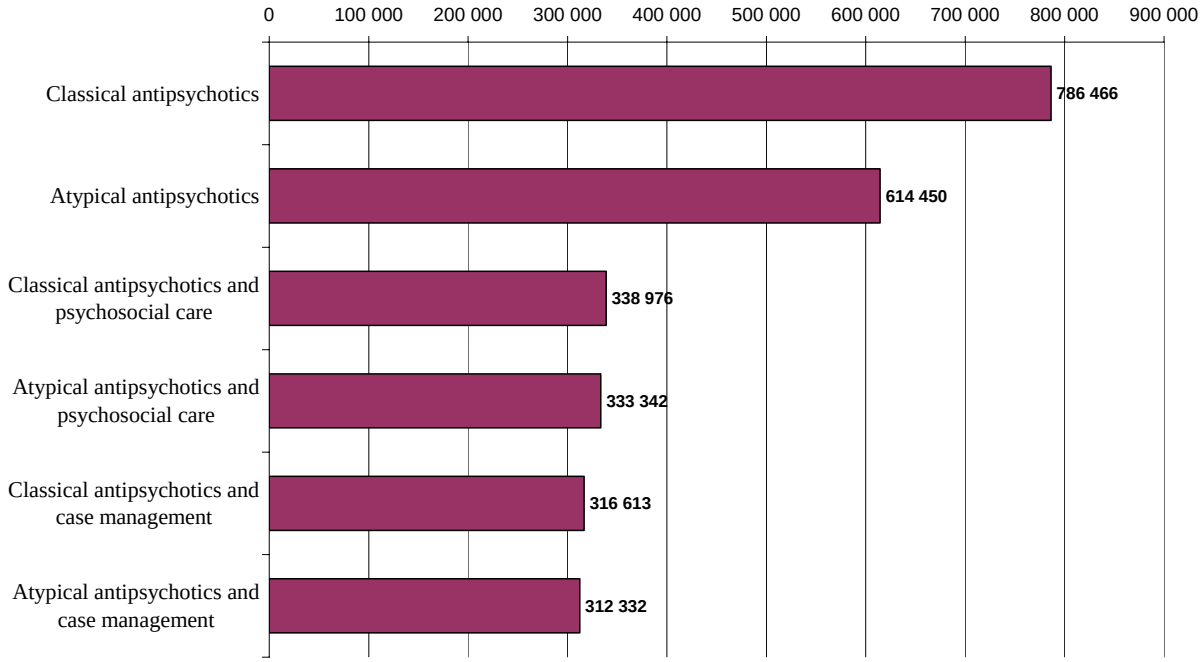


Figure 9-3. Cost-effectiveness of single interventions for schizophrenia presented as an average cost (EEK) of one gained healthy life year (averted DALY) in one year.

The results of this report are also influenced by price policies of drug companies on Estonian market. Hence, it is quite possible that classical antipsychotic medications and their combinations with supportive services could become the most cost-effective if the prices of atypical antipsychotic drugs were to increase.

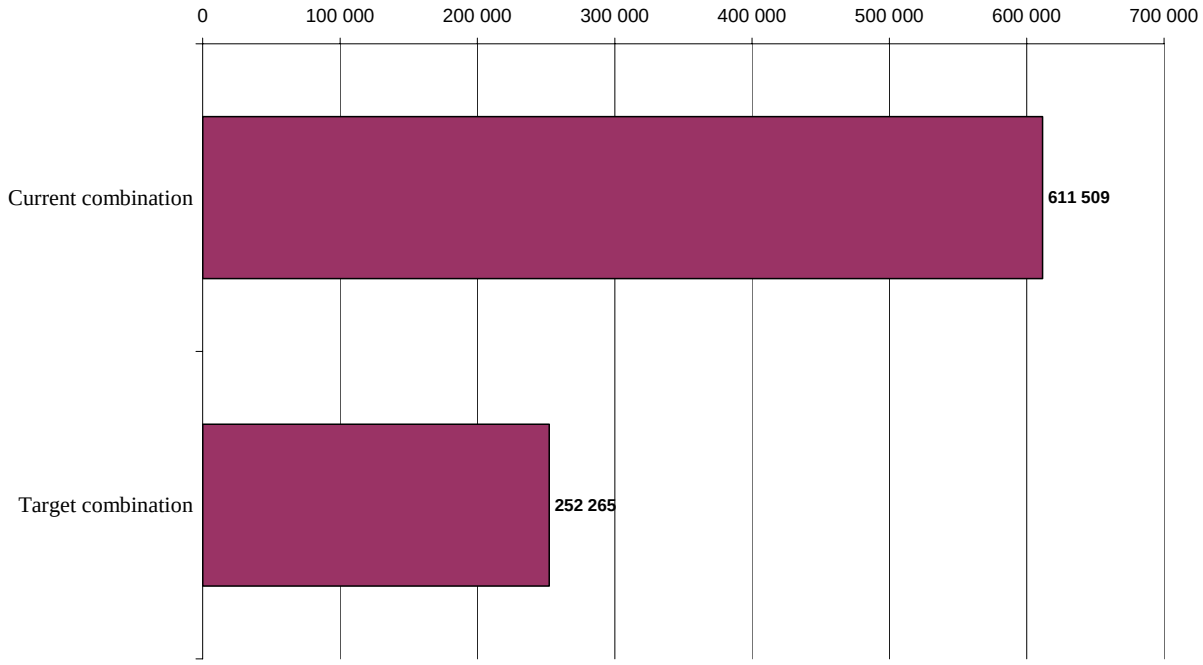


Figure 9-4. Cost-effectiveness of intervention combinations for schizophrenia presented as an average cost (EEK) of one gained healthy life year (averted DALY) in one year.

Of the analyzed interventions, the ones based on solely medications without supportive services are the least cost-effective. When simply prescribing medications, the probability of the patient not following the treatment plan is greater and thus at equal costs, the benefits would be smaller when compared to interventions where medications are combined with psychotherapy or case management. In comparing total amounts, the implementation of the intervention including only older medications is the least effective one with 786 466 EEK spent on gaining one healthy life year.

Among interventions for schizophrenia the target mix of single interventions can be considered cost-effective, when compared to GDP per capita, which in 2004 was 90 472 EEK for Estonia (43), according to the recommendations of the WHO Commission on Macroeconomics and Health (42).

According to incremental cost-effectiveness the first choice would be the combination of all interventions in the relations suggested by the focus group. Of other interventions, the greatest additional impact with the smallest cost is achieved with using newer antipsychotic medications with case management at the 80% coverage of the target group (figure 9-5).

