World Health Organization
REGIONAL OFFICE FOR Europe

Republic of Moldova
Health Policy Paper Series No. 3

REDUCING HARMFUL USE OF ALCOHOL: COST-EFFECTIVENESS OF ALCOHOL CONTROL STRATEGIES IN THE REPUBLIC OF MOLDOVA

By: Marcela Țirdea

Angela Ciobanu

Tudor Vasiliev

Liliana Buzdugan

MINISTERUL SĂNĂTĂȚII

World Health Organization
REGIONAL OFFICE FOR Europe

Reducing harmful use of alcohol: cost-effectiveness of alcohol control strategies in the Republic of Moldova

By:

Marcela Ţîrdea

Angela Ciobanu

Tudor Vasiliev

Liliana Buzdugan

Keywords

ALCOHOL DRINKING – prevention and control
HEALTH PROMOTION – economics
HEALTH POLICY
PROGRAM EVALUATION – economics
COST-BENEFIT ANALYSIS
REPUBLIC OF MOLDOVA

Address requests about publications of the WHO Regional Office for Europe to:
Publications
WHO Regional Office for Europe
Scherfigsvej 8
DK-2100 Copenhagen Ø, Denmark
Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the Regional Office web site (http://www.euro.who.int/pubrequest).

Contents

Affiliation of the authors

Marcela Țîrdea
Deputy Head of Department, Analysis, Evaluation and Monitoring of Policies, Ministry of Health, Republic of Moldova

Angela Ciobanu
National Professional Officer, Public Health, WHO Country Office in the Republic of Moldova

Tudor Vasiliev
Deputy Director, Republican Dispensary of Narcology, Republic of Moldova

Liliana Buzdugan
Head of unit Quality Management of Health Services, National Centre of Health Management, Republic of Moldova

Acknowledgements

The authors thank Dan Chisholm and Jarno Habicht of the WHO Regional Office for Europe, and Taavi Lai of the Department of Public Health, Tartu University, Estonia for their valuable assistance. The staff of the WHO Country Office provided very valuable input. The authors are also grateful to Ghenadie Ţurcanu, Galina Obreja, Ion Şalaru and to the many other people involved who have given helpful advice and provided data.

For their comments and helpful advice, the authors would also like to thank participants of the round-table discussion on the National Alcohol Control Action Plan 2012–2020 and of the National Conference, organized with the purpose of presenting the results of the cost-effectiveness analysis of tobacco and alcohol control strategies which were held in the Republic of Moldova in period of August - October 2011.

This document has been produced with the financial assistance of the European Union (EU).

The work contributes to the Biennial Collaborative Agreement 2010–2011 between the Government of the Republic of Moldova and the WHO Regional Office for Europe.

Disclaimer

The authors' views expressed in this report do not necessarily reflect the views of the World Health Organization, European Union and the Ministry of Health of the Republic of Moldova.

List of illustrations

Figures

Tables

List of abbreviations

DALY	Disability adjusted life year
EU	European Union
Eur-A	WHO subregion, comprising: Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom
Eur-B	WHO subregion, comprising: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Slovakia, Tajikistan, the former Yugoslav Republic of Macedonia, Serbia and Montenegro, Turkey, Turkmenistan, Uzbekistan
Eur-C	WHO subregion, comprising: Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Russian Federation, Ukraine
GDP	Gross domestic product
IARC	International Agency for Research on Cancer
MDL	Moldovan lei (national currency)
NCPM	National Scientific and Applied Center for Preventive Medicine
SDR	Standardized death rate
WHO	World Health Organization
WHO-CHOICE	CHOosing Interventions that are Cost Effective

Executive summary

This study, *Reducing harmful use of alcohol: cost–effectiveness of alcohol control strategies in the Republic of Moldova* was initiated with a view to evaluating the effectiveness and cost-effectiveness of internationally accepted viable interventions regarding the control of hazardous consumption of alcohol. The effectiveness of control strategies on alcohol consumption is measured by the number of healthy years of life gained as a result of interventions. The cost-effectiveness of the strategy is measured by the sum of financial resources (measured in MDL)[1] required to gain one healthy year of life as a result of the intervention(s).

Interest in measuring the effectiveness and cost-effectiveness of interventions to control alcohol consumption is determined by the impact this phenomenon has on the population health and society as a whole. Alcohol is identified worldwide as one of the fundamental risk factors in terms of mortality and disability cases, and is the cause of 3.8% of the total number of deaths and 4.5% of life years lost as a result of disability. Alcohol consumption is a determinant factor, causing more than 60 types of disease and accidents, incidents involving intoxication and injuries, and resulting in approximately 2.5 million deaths annually.