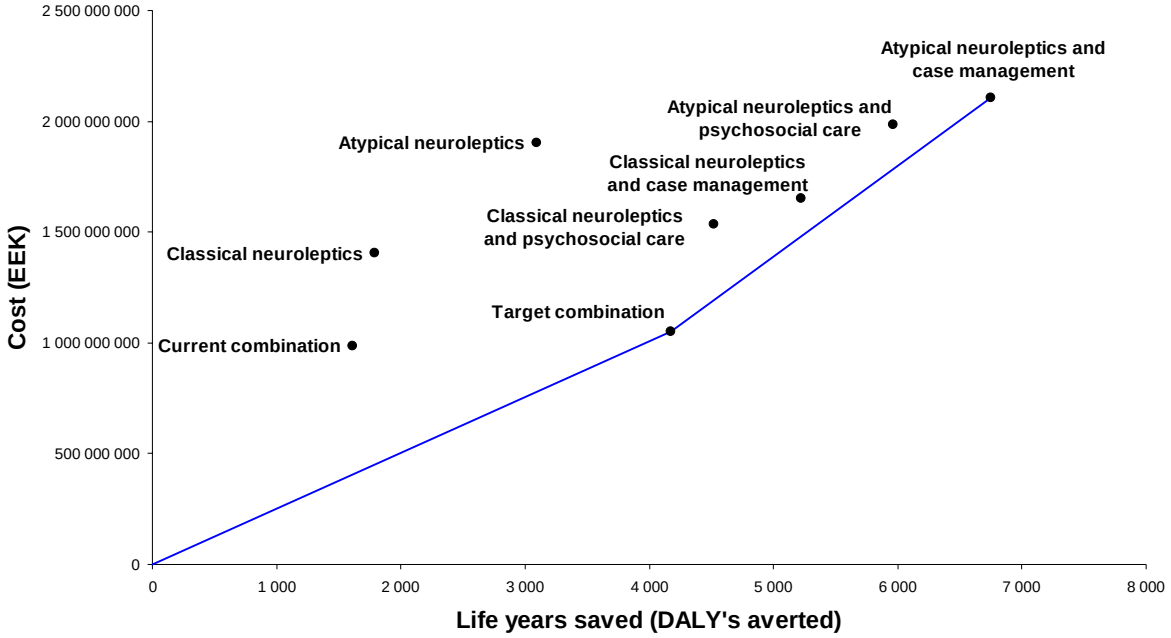


Figure 9-5. Incremental cost-effectiveness of interventions for schizophrenia presented as an additional cost (EEK) of one additionally gained life year (averted DALY) in 10-year span of an intervention along with an optional order of selection

By adding other interventions it is possible to gain an additional 2 500 healthy life years during the next 10 years. The cost of additional intervention on the entire population during the 10 years is approximately 150 million EEK, most of which is spent on training service providers, increasing service coverage and salaries of case managers.

10 Depression

Similarly with other conditions, depression-related interventions, analyzed according to the WHO-CHOICE methodology, included pharmacological treatment with two medication groups, psychosocial treatment and proactive collaborative care in different combinations.

The most efficient interventions were the usage of SSRI and tricyclic antidepressants with psychotherapy and proactive collaborative care with 4 935 and 4 669 healthy life years gained per year respectively (figure 10-1). The effects of the other single interventions on population health were only half as efficient.

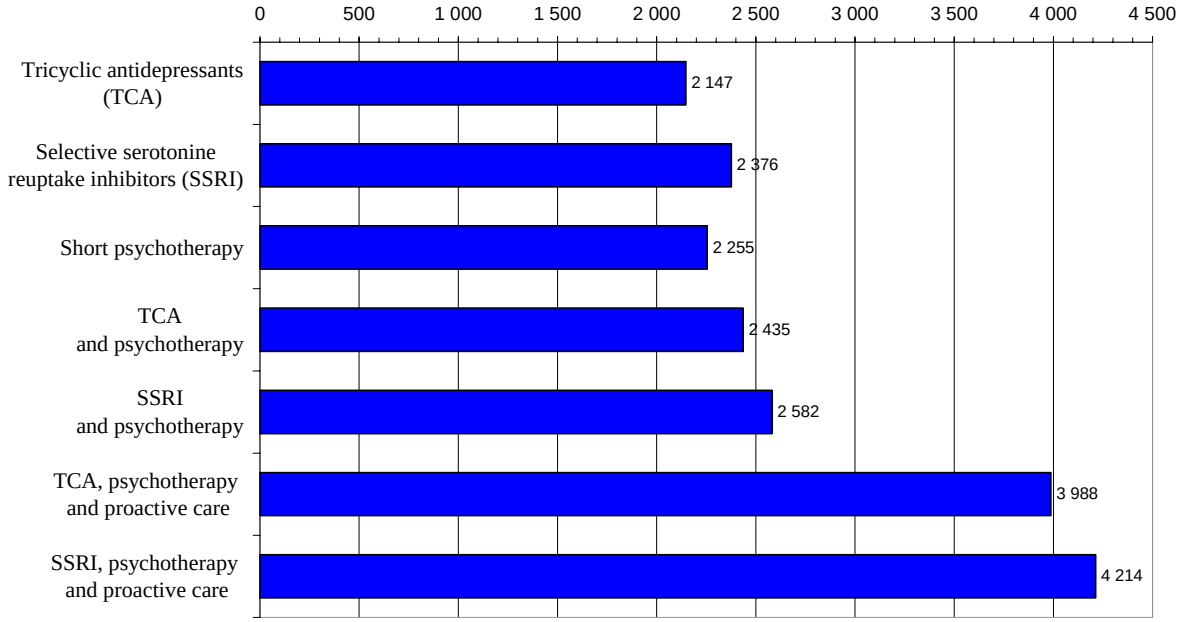


Figure 10-1. Effectiveness of single interventions for depression presented as a number of healthy life years gained (DALY's averted) in one year.

Using tricyclic antidepressants according to a regular treatment plan without supportive psychotherapy was the least efficient of all single interventions by gaining 2 481 healthy life years per year.

The target combination suggested by the focus group had the greatest effect of all combinations of single interventions with 2 839 healthy life years gained which is approximately 800 healthy life years more than the current situation (figure 10-2).

When viewing the effectiveness of an intervention together with the amount of resources required, the most cost-effective intervention is the combination of all interventions (figure 10-3) in the percentages recommended by the focus group (table 8-6), which would require the expenditure of 43 000 EEK for gaining one healthy life year.

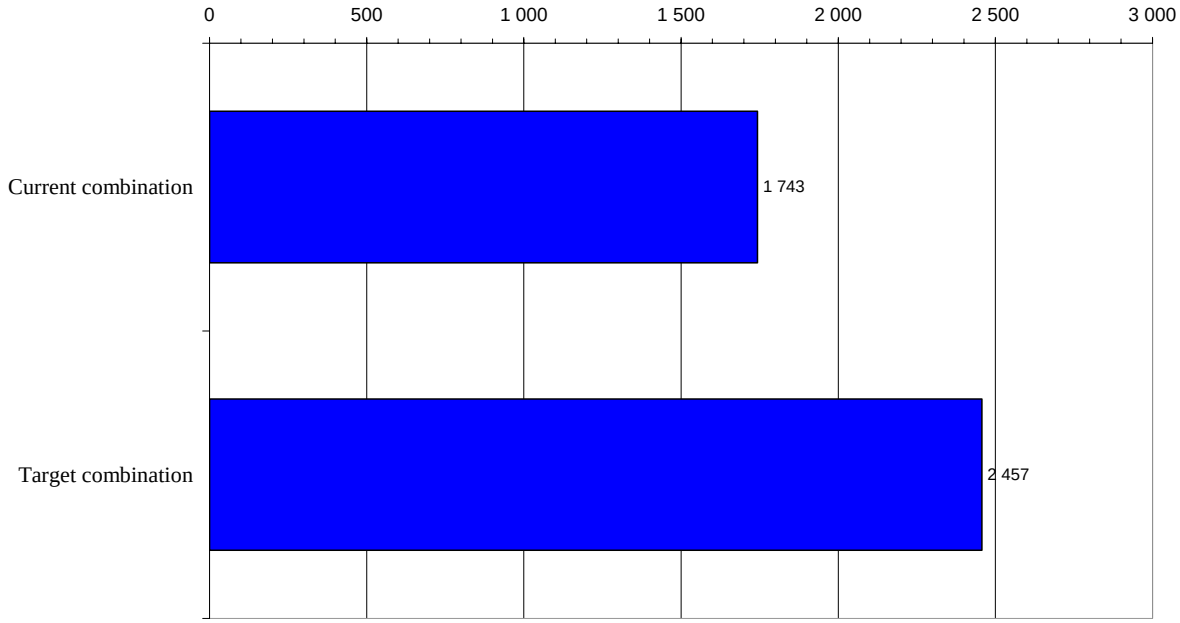


Figure 10-2. Effectiveness of intervention combinations for depression presented as a number of healthy life years gained (DALY's averted) in one year.

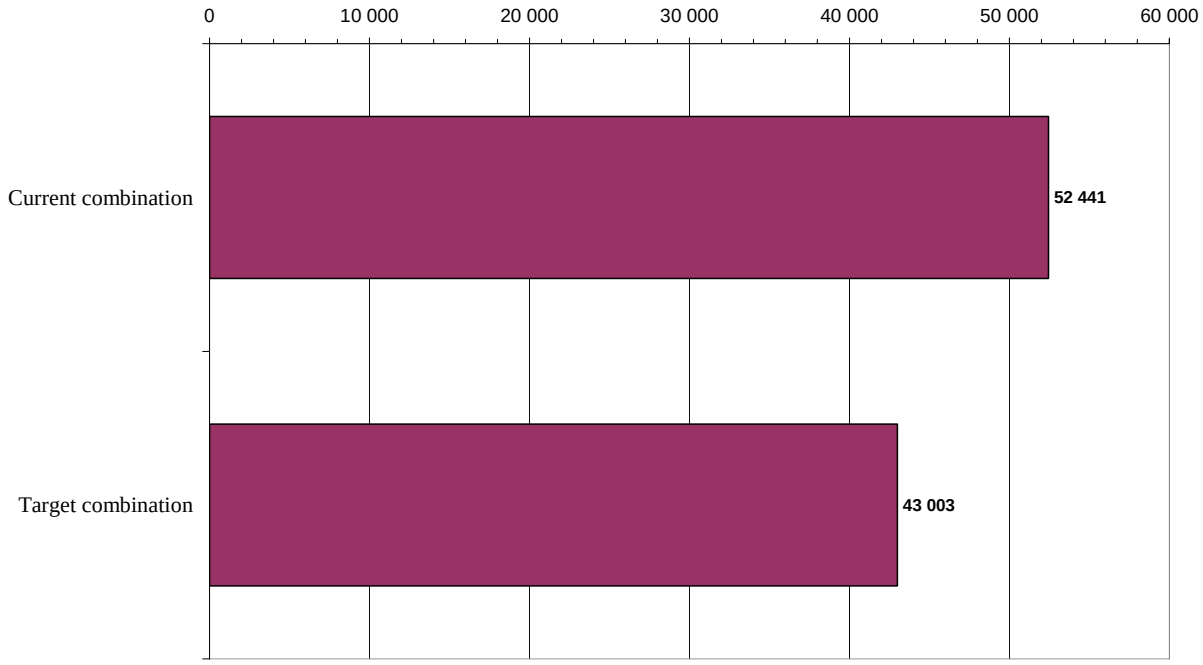


Figure 10-3. Cost-effectiveness of intervention combinations for depression presented as an average cost (EEK) of one gained healthy life year (averted DALY) in one year.

In cost-effectiveness terms, the combination of all interventions is followed by two interventions incorporating only pharmacological treatment (figure 10-4). Gaining one healthy life year would require approximately 48 000 EEK when using only SSRI and 71 000 EEK when using only tricyclic anti-depressants.

Using tricyclic antidepressants with psychotherapy is the least cost-effective intervention, each year of health life costing over 120 000 EEK.

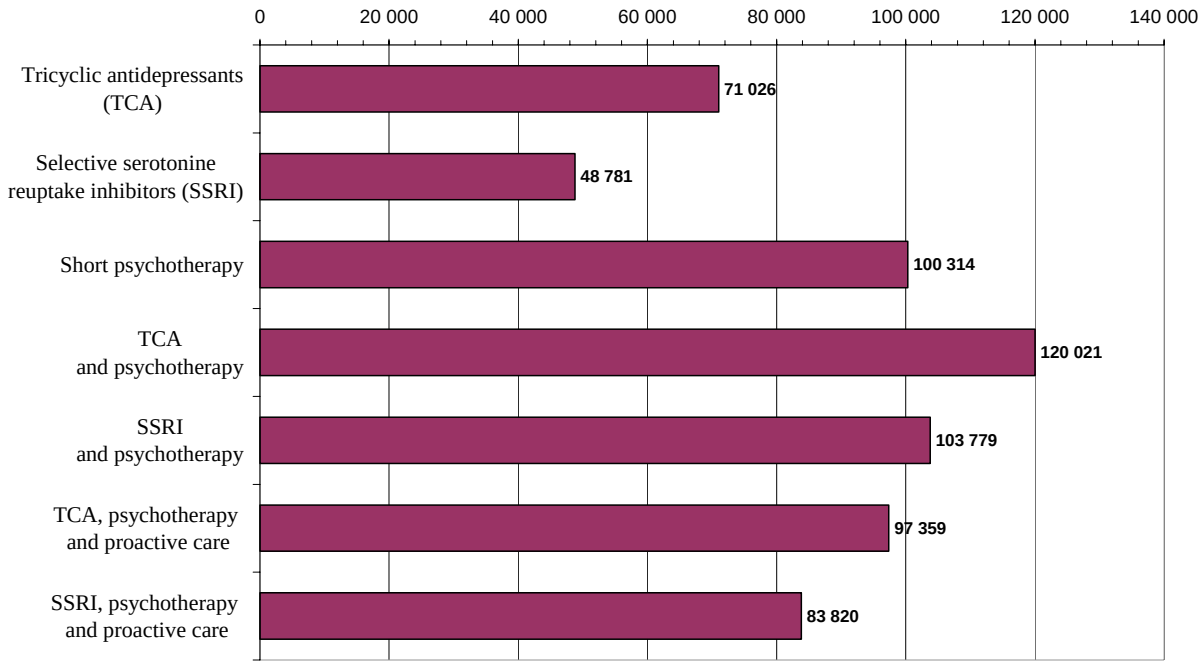


Figure 10-4. Cost-effectiveness of single interventions for depression presented as an average cost (EEK) of one gained healthy life year (averted DALY) in one year.

When comparing the intervention costs for gaining one healthy life year to GDP per capita, then according to the recommendations of the WHO Commission on Macroeconomics and Health (42), all interventions are cost-effective, with most being even very cost-effective.

According to the incremental cost-effectiveness on interventions, the first choice would be the combination of all single interventions in coverage suggested by the focus group (figure 10-5).

The second choice according to incremental cost-effectiveness would be the usage of SSRI with psychotherapy and proactive collaborative care with 60% target group coverage. During 10 years this would generate an additional 21 000 healthy life years with expenses on pharmacological treatment of a longer duration and the training and salaries of a greater number of psychotherapists.