In the Republic of Moldova the hazardous consumption of alcohol is a phenomenon that requires rapid identification of effective and cost-effective measures in order to mitigate it. According to the data recently published by the World Health Organization (WHO), the adult population (aged over 15 years) of the Republic of Moldova consumes the highest quantity (18.22 litres per capita) of pure alcohol in the world. The impact of such alcohol consumption on population health is highlighted by the fact that the country has the highest number of deaths caused by cirrhosis in Europe.

The authorities of the Republic of Moldova have developed and are implementing several interventions to restrict alcohol consumption, such as tax charged on alcoholic beverages, prohibition of alcohol sale to individuals aged under 16 years, testing drivers for blood alcohol concentration, measures to inform the population about the dangers of excessive alcohol consumption, and so on.

1 Moldovan lei. The exchange rate of the national currency in 2010 was 12.37 lei per US dollar and 16.4 lei per euro.

This study analyses interventions to control hazardous consumption of alcohol from the perspectives of effectiveness and cost-effectiveness and comes with recommendations for enhancing them and, consequently, improving the health status of the population of the Republic of Moldova.

For the evaluation of the effectiveness and cost-effectiveness of interventions to control alcohol consumption the WHO-CHOICE methodology was used (CHOosing Interventions that are Cost Effective), as developed by WHO and designed for the analysis of the effectiveness and cost-effectiveness of interventions focused on reducing the burden of disease. This methodology offers the possibility to determine the effects of the current (and those planned for the future) interventions to control alcohol consumption applied separately and combined, which allows the maximum effect of interventions on population health to be measured. Interventions under analysis have two dimensions: those aimed at preventing new cases of hazardous alcohol consumption (increase in tax on alcoholic beverages, limitation of access to alcoholic beverages in commercial facilities, testing of drivers for blood alcohol concentration, information campaigns) and those focused on individuals at risk of addiction, which are aimed at reducing the amount of alcohol consumed (counselling by the family doctor).

Estimating the cost of alcohol consumption control strategies is carried out by quantifying of all the costs at both individual and society levels, applying 2010 prices. The cost-effectiveness of interventions to control hazardous consumption of alcohol is shown by the cost (MDL) of a healthy year of life gained (disability-adjusted life year (DALY) averted) as a result of interventions and compared with the gross domestic product (GDP) per capita (MDL 20 171 in 2010).

The results of analysis show that the most cost-effective intervention to control alcohol consumption (applied separately) is the level of tax stipulated for 2010, followed by the increase of tax by 25% and 50%, but the most effective intervention is the increase of tax by 25%. This is explained by the large share of untaxed alcohol consumption in the country, indicating that, with to obtain additional benefit in terms of reducing the hazardous consumption of alcohol by means of tax increases, the society as a whole must bear additional costs involved – in particular, in the registration and taxation of previously untaxed alcohol. The following strategies to reduce the hazardous consumption of alcohol (based on cost-effectiveness criteria) have been proposed, to be applied in the following order: a comprehensive advertising ban; counselling to at-risk drinkers by the

primary care doctor; restricting the sale of alcoholic beverages in commercial facilities; and expanding roadside breath-testing for blood alcohol content in motor vehicle driver.

The combination of alcohol consumption control interventions applied in the Republic of Moldova in 2010 allowed a saving of 6 114 healthy years of life. The increase of tax in combination with all other interventions analysed provides the opportunity to gain a total of 17 736 healthy years of life each year and the cost of each healthy life year gained constitutes MDL 3 821.

The major obstacle to be overcome with a view to improving alcohol consumption control in the Republic of Moldova is the presence of a large quantity of untaxed alcohol (more than 50%). Scenarios were proposed within the framework of the evaluation, to reduce the untaxed alcohol consumption by up to 30% and, if the analysed strategies are implemented in combination, 27 250 healthy life years could be gained annually, at the cost of MDL 2 487 per year.

The results of the cost-effectiveness analysis of the alcohol consumption control strategies in the Republic of Moldova indicate that all the interventions under evaluation are economically highly cost-effective, as the sum of resources required for their implementation is under the country's level of GDP per capita, and the benefits of implementing the interventions will be much greater than the expenditure required to do so.

The results of the cost-effectiveness analysis of alcohol consumption control interventions in the Republic of Moldova form the basis of one of the arguments put forward to justify political decisions relating to strategies for alcohol consumption control. The evaluation results provide clear evidence regarding the most effective methods of population health improvement at the lowest cost.

1. Introduction

The need to carry out an analysis of the effectiveness and cost-effectiveness of the alcohol consumption control interventions in the Republic of Moldova stems from the burden that alcohol consumption places on the health status of the country's population.