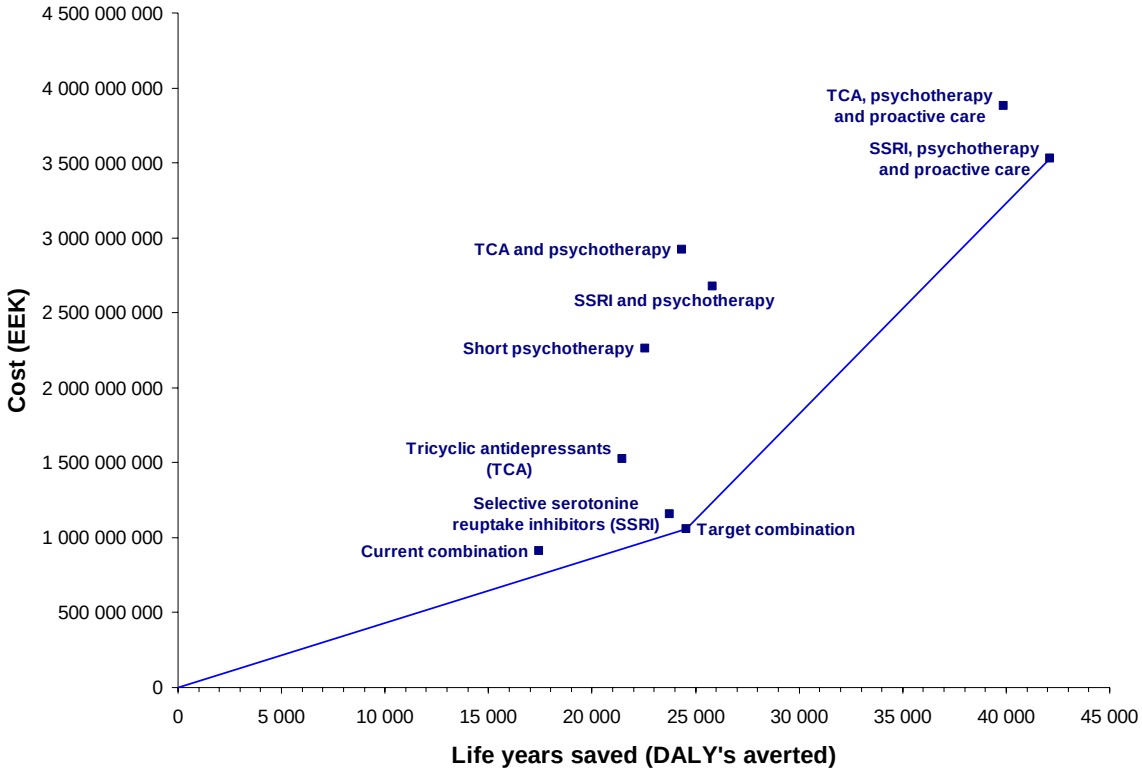


Figure 10-5. Incremental cost-effectiveness of interventions for depression presented as an additional cost (EEK) of one additionally gained healthy life year (averted DALY) in 10-year span of an intervention along with an optional order of selection

11 Alcohol abuse

With alcohol abuse, interventions that encompass the entire population e.g. taxation, access limitation and person directed interventions in the form of counselling were analyzed. In case of taxation interventions the level from November of year 2004 is regarded as current.

According to WHO-CHOICE methodology the most efficient single intervention targeted at decreasing alcohol consumption is the increase of alcohol taxation by 50% which would save 3 677 healthy life years each year (figure 11-1).

The most effective intervention combinations is the mix of all single interventions which would save 8 350 healthy life years annually (figure 11-2).

The least effective interventions to decrease alcohol abuse are counselling and reduced access with 1 196 and 1 159 life years saved accordingly.

Since banning alcohol advertising is mainly targeted at the consumption habits of the younger population and its impact is long term, current studies may not express the full extent of this intervention and it may also be somewhat underestimated in this analysis.

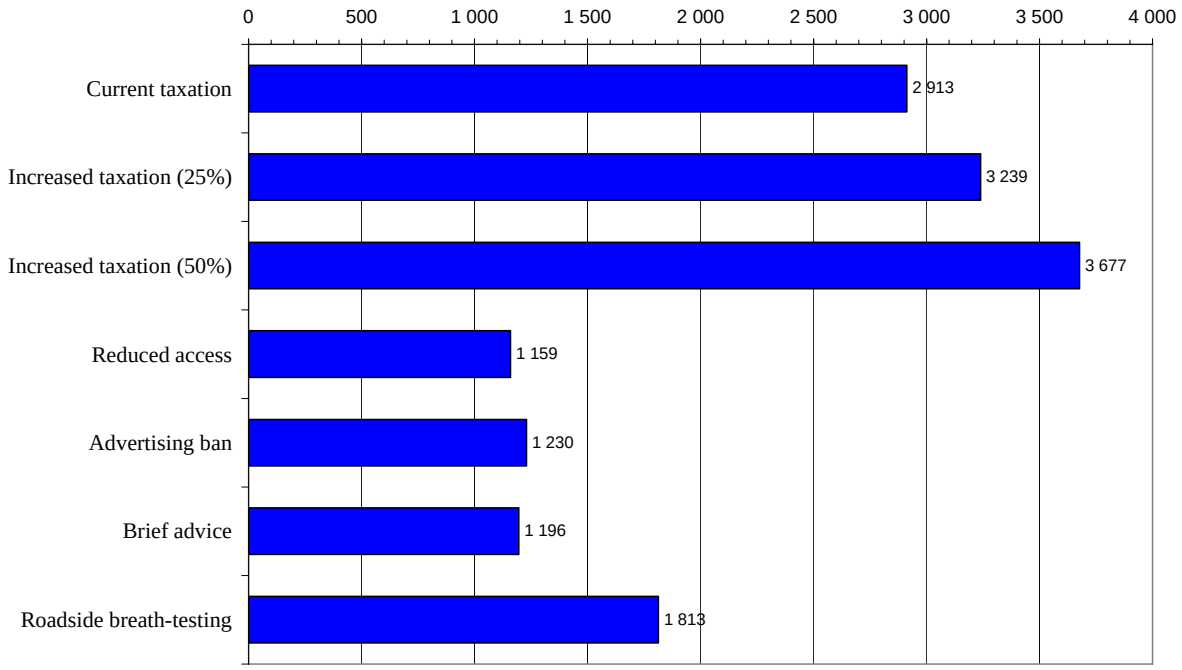


Figure 11-1. Effectiveness of single interventions for alcohol abuse presented as a number of healthy life years saved (DALY's averted) in one year.

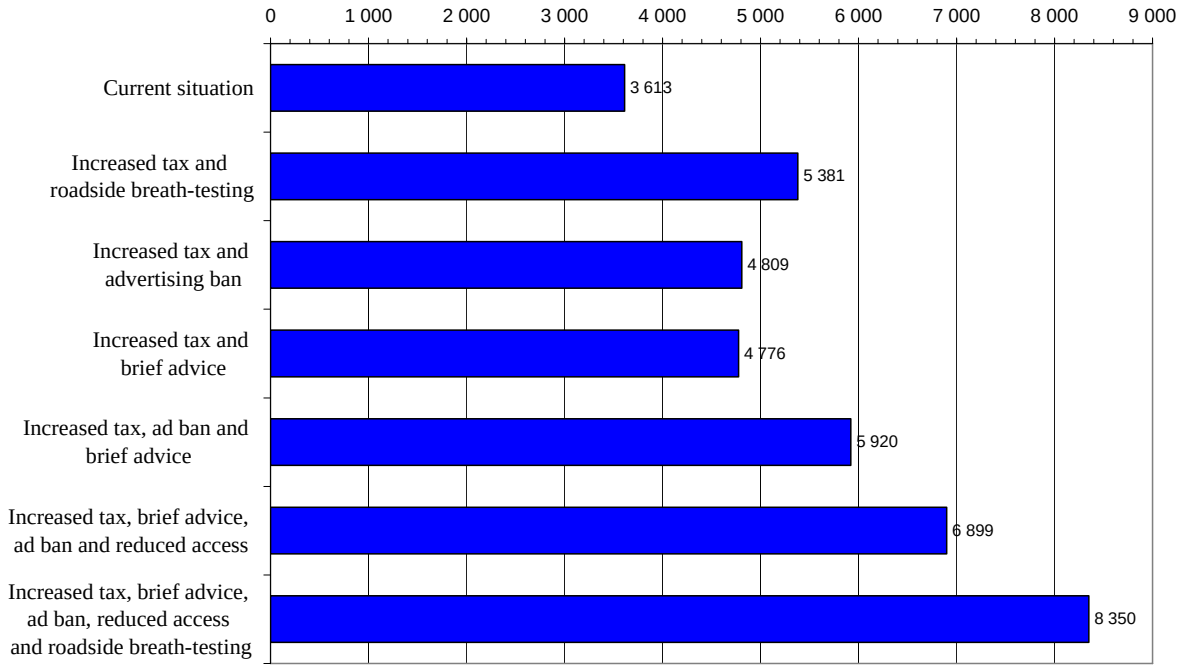


Figure 11-2. Effectiveness of intervention combinations for alcohol abuse presented as a number of healthy life years saved (DALY's averted) in one year.

The most cost-effective intervention for reducing exposure to hazardous alcohol use is increasing alcohol taxation by 50% compared to the 2004 level. In this case the costs for saving one healthy life year per year would be just 639 EEK (figure 11-3). A 25% tax rise has a similar cost-effectiveness.