In the Republic of Moldova – a country with a significant share of production and consumption of alcohol – the disease burden resulting from alcohol use requires the development and implementation of intervention mechanisms with strong foundations to ensure the reduction of the heavy alcohol use and, therefore, to improve the health status of the population. With the view to achieving this objective, the Ministry of Health of the Republic of Moldova – with the support of the World Health Organization (WHO) Regional Office for Europe – initiated an analytical study of the strategies aimed at the reduction of burden of heavy alcohol use in the country.

The purpose of such an analysis is to evaluate the effectiveness and cost-effectiveness of alcohol control strategies, applying the results of the study as the foundation of the national policy documents relating to alcohol use reduction.

For the purposes of this analysis the WHO-CHOICE methodology was used (CHOosing Interventions that are Cost Effective) (Tan-Torres Edejer et al., 2003), established by WHO for evaluating the cost-effectiveness of interventions relating to control of diseases. The use of this methodology for the analysis of the cost-effectiveness of alcohol consumption control strategies necessitated the updating and contextualization of demographic and epidemiological data specific to the Republic of Moldova, as well as data on the financial cost of implementing the strategies.

The report sets out the situation regarding the alcohol consumption risk factor and its impact on population health in the Republic of Moldova. The approach to analysing the effectiveness and cost-effectiveness of alcohol consumption control strategies is described, and the report presents the data collected and used for the analysis, as well as evaluation results relating to the effectiveness and cost-effectiveness of the strategies under analysis.

2. Analysis of the hazardous alcohol consumption situation in the Republic of Moldova

2.1 Production and import of alcoholic products

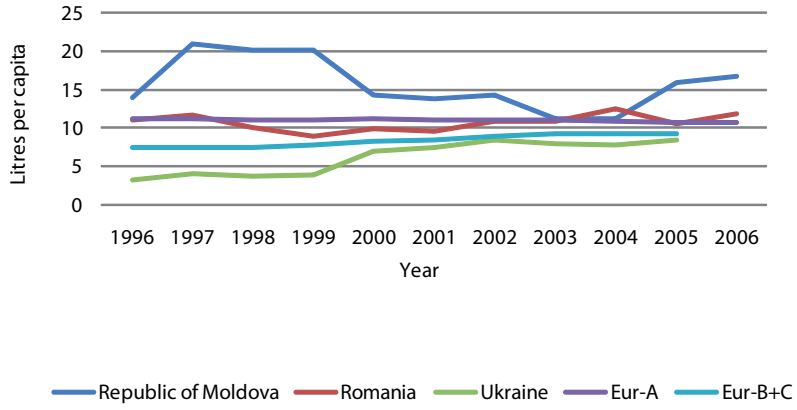
Hazardous alcohol use is one of the most important social and health concerns at global, regional and national levels. The WHO European Region is the region with the highest rate of alcohol abuse in the world, with a prevalence of excessive drinking episodes in the adult population being one fifth higher than in other regions (WHO Regional Office for Europe, 2010). According to data recently published by WHO, the adult population (aged over 15 years) of the Republic of Moldova consumes the highest quantity of pure alcohol per capita globally (WHO, 2011b), amounting to 18.22 litres per capita.

Within the period 1996–2006, alcohol use in the Republic of Moldova remained at a high level in comparison with neighbouring countries, and those from group Eur-A, as well as Eur-B + C[2] (Fig. 2.1), registering a decrease during the period 1999–2003 and an increase in alcohol use since 2004 (WHO Regional Office for Europe, 2011).

The Republic of Moldova is an agro-industrial country in which viticulture and production of alcoholic beverages are an important part of the national economy and a tradition for the population. Over a half of the amount of alcohol consumed by the population constitutes unlicensed alcohol, the majority of which is produced and consumed in household conditions.

2 Grouping of the WHO Member States into regions and subregions by the mortality rate among children and adults. Eur-A: Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom; Eur-B: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Slovakia, Tajikistan, the former Yugoslav Republic of Macedonia, Serbia and Montenegro, Turkey, Turkmenistan, Uzbekistan; Eur-C: Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Russian Federation, Ukraine.

Fig. 2.1 Pure alcohol consumption at age 15+ years in selected countries, 1996–2006 (or latest available year)



According to the Moldovan legal framework, the production of alcoholic beverages in the Republic of Moldova is divided as follows:

- licensed – production in industrial conditions, storage and marketing of alcoholic products;
- unlicensed – production of wine products in household conditions.

At present, according to data provided by the Ministry of Agriculture and Food Industry, 162 licensed entrepreneurs are involved in the production, storage and marketing of alcoholic products in the Republic of Moldova, of which 135 enterprises work in the field of wine production; 19 enterprises produce wine distillates, cognac and brandy; and 19 companies work in the field of ethyl alcohol and rectified spirits production (vodka, rachia, etc.).

During the year 2010 the volume of licensed alcoholic products produced constituted 12 307 thousand decalitres (Table 2.1), and the use of licensed alcohol in the domestic market amounted to 5 338 thousand decalitres – more than 40% of the amount produced.