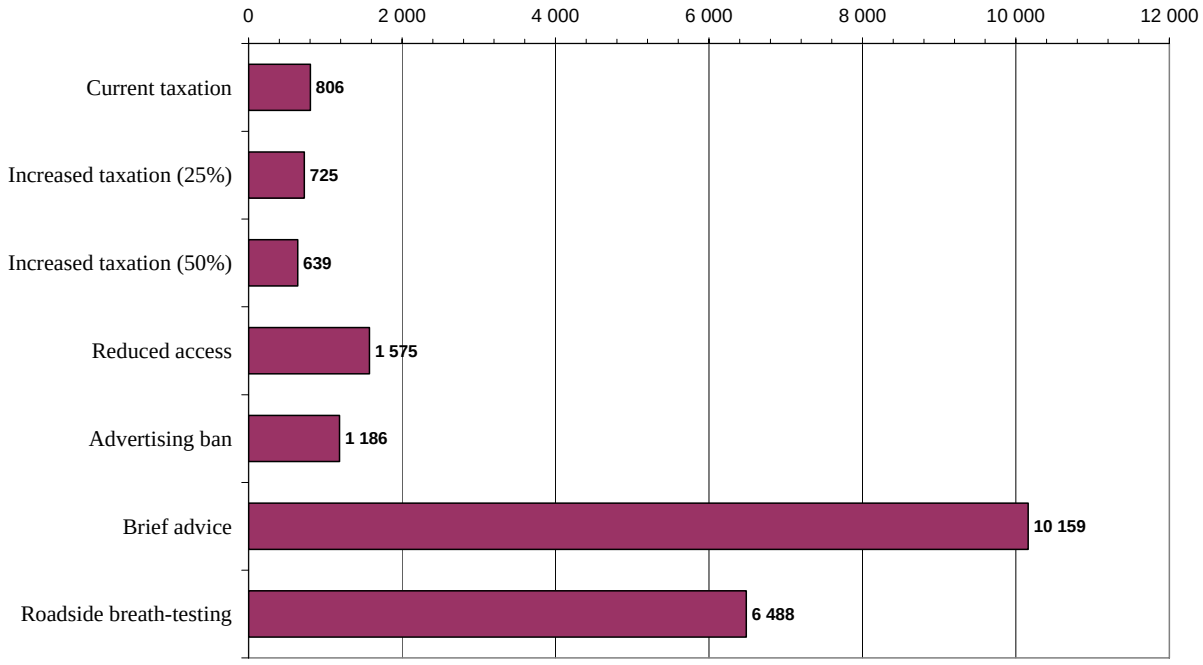


Figure 11-3. Cost-effectiveness of single interventions for alcohol abuse presented as an average cost (EEK) of one gained healthy life year (averted DALY) in one year.

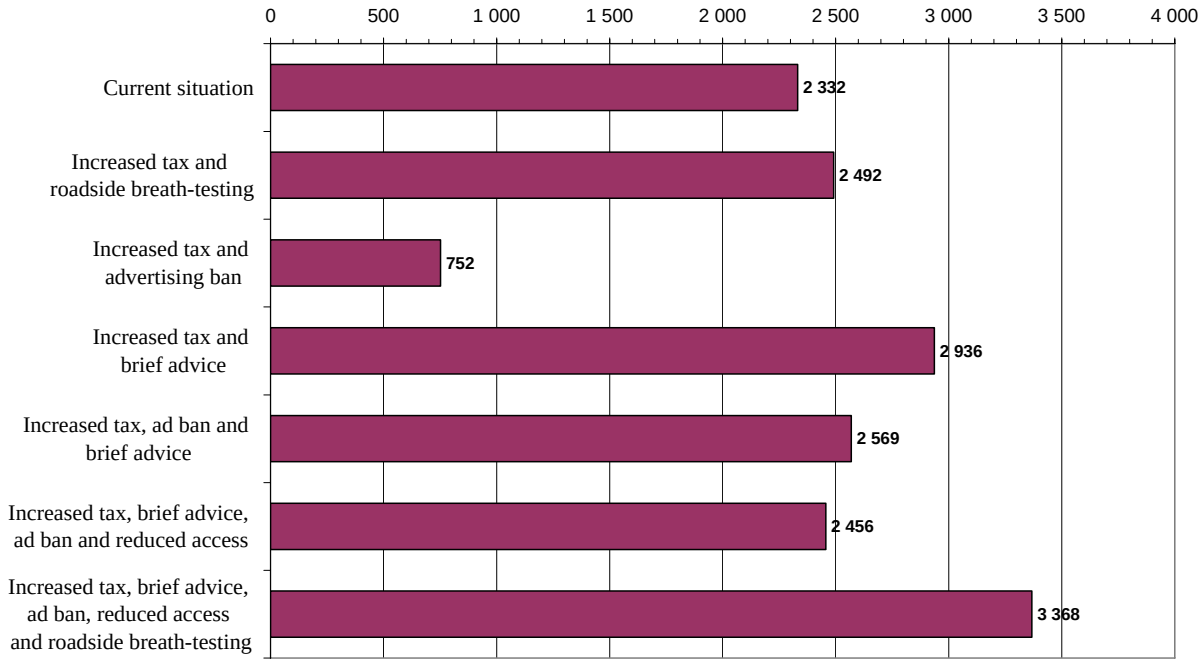


Figure 11-4. Cost-effectiveness of intervention combinations for alcohol abuse presented as an average cost (EEK) of one gained healthy life year (averted DALY) in one year.

Besides taxation, the most cost-effective single interventions are time-limited access to alcohol and banning advertising, all of which require less than 2 000 EEK per healthy life year gained.

Brief advice by G.P. is the least cost-effective intervention, requiring over 10 000 EEK for gaining one healthy life year.

All the analyzed interventions are regarded as very cost-effective according to GDP per capita as all require less that 90 472 EEK for one gained healthy life year. Even for brief advice as the least cost-effective intervention the cost for gaining one healthy life year is well below the Estonian GDP per capita.

According to incremental cost-effectiveness (figure 11-5) the order of implementing interventions is the following:
1) 50% rise in taxation,
2) the combination of rising taxation and banning advertisement,
3) the simultaneous implementation of all single interventions.