Table 2.1. Production of alcoholic beverages in the Republic of Moldova, 2010

Type of alcoholic beverage	Produced volume	Traded quantity, total	Mii de decalitri, inclusiv		Stock at the end of December
			internal market	external market	
Cognacs	439,2	547,1	115,7	431,4	102,4
Grape brandy	26,3	26,4	12,1	14,3	20,1
Vodka	307,9	310,3	214,4	95,9	47,7
Liqueurs and other drinks containing spirits	636,1	624,9	615,7	9,2	85,1
Rachiu and liqueurs	944,0	935,2	830,1	105,1	132,8
Sparkling wines	537,2	540,2	277,5	251,0	80,4
Effervescent wines	200,3	182,1	97,9	84,2	32,9
Natural grape wines	8 262,6	10 054,9	2 907,2	7 147,7	3 235,4
Porto, Madeira, Sherry, and other special wines	953,4	974,9	267,2	707,7	158,5
Total	**12 307**	**14 196**	**5 337,8**	**8 846,5**	**3 895,3**

Source: National Bureau of Statistics, 2011 (data provided by the Ministry of Agriculture and Food Industry).

The quantity of beer produced and sold is not a subject to a mandatory reporting process, but according to unofficial data, the company Efes Vitanta Moldova Brewery – the leader in beer sales in the national market – annually produces beer in the volume of 10 000 thousand decalitres, which is sold exclusively within the territory of the Republic of Moldova. At present 14 licensed enterprises are working in the field of beer production and marketing.

Production of alcoholic beverages in household conditions is an unlicensed area, but is permitted by the related national legislation. The type of alcoholic beverages produced in individual households varies from one area to another, but in the majority of cases, wine is produced at home. Within the framework of the public opinion poll carried out by the Expert Group (Expert Grup, 2008) it was revealed that in 56% of the surveyed households, alcoholic beverages are produced at home and in most cases (99%) these households produce wine. A total of 70% of respondents from rural households and 32% of those from urban areas reported that they produce wine in household conditions.

The Republic of Moldova both produces and imports alcoholic beverages; these mainly originate from the Ukraine and the Russian Federation. Beer constitutes about 70–90% of the total share of imported alcoholic products (Table 2.2).

Table 2.2. Import of alcoholic products by the Republic of Moldova, 2010

		Thousand deciliters
Product name	Quantity, for 6 months of 2010	Quantity, for 6 months of 2011
Beer	1 264.6	1 307.6
Sparkling wines	2.53	2.73
Wines	10.70	236.15
Vermouths	4.80	4.77
Fermented beverages	7.93	24.71
Refined ethyl alcohol	7.34	15.04
Cognac and brandy	0.59	0.99
Wine distillates	58.97	66.56
Vodka and other spirits	26.76	36.53
Total	**1 384.97**	**1 696.53**

Source: National Bureau of Statistics, 2011 (data provided by the Ministry of Agriculture and Food Industry).

2.2 Alcohol consumption prevalence

Alcohol is the third most significant risk factor affecting health and causing premature death, both at the global and the European Community levels (WHO, 2011b; Anderson & Baumberg, 2006). The absolute risk of death caused by the harmful effects of alcohol use increases alongside the total quantity of alcohol consumed during a lifetime, the frequency of consumption and the quantity of alcohol consumed per serving.

In the Republic of Moldova the alcohol has been produced and consumed for thousands of years. Wine-making is a tradition and a matter of national pride, but the share of wine among the alcoholic products consumed at present is equally proportional to the consumption of beer and stronger alcoholic beverages. Therefore, the distribution of alcohol consumption is currently almost proportional: 36% wine, 33% stronger alcoholic beverages and 31% beer (WHO Regional Office for Europe, 2010). Wine is predominantly consumed in rural areas, and stronger alcoholic beverages are mainly consumed in urban areas (18% in urban areas compared to 13% in rural areas) (Expert Grup, 2008). Beer is consumed mostly by young people, aged 15–19 years.

A fairly large proportion of the adult population of the Republic of Moldova consumes alcohol. The results of the Moldova Demographic and Health Survey carried out in 2005 (NCPM [Moldova] & ORC Macro, 2006) revealed that 59% of women and 81% of men had consumed at least one alcoholic drink[3] during the month preceding the study. No significant differences were observed in the alcohol consumption of men in terms of area of residence, region, level of education or welfare quintile. On the contrary, for women, differences were revealed in all of these factors. A smaller percentage of women in rural areas and in the northern region had consumed alcohol during the previous month, but a tendency was observed towards an increase in alcohol consumption alongside the increase of the level of education and welfare of women.

Data on the frequency of alcohol consumption are different from those relating to the amount of alcohol consumed. Of the 81% of men who reported consuming at least one alcoholic drink during the month preceding the survey, only 7% of men consumed alcohol once a month and none did it less frequently than once a month. In total, 17% of men reported daily or almost daily consumption of alcohol and 41% consumed alcohol at least once a week. Men from rural areas (20%) and those from central (27%) and southern regions (20%) consumed alcohol more frequently. Men with a higher level of education and from the higher welfare quintile consumed alcohol less frequently.

Within the framework of the sociological survey conducted in 2008 (Expert Grup, 2008), it was revealed that alcoholic beverages were consumed in 60% of households in Moldova, with a higher prevalence in rural areas (66%) compared with urban ones (50%). The highest level of alcohol consumption was recorded among the population aged between 20 and 44 years, with secondary vocational education and household incomes exceeding MDL 2500 (US$ 241) per month. In 32% of cases the consumed alcoholic beverages were purchased from the commercial network; in 30% in restaurants and bars; in 25% of cases the consumed drinks originated from household production; and in 11% of cases they were purchased from individuals (Expert Grup, 2008).

2.2.1 Basic reasons for alcohol consumption

Alcohol is consumed at celebrations or at certain events (35%), to "overcome stress" (28%), to relax (22%), as part of family tradition (20%), and because it is believed to be beneficial for health (19%) (Expert Grup, 2008).

3 A standard alcoholic drink was considered a bottle or a pint of beer (330–500 ml), a glass of wine (50–200 ml), a glass of liqueur, rachia or whiskey (50 ml).

2.3 Burden of disease caused by alcohol consumption

Hazardous consumption of alcohol has a negative impact on public health, expressed by the indicators of mortality and disease burden.

Alcohol is identified worldwide as one of the fundamental risk factors for mortality and disability, being the cause of 3.8% of deaths and 4.5% of life years lost as a result of disability (WHO, 2009). According to WHO data, each year 2.5 million people worldwide die as a result of hazardous alcohol use.

The disease burden is defined by WHO as the difference between current health status and perfect health (condition that allows each person to live into old age without any illness or disability). Premature death, disability or risks – which contributes to the development of disease and trauma – are considered to be causes of such a difference in health status. The burden of disease is shown by the disability-adjusted life year (DALY) index.[4] The use of this index in estimating of the burden of disease, including those determined by hazardous alcohol use, allows both mortality and morbidity to be united in a single measuring instrument.

In terms of the DALY index, alcohol occupies the third place worldwide (second place in high-income countries, first place in middle-income countries, and eighth place in low-income countries). The social costs generated by alcohol consumption are estimated at about 1.3–3.3% of the gross domestic product (GDP) (WHO, 2011b).

Alcohol consumption can have a variety of adverse effects. Some of them are acute and are associated with particular occasions of consumption, while others are chronic, determined by repeated consumption of alcohol. Alcohol use progressively affects coordination, perception and attention and as a result increases the risk of accidents and injuries. At the global level it has been estimated that alcohol is the cause of approximately 20% of deaths resulting from road accidents (WHO, 2009). In addition, excessive alcohol consumption potentially affects individuals' behavioural intentions and reasoning and thus the intoxication can play a causal role in violent behaviour and crime (Graham et al., 1998) It is usually young people that suffer more often from acute adverse effects of alcohol consumption. According to WHO data, 320 000 young people aged between 15 and 29 years die annually from causes associated with alcohol consumption, resulting in 9% of all deaths in this population group (WHO, 2011b).

4 DALYs are calculated by adding the years lost due to premature death and years lived with impaired health status or disability.

Chronic effects are determined by hazardous alcohol use and repeated patterns of alcohol consumption. Alcohol has the potential to affect almost all organs of the human body; it contributes to the development of more than 60 diseases and injuries (WHO, 2009). Chronic conditions, in which alcohol is implied as a cause, are diseases of the digestive system (cirrhosis, pancreatitis, gastritis), of the cardiovascular system (cardiomyopathy, hypertension, ischaemic stroke) and several types of cancer (pharyngeal cancer, cancer of the oesophagus, larynx and liver, as well as gastric, pancreatic and breast cancer) (Baan et al., 2007). Alcohol contributes to the increase in the incidence of infectious diseases through a variety of mechanisms. Hazardous repeated consumption of alcohol may also negatively affect mental health.

2.3.1 Hazardous consumption of alcohol and cancer

There is sufficient evidence proving the causal effect of alcohol consumption for the development of some types of cancer, particularly in combination with cigarette smoking; for example, cancer of the mouth cavity, pharynx, larynx, oesophagus, liver, colon, rectum and breast (Baan et al., 2007; IARC, 1998). The existing evidence proves the "dose–response" interrelation between the quantity of alcohol consumed and the risk of cancer development; therefore, the risk obviously increases with any increase in the quantity of alcohol consumed (Rehm et al., 2010b). For every 10 grams of additional pure alcohol consumed by a woman per day, the relative risk of breast cancer increases by 7% (Baan et al., 2007). Regular consumption of 50 grams of pure alcohol daily increases the relative risk of developing colon cancer by 10–20% (ibid.) and cancer of the pharynx, larynx and oesophagus by 100–200% (Anderson & Baumberg, 2006).