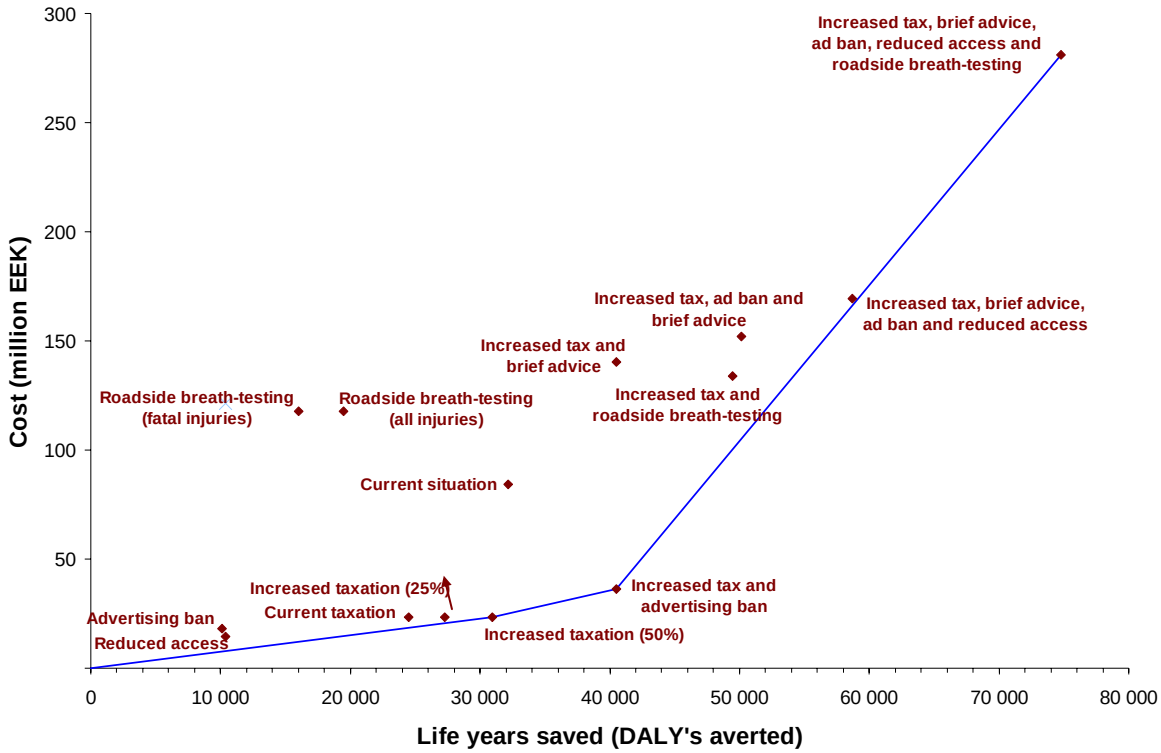


Figure 11-5. Incremental cost-effectiveness of interventions for alcohol abuse presented as an additional cost (EEK) of one additionally gained healthy life year (averted DALY) in 10-year span of an intervention along with an optional order of selection

12 The comparison of the results of analysis

The analysis compares three essentially very different problems connected with mental health – schizophrenia, depression and alcohol abuse. These conditions differ in character, severity and also the possibility to prevent the burden of disease inflicted by them.

Schizophrenia is a chronic disease with an important genetic component. It causes great indirect expenses on the diseased, his close friends and relatives and the society. The treatment of schizophrenia is mostly targeted at constraining the disease and restoring the person's life-quality and the ability to work.

In the case of depression, an important role is played by the social definition of the condition and like schizophrenia its treatment is mainly directed at mitigating the condition and preventing new episodes.

Alcohol abuse in some forms can be regarded a disease. However, mostly it is rather a health-behavioural problem which increases the risk of other mental disorders such as depression. Although treatment for addiction is possible, most interventions are targeted at preventing the burden of disease due to alcohol.

The costs for saving one life year are the smallest for alcohol abuse interventions, where most cost between 1000 and 10000 EEK per life year. Of the three conditions, the greatest costs per life year are for schizophrenia.

The largest costs are related to conducting treatment, thus for both schizophrenia and depression the costs for saving a life year are substantially greater than for alcohol abuse. Meanwhile the costs for schizophrenia and depression are in similar orders of magnitude.

In efficiency the interventions for alcohol abuse and depression are rather similar. One possible cause of the difference in the effectiveness of schizophrenia and depression interventions is the greater prevalence of forms that are milder and more responsive to therapy in the case of depression which is greatly effected by the society's understanding of the limit between the disease and pre-disease condition.

Meanwhile, terminating treatment solely based on judgement cost-effectiveness is unthinkable. For instance, a person suffering from schizophrenia is a substantial burden on his close relatives and friends and it is ethically unacceptable to deprive patients and members of the society in contact with them of the society's support, thus practically casting them out of the society.

Comparing the analyzed conditions is thus required primarily to better understand their nature, but decisions in selecting interventions should be made within the limits of one condition.

13 Discussion

The goal of the analysis was the mapping of already active interventions and determining a combination of interventions with a better cost-effectiveness to decrease the burden of disease by schizophrenia, depression and alcohol abuse. The goal was not to order different diseases as all decisions in selecting interventions should be made within the bounds of one condition. Neither is this study meant for making everyday treatment decisions.

The study results show that despite the differences in the conditions, investments directed at solving mental health problems are beneficial in the economic sense. This is directly reflected in the fact that most of the analyzed interventions are cost-effective, alcohol abuse interventions even very cost-effective.

An important result of the analysis is the apparent important role of supportive actions e.g. psychotherapy and case management in increasing the cost-effectiveness of pharmacological treatment of depression and schizophrenia, hopefully thus being an impulse for decreasing the burden of disease on the people suffering from the aforementioned conditions.

Although when combining simple pharmacological treatment with supportive actions the amount of necessary resources increases substantially, the effectiveness of the combination increases even more. Most of the additional costs are due to an increase of required manpower, required training and salaries.

In addition to increasing the role of supportive actions, the cost-effectiveness of current actions can be increased by improving the adherence to treatment.

The current analysis combines ambulant and stationary treatment and their influence has not been separately described according to the methodology, however, although many nations are still in the process of deciding the future course of their mental health system development, Estonia has already decided to move in the direction of increasing the role of ambulant treatment.

The orientation towards increasing the role of ambulant treatment is also expressed by the most cost-effective intervention combinations in the case of depression and schizophrenia, where stationary treatment is assigned only on cases where ambulant treatment is not possible due to the health condition of the person or when the person has become a threat to himself and others because of his psychic condition.

When using the results of the analysis one must keep in mind that the cost-effectiveness of interventions is evaluated conservatively as it does not depict indirect impacts e.g. the increase of population productivity and its economic consequences in line with the improvement in population health. This exclusion is due to the substantially larger variability of these effects when compared to the conditions that cause them which makes the reason for the quantification and presentation of these effects on a single scale questionable.

As this is an analysis of cost-effectiveness, the current study has not attempted to determine the monetary value of a quality life year. However, it is possible to establish a monetary limit which determines whether an intervention is cost-effective or not. This analysis has implemented GDP per capita as one possible limit, according to which the value of one life year is the average resource produced by one person in the society in a year.

Reference

(1) World Health Organization. The World Health Report 2002: Reducing risks, promoting healthy life. Geneva, World Health Organization 2002.

(2) Atlas of Mental Health Resources in the World. Geneva: World Health Organization; 2001.

(3) Vaimne tervis. Sotsiaalministeerium. http://www.sm.ee/est/pages/goproweb0012 accessed on 27.05.2005.

(4) Eesti vaimse tervise poliitika alusdokument. Tallinn: PRAXIS; 2002.

(5) Habicht T, Thetloff M. Financing of Mental Health Services in Estonia. PRAXIS Working Paper no 3. Tallinn, PRAXIS 2003.

(6) Estimates of DALYs by sex, cause and WHO mortality sub-region, Version 3 estimates for 2000. http://www3.who.int/whosis/burden/estimates/2000V3/V3subregion/DALY14%202000c.zip

(7) World development report 1993: Investing in Health. For World Bank by Oxford University Press; 1993.

(8) Davis KE. Primary health care and severe mental illness: the need for national and state policy. Health Soc Work 1996 May;21(2):83-7.

(9) Ettner SL. New evidence on the relationship between income and health. J Health Econ 1996 Feb;15(1):67-85.

(10) Narayan D, Shah T. Connecting the Local to the Global: Voices of the Poor. Framework paper for Workshop on Local to Global Connectivity for Voices of the Poor. http://www.worldbank.org/poverty/voices/reports/crying/cry8.pdf 2000

(11) Mental health. World Health Organization. http://www.who.int/mental_health/en/ accessed on 27.05.2005.

(12) Tervishoiustatistika 2000-2002. http://www sm ee/est/pages/goproweb0698 2005 accessed on 26.05.2005.

(13) Kunst A, Leinsalu M, Kasmel A, Habicht J. Social inequalities in health in Estonia. Tallinn: Ministry of Social Affairs; 2002.

(14) World development report 1993 : investing in health. http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1993/06/01/000009265_3970716142319/Rendered/PDF/multi0page.pdf 1993

(15) Leinsalu M, Grintšak M, Noorkõiv R, Silver B. Eesti terviseuuring: Tabelid (Estonian health interview survey: Tables). Tallinn: Eksperimentaalse ja Kliinilise Meditsiini Instituut; 1998.

(16) Hutubessy RCW, Baltussen RMPM, Tan Torres-Edejer T, Evans DB. Generalised cost-effectiveness analysis: an aid to decision making in health. Applied Health Economics and Health Policy 2002;1:89-95.