2.3.2 Hazardous consumption of alcohol and cardiovascular diseases

Observational studies have established J-shaped correlation between alcohol consumption and blood pressure (Klag et al., 1993). Thus, people who consume 14–28 grams of pure alcohol per day have lower blood pressure than those who do not consume alcohol, and for those who consume more than 42 grams of alcohol the blood pressure rises significantly (Victor & Hansen, 1995). Chronic consumption of alcohol in hazardous quantities is associated with various cardiac diseases, including ischaemic heart disease, cardiomyopathy, cardiac arrhythmias and ischaemic hemorrhagic

stroke (Zakhari, 1997). Consuming 2–5 doses of alcohol (equivalent to 28–70 grams of pure alcohol) daily determines the development of new cases of cardiac arrhythmias in 30–60% of patients (Rehm et al., 2010b).

2.3.4 Hazardous consumption of alcohol and liver diseases

Various liver diseases are associated with hazardous consumption of alcohol, among them alcoholic hepatitises, hepatic steatosis and cirrhosis, with the latter being most common. The probability of developing these diseases depends on the duration of consumption and quantity of alcohol consumed (Mann, Smart & Govoni, 2003); therefore, the relative risk of cirrhosis morbidity and mortality increases along with the quantity of alcohol consumed per day (Rehm et al., 2010a). However, the risk varies for men and women consuming the same amount of alcohol. Consuming 30 grams of pure alcohol per day for men is associated with the relative risk of death from cirrhosis equal to 2.8, while for women it is 7.7. The relative risk of cirrhosis morbidity for men consuming the same amount of alcohol daily constitutes 0.7 and for women the figure is - 2.4. The quantity of pure alcohol up to 54 grams consumed daily by men involves the risk of morbidity from cirrhosis of up to 2.3 (Rehm et al., 2010a).

2.4 Burden of disease caused by alcohol consumption in the Republic of Moldova

In the Republic of Moldova a large number of people suffer from chronic alcoholism and alcoholic psychoses. According to data from the Republican Narcologic Dispensary, the prevalence of chronic alcoholism in 2010 constituted 1314 cases per 100 000 population, with a slight increasing trend (Table 2.3). Of the total number of ill individuals, 15% were women. More than half of patients (66.3%) suffering from chronic alcoholism were from rural areas.

According to the opinion of some experts in the field, the registered number of people suffering from chronic alcoholism does not reflect the actual number of individuals suffering, but reflects only those who fall within the range of activity of medical institutions.

Both the incidence and prevalence rates of alcoholic psychoses remain steadily at a high level, that is, 23.4 and 27.7 cases per 100 000 population, respectively.

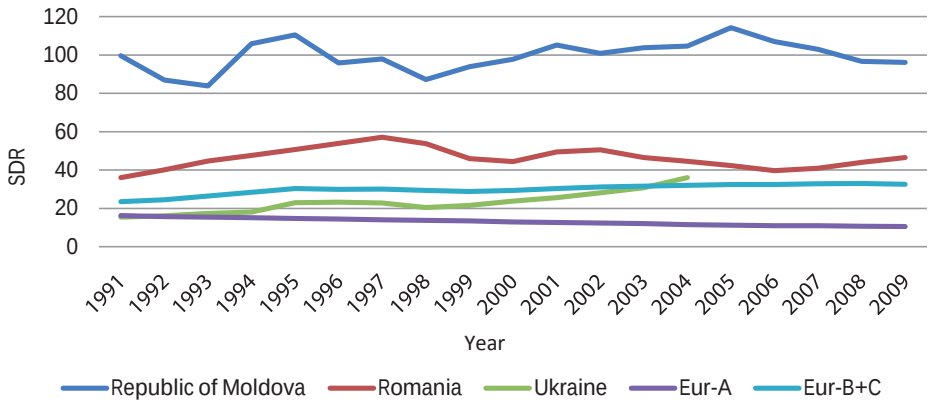
Table 2.3. Incidence and prevalence of chronic alcoholism and alcoholic psychoses among the population of the Republic of Moldova, per 100 000 population, 2007–2010

Indices	2007	2008	2009	2010
Chronic alcoholism incidence	111,9	111,7	129,8	121,3
Chronic alcoholism prevalence	1300,2	1292,1	1299,6	1314,2
Alcoholic psychoses incidence	23,1	21,9	22,7	23,4
Alcoholic psychoses prevalence	26,6	28,3	28,9	27,7

Sources: National Center of Health Management, 2008, 2009, 2010, 2011.

The highest rate of deaths from chronic liver diseases and cirrhosis in European countries is registered in the Republic of Moldova (Fig. 2.2). Chronic hepatitis and cirrhosis caused 3533 deaths, or 99.2 deaths per 100 000 population in 2010, constituting almost 10% of total deaths. Based on the data provided by specialized literature, which states that alcohol is responsible for about 50% of deaths determined by cirrhosis (WHO, 2009), we can envisage that about 45 deaths per 100 000 population are caused by the hazardous consumption of alcohol.

Fig. 2.2. Standardized death rate, chronic liver diseases and cirrhoses, all ages, per 100 000 population, 1991–2009 (or latest available year)



Source: WHO Regional Office for Europe, 2011.

Alcohol is a risk factor in road accidents. In the Republic of Moldova about 17% of the total number of road accidents is caused by individuals in a state of alcoholic intoxication (Table 2.4). In recent years, the number of accidents that occurs involving alcoholic intoxication has remained stable, with a slight tendency towards increasing.

Table 2.4. The absolute number of road accidents and individuals injured in road accidents, 2008–2010

Year	Road accidents	Road accidents under alcoholic intoxication	% of road accidents under alcoholic intoxication	Individuals injured in road accidents	Injured (total)	Died (total)
2008	2 869	493	17.2	3 994	3 494	500
2009	2 755	476	17.3	3 784	3 297	483
2010	2 921	498	17.0	4 187	3 735	471

Sources: National Center of Health Management, 2008, 2009, 2010, 2011.

As regards the death rate from road accidents, a slight decrease can be observed over the period 2007–2010 (see Table 2.5).

Table 2.5. Death rate from road accidents, per 100 000 population, 2007–2010

	2007	2008	2009	2010
Road accidents	16.5	16.0	13.5	13.2

Sources: National Center of Health Management, 2008, 2009, 2010, 2011.

The major causes of morbidity and mortality associated with alcohol consumption are clear, and have a tendency towards increasing; therefore, it can be stated that the impact of alcohol consumption on society must not be neglected. Reducing the hazardous consumption of alcohol becomes a priority area and this must be carried out by means of cost-effective strategies.

2.5 National legislation in the field of alcohol control

In the Republic of Moldova the consumption of alcoholic beverages is regulated by several normative acts, listed here.

1. Law nr. 1227 of 27 June 1997 on advertising.
2. Law nr. 1100 of 30 June 2000 on the production and turnover of ethyl alcohol and alcohol products.
3. Law nr. 713 of 6 December 2001 on the control and prevention of the hazardous consumption of alcohol, illicit consumption of drugs and other psychotropic substances.
4. Law nr. 57 of 10 March 2006 on viticulture and wine.
5. Law nr. 218 of 24 October 2008, the Contravention Code of the Republic of Moldova.
6. Law nr. 451 of 30 July 2001 on licensing of certain types of activities.

Law nr. 713 of 06 December 2001 on the control and prevention of the hazardous consumption of alcohol, illicit consumption of drugs and other psychotropic substances stipulates conditions and production volume(s) for alcohol products, requirements for the import of alcoholic beverages and similar products to be consumed in the country.

Recently the Government of the Republic of Moldova has elaborated and approved a number of draft legislative acts aimed at tightening control on the marketing of alcoholic beverages. These are yet to be adopted by the Parliament of the Republic of Moldova. It is expected that a ban will be placed on direct and/or indirect advertising of alcoholic beverages (including beer) by the modification, which is to be introduced to Law nr. 1227-XIII of 27 June 1997 on advertising. In addition, article 264 of Law nr. 218 of 24 October 2008, the Contravention Code of the Republic of Moldova is modified in relation to the sanctions applied in case of failure to comply with the requirements for alcohol advertising: "placement or broadcasting of alcohol advertising is sanctioned with a fine from 20 to 300 conventional units".[5]

In article 30 of Law nr. 1100 on the production and turnover of ethyl alcohol and alcohol products, modifications were introduced to restrict access to and prohibit the marketing of alcoholic beverages (paragraph (b)) at commercial enterprises located near preschool and educational institutions (within 50 m distance from

5 One conventional unit is equal to MDL 20.

them, measured from the borders of the given institutions and indicated in the cadastral plan). The age at which alcohol sale is permitted is also increased (paragraph (j)): the words is "aged 16 years" are substituted by "aged 18 years". The time of alcohol sale is limited by the amendment in paragraph (l), whereby sale of alcohol is prohibited: "in public entertainment places, catering companies, points of sale, technical service and fuel stations from 20:00 to 10:00".