(17) Lai T, Vals K, Kiivet R. Suremusest ja haigestumisest põhjustatud tervisekadu Eestis. Eesti Arst 2005;(Toimetusele saadetud).

(18) Vals K, Lai T, Kiivet R. Rahvastiku tervisekaotus e. haiguskoormus: hindamise metoodika. Eesti Arst 2005;(Toimetusele saadetud).

(19) Bogovski P. Rahvusvaheline haiguste ja nendega seotud terviseprobleemide statistiline klassifikatsioon : RHK-10. Tallinn: Eesti Sotsiaalministeerium; 1996.

(20) Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. The Lancet 1997 May 17;349(9063):1436-42.

(21) Chisholm D. The attributable and avertable burden of disease in Estonia - a public health approach to priority-setting. Ettekanne Sotsiaalministeeriumis 10-5-2005.

(22) Murray CJ, Lopez AD. The Global Burden of Disease: A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. WHO, Harvard School of Public Health, World Bank; 1996.

(23) Ezzati M, Lopez AD, Rodgers A, Hoorn SV, Murray CJL. Selected major risk factors and global and regional burden of disease. The Lancet 2002 Nov 2;360(9343):1347-60.

(24) Lai T, Vals K, Kiivet R. Haiguskoormuse tõttu kaotatud eluaastad Eestis: seosed riskifaktoritega ja riskide vähendamise kulutõhusus. Tallinn: Sotsiaalministeerium; 2004.

(25) Sullivan LE, Fiellin DA, O'connor PG. The prevalence and impact of alcohol problems in major depression: A systematic review. Am J Med 2005 Apr;118(4):330-41.

(26) Bilban M, Skibin L. Presence of alcohol in suicide victims. Forensic Sci Int 2005 Jan 17;147 Suppl:S9-12.

(27) Over AM. Economics for health sector analysis: concepts and cases. Washington: The International Bank for Reconstruction and Development, The World Bank; 1991.

(28) Hutubessy RCW, Baltussen RMPM, Tan Torres-Edejer T, Evans DB. Generalised cost-effectiveness analysis: an aid to decision making in health. Applied Health Economics and Health Policy 2002;1:89-95.

(29) Hutubessy R, Chisholm D, Edejer T. Generalized cost-effectiveness analysis for national-level priority-setting in the health sector. Cost Effectiveness and Resource Allocation 2003;1(1):8.

(30) Murray CJ, Evans DB, Acharya A, Baltussen RM. Development of WHO guidelines on generalized cost-effectiveness analysis. Health Econ 2000 Apr;9(3):235-51.

(31) Baltussen R, Adam T, Tan Torres-Edejer T, Hutubessy R, Acharya A, Evans DB, et al. Generalized Cost Effectiveness Analysis: A Guide. http://www3.who.int/whosis/cea/background_documents/pdf/guidelines.pdf accessed on 11.04.2005

(32) Lauer JA, Rohrich K, Wirth H, Charette C, Gribble S, Murray CJ. PopMod: a longitudinal population model with two interacting disease states. Cost Eff Resour Alloc 2003 Feb 26;1(1):6.

(33) Murray CJ, Acharya AK. Understanding DALYs (disability-adjusted life years). J Health Econ 1997 Dec;16(6):703-30.

(34) Magnus A, Bensberg M. Southern Metropolitan burden of disease study: mortality and morbidity. Southern Metropolitan Region, 2000. http://www.dhs.vic.gov.au accessed on 14.12.2004.

(35) Mathers CD, Vos ET, Stevenson CE, Begg SJ. The Australian Burden of Disease Study: measuring the loss of health from diseases, injuries and risk factors. Med J Aust 2000 Jun 19;172(12):592-6.

(36) Krahn M, Gafni A. Discounting in the economic evaluation of health care interventions. Med Care 1993 May;31(5):403-18.

(37) Adam T, Evans DB, Koopmanschap MA. Cost-effectiveness analysis: can we reduce variability in costing methods? Int J Technol Assess Health Care 2003;19:407-20.

(38) Adam T, Aikins M, Evans D. CostIt software.

(39) Johns B, Baltussen R, Hutubessy R. Programme costs in the economic evaluation of health interventions. Cost Eff Resour Alloc 2003 Feb 26;1(1):1.

(40) Adam T, Evans DB, Murray CJ. Econometric estimation of country-specific hospital costs. Cost Eff Resour Alloc 2003 Feb 26;1(1):3.

(41) Workshop on Evidence for Health Policity 2002: Burden of Desease, Cost-Effectiveness, Health Systems Performance, and Povetry & Health.Module 1.: Harvard Center for Population and Development Studies, WHO; 2002.

(42) WHO Commission on Macroeconomics and Health. Macroeconomics and health: investing in health for economic development. Report of the Commission on Macroeconomics and Health: Executive Summary. Geneva, World Health Organization 2001.

(43) Sisemajanduse koguprodukt institutsionaalsete sektorite kaupa 2000. aasta püsivhindades, 1993-2003. Statistikaamet. http://pub.stat.ee/px-web.2001/Dialog/varval.asp?ma=RAA022&ti=SISEMAJANDUSE+KOGUPRODUKT+JA+KOGURAHVATULU+%28RAHVUSLIK+KOGUPRODUKT%29+%DCHE+ELANIKU+KOHTA%2C+KROONI%2C++EUROT%2C+USA+DOLLARIT&path=../Database/Majandus/15Rahvamajanduse_arvepidamine/06Sisemajanduse_koguprodukt_%28SKP%29/02Pehilised_rahvamajanduse_arvepidamise_naitajad/&lang=2 accessed on 27.05.2005.

(44) Eesti statistika aastaraamat 2003. Tallinn: Statistikaamet; 2003.

(45) Aluoja A, Leinsalu M, Shlik J, Vasar V, Luuk K. Symptoms of depression in the Estonian population: prevalence, sociodemographic correlates and social adjustment. J Affect Disord 2004 Jan;78(1):27-35.

(46) Saks K, Tiit E, Kaarik E, Jaanson K. Depressive symptoms in older Estonians: prevalence and models. J Am Geriatr Soc 2002 Jun;50(6):1164-5.

(47) Varnik A. Suicide in Estonia. Acta Psychiatr Scand 1991 Sep;84(3):229-32.

(48) Bromet EJ, Fennig S. Epidemiology and natural history of schizophrenia. Biol Psychiatry 1999 Oct 1;46(7):871-81.

(49) Jablensky A. Epidemiology of schizophrenia: the global burden of disease and disability. Eur Arch Psychiatry Clin Neurosci 2000;250(6):274-85.

(50) an der HW, Hafner H. The epidemiology of onset and course of schizophrenia. Eur Arch Psychiatry Clin Neurosci 2000;250(6):292-303.

(51) Inskip HM, Harris EC, Barraclough B. Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia. Br J Psychiatry 1998 Jan;172:35-7.

(52) Harris EC, Barraclough B. Excess mortality of mental disorder. Br J Psychiatry 1998 Jul;173:11-53.

(53) Harrison G, Hopper K, Craig T, Laska E, Siegel C, Wanderling J, et al. Recovery from psychotic illness: a 15- and 25-year international follow-up study. Br J Psychiatry 2001 Jun;178:506-17.

(54) Harris EC, Barraclough B. Suicide as an outcome for mental disorders. A meta-analysis. Br J Psychiatry 1997 Mar;170:205-28.

(55) Inskip HM, Harris EC, Barraclough B. Lifetime risk of suicide for affective disorder, alcoholism and schizophrenia. Br J Psychiatry 1998 Jan;172:35-7.

(56) Essink-Bot ML, Pereira J, Packer C, Schwarzinger M, Burstrom K. Cross-national comparability of burden of disease estimates: the European Disability Weights Project. Bull World Health Organ 2002;80(8):644-52.

(57) Chisholm D, Rehm J, van Ommeren M, Monteiro M. Reducing the Global Burden of Hazardous Alcohol Use: A Comparative Cost- Effectiveness Analysis. J Stud Alcohol 2004 Nov;65(6):782-93.

(58) Kasmel A, Lipand A. Eesti täiskasvanud elanikkonna tervisekäitumise uuring 2002. [Health behaviour survey of Estonian adult population 2002.]. Tallinn: Eesti Tervisekasvatuse Ühing; 2003.

(59) Chisholm D, Sanderson K, yuso-Mateos JL, Saxena S. Reducing the global burden of depression: Population-level analysis of intervention cost-effectiveness in 14 world regions. Br J Psychiatry 2004 May 1;184(5):393-403.

(60) Chilvers C, Dewey M, Fielding K, Gretton V, Miller P, Palmer B, et al. Antidepressant drugs and generic counselling for treatment of major depression in primary care: randomised trial with patient preference arms. BMJ 2001 Mar 31;322(7289):772.

(61) Katon W, Von Korff M, Lin E, Walker E, Simon GE, Bush T, et al. Collaborative management to achieve treatment guidelines. Impact on depression in primary care. JAMA 1995 Apr 5;273(13):1026-31.

(62) Malt UF, Robak OH, Madsbu HP, Bakke O, Loeb M. The Norwegian naturalistic treatment study of depression in general practice (NORDEP)---I: randomised double blind study. BMJ 1999 May 1;318(7192):1180-4.

(63) Solomon DA, Keller MB, Leon AC, Mueller TI, Shea MT, Warshaw M, et al. Recovery from major depression. A 10-year prospective follow-up across multiple episodes. Arch Gen Psychiatry 1997 Nov 1;54(11):1001-6.

(64) Thase ME, Greenhouse JB, Frank E, Reynolds CF, III, Pilkonis PA, Hurley K, et al. Treatment of major depression with psychotherapy or psychotherapy-pharmacotherapy combinations. Arch Gen Psychiatry 1997 Nov 1;54(11):1009-15.

(65) Araya R, Rojas G, Fritsch R, Acuna J, Lewis G. Common mental disorders in Santiago, Chile: Prevalence and socio-demographic correlates. Br J Psychiatry 2001 Mar 1;178(3):228-33.

(66) Bolton P, Bass J, Neugebauer R, Verdeli H, Clougherty KF, Wickramaratne P, et al. Group Interpersonal Psychotherapy for Depression in Rural Uganda: A Randomized Controlled Trial. JAMA 2003 Jun 18;289(23):3117-24.

(67) Simon GE, Katon WJ, VonKorff M, Unutzer J, Lin EHB, Walker EA, et al. Cost-Effectiveness of a Collaborative Care Program for Primary Care Patients With Persistent Depression. Am J Psychiatry 2001 Oct 1;158(10):1638-44.

(68) Geddes JR, Freemantle N, Mason J, Eccles MP, Boynton J. SSRIs versus other antidepressants for depressive disorder. Cochrane Database Syst Rev 2000;(2):CD001851.

(69) Barbui C, Campomori A, D'Avanzo B, Negri E, Garattini S. Antidepressant drug use in Italy since the introduction of SSRIs: national trends, regional differences and impact on suicide rates. Soc Psychiatry Psychiatr Epidemiol 1999 Mar;34(3):152-6.

(70) Kahn K, Tollman SM, Garenne M, Gear JS. Validation and application of verbal autopsies in a rural area of South Africa. Trop Med Int Health 2000 Nov;5(11):824-31.

(71) Storosum JG, van Zwieten BJ, van den BW, Gersons BP, Broekmans AW. Suicide risk in placebo-controlled studies of major depression. Am J Psychiatry 2001 Aug;158(8):1271-5.

(72) Hotopf M, Lewis G, Normand C. Are SSRIs a cost-effective alternative to tricyclics? Br J Psychiatry 1996 Apr;168(4):404-9.

(73) Karasu TB, Gelenberg A, Merriam A, Wang P. Practice Guide for the Treatment of Patients With Major Depressive Disorder. 2 ed. Arlington: American Psychiatric Association; 2000.

(74) Chisholm D, Diehr P, Knapp M, Patrick D, Treglia M, Simon G. Depression status, medical comorbidity and resource costs: Evidence from an international study of major depression in primary care (LIDO). Br J Psychiatry 2003 Aug 1;183(2):121-31.

(75) Barbui C, Hotopf M, Freemantle N, Boynton J, Churchill R, Eccles MP, et al. Selective serotonin reuptake inhibitors versus tricyclic and heterocyclic antidepressants: comparison of drug adherence. Cochrane Database Syst Rev 2000;(4):CD002791.

(76) Gloaguen V, Cottraux J, Cucherat M, Blackburn IM. A meta-analysis of the effects of cognitive therapy in depressed patients. J Affect Disord 1998 Apr;49(1):59-72.

(77) Sanderson K, Andrews G. Mental disorders and burden of disease: how was disability estimated and is it valid? Aust N Z J Psychiatry 2001 Oct;35(5):668-76.

(78) Verghese A, John JK, Rajkumar S, Richard J, Sethi BB, Trivedi JK. Factors associated with the course and outcome of schizophrenia in India. Results of a two-year multicentre follow-up study. Br J Psychiatry 1989 Apr;154:499-503.

(79) Huber G, Gross G, Schuttler R. A long-term follow-up study of schizophrenia: psychiatric course of illness and prognosis. Acta Psychiatr Scand 1975 Jul;52(1):49-57.

(80) Lai T, Vals K, Kiivet R. Haiguskoormuse tõttu kaotatud eluaastad ehk tervisekaotus Eestis. Tallinn: Sotsiaalministeerium; 2003.

(81) Magnum Medical: Raviainete jaotus anatoomiliste tasemete järgi. http://www.magnum.ee/cgi-bin/script/atc? Accessed on 12.04.2005.

(82) TopMed: Toimeainete kataloog. http://www.topmed.ee/atc.php?sid=oilyr1s305 accessed on 12.04.2005.

(83) Põhiametikohtade palgamäärad. Sotsiaalministeerium 2005. http://www.sm.ee. accessed on 12.04.2005.

(84) Haiglavõrgu arengukava. Elektrooniline Riigi Teataja, 11.04.2003, 35, 223. https://www.riigiteataja.ee/ert/act.jsp?id=830528. accessed on 15.05.2005.

(85) Eesti Haigekassa tervishoiuteenuste loetelu. Elektrooniline Riigi Teataja, 20.01.2005, 4, 13. https://www.riigiteataja.ee/ert/act.jsp?id=839278. accessed on 15.05.2005.

(86) Ravivoodite kasutamine voodiprofiilide lõikes 2003 aastal. Sotsiaalministeerium, individuaalpäring.

(87) Tervishoiutöötajate tunnipalk 2004 aastal. Sotsiaalministeerium. http://www.sm.ee accessed on 12.04.2005.

(88) Leinsalu M, Grintšak M, Noorkõiv R, Silver B. Eesti terviseuuring: metodoloogiaülevaade (Estonian health interview survey: methodological report). Tallinn: Eksperimentaalse ja Kliinilise Meditsiini Instituut; 1998.

(89) Leinsalu M, Grintšak M, Noorkõiv R, Silver B. Eesti terviseuuring: Tabelid (Estonian health interview survey: Tables). Tallinn: Eksperimentaalse ja Kliinilise Meditsiini Instituut; 1998.

(90) Aluoja A, Leinsalu M, Shlik J, Vasar V, Luuk K. Symptoms of depression in the Estonian population: prevalence, sociodemographic correlates and social adjustment. J Affect Disord 2004 Jan;78(1):27-35.

(91) Lehtinen V, Joukamaa M, Lahtela K, Raitasalo R, Jyrkinen E, Maatela J, et al. Prevalence of mental disorders among adults in Finland: basic results from the Mini Finland Health Survey. Acta Psychiatr Scand 1990 May;81(5):418-25.

(92) Sabate E. Adherence to long-term therapies: evidence for action. Geneva: World Health Organisation; 2003.