At present, legislation contains several provisions that make alcoholic beverages easily accessible. Article 1 of Law nr. 1100 of 30 June 2000 on the production and turnover of ethyl alcohol and alcohol products defines alcohol products as "food products, with a volume of alcohol concentration higher than 1.5%". In European countries, alcoholic production is the production of products containing ethyl alcohol with a volume of concentration higher than 1%, and as such, similar provision should also be introduced into the legislation of the Republic of Moldova. In the same article, "strong alcoholic drinks" are defined as food production with alcohol concentration exceeding 25% by volume.

One of the limitations of the control of alcoholic beverage consumption is that beer production and turnover is not regulated (article 3) by Law nr. 1100 of 30 June 2000 on the production and turnover of ethyl alcohol and alcohol products, despite the fact that the concentration of alcohol in beer exceeds 1.5% by volume.

The same law stipulates that "production, storage (warehousing) and wholesale of alcohol products are subject to licensing in accordance with Law nr. 451 on licensing of certain types of activities. Retail trade of alcoholic products is licensed by the local public administrative authorities (article 13, paragraph (1)). It is hereby proposed that licensing the marketing of alcoholic beverages should be introduced based on the quantity of ethylic (pure) alcohol allowed for sale, thus allowing control of the quantity of marketed alcohol.

Law nr. 1100 of 30 June 2000 on the production and turnover of ethyl alcohol and alcohol products does not stipulate the quantity of alcohol produced in household conditions; it only indicates that (article 21) "it is permitted to produce alcoholic beverages for personal consumption in household conditions in individual and rural households (farms)".

Proposed regulatory elements relating to alcohol consumption – if approved and implemented – will lead to a reduction in the quantity of alcohol consumed by the population.

3. Aim of the study

Initiation by the Ministry of Health – with the support of the WHO Regional Office for Europe – of a study of the medical and socioeconomic quantification of interventions aimed at reducing hazardous alcohol use in the Republic of Moldova was brought about by the need to analyse measures undertaken by state authorities towards reducing the burden of disease caused by the hazardous use of alcohol, as well as to evaluate the effects of new measures and determine the most cost-effective strategies.

The aim of the study is to evaluate the effectiveness and cost-effectiveness of control strategies relating to hazardous alcohol use in the Republic of Moldova.

The analysis of cost-effectiveness of control strategies relating to the hazardous use of alcohol was carried out by applying the WHO-CHOICE methodology for estimating the cost-effectiveness of measures for controlling disease burden, developed by WHO and applied by its Member States. This is the first time that the effectiveness and cost-effectiveness of alcohol control measures – as well as their impact on the burden of disease – have been evaluated in the Republic of Moldova.

In Eastern Europe the cost-effectiveness analysis of control interventions relating to alcohol consumption (based on the WHO-CHOICE methodology) was carried out in Estonia (Taavi Lai et al., 2007).

4. Methodology of the cost-effectiveness analysis regarding alcohol control interventions

4.1 WHO-CHOICE methodology

Analysis of the cost-effectiveness of interventions aimed at disease control is one of the methods widely applied in health care economics. The method determines the resources (in monetary units) necessary to obtain a result (in natural units) through the implementation of health-related interventions. The result of implementing the intervention is measured by quantifying the number of healthy years of life gained, or the number of disability-adjusted life years (DALYs) averted.

The cost-effectiveness analysis method allows the burden of disease on the population health status to be quantified, expressed in DALYs averted, and resources necessary to implement different interventions/strategies to be developed and applied to reduce this burden. The improvement of health status achieved as a result of implementing specific strategies and the resources necessary for that are calculated, both separately and combined, for each strategy. The method offers explanations regarding the relationship between improved health status and the economic costs of the intervention.

The first phase of analysing the cost-effectiveness of reducing the disease burden is focused on defining the public health problem, in this case caused by the hazardous consumption of alcohol. At this stage, the answers to the following questions are provided: What do we want to analyse? Why? When do we want to change the situation? Possible interventions and actions to be carried out, along with instruments to be applied in order to obtain the desired result – relevant to the achievement of the set of objectives – are established as well.

The resources required for the implementation of interventions are quantified at the second stage of analysis, and the resources required to improve health status are quantified for each intervention, both at the programme and patient levels.

Each result (of quantifying the intervention costs) is compared with the situation if no intervention is carried out.

The third stage of analysis involves presenting the achieved change in the health status of the population as a result of carrying out the intervention, expressed in life years of improved health. The cost-effectiveness of interventions is expressed by the number of healthy life years gained or in DALYs averted, and the cost (in national currency) of each year of healthy life gained or DALY averted.

Despite the fact that cost-effectiveness analysis of the disease control interventions provides clear evidence regarding the value of interventions, this method is not widely used for determining health priorities. This is explained by the fact that not all countries can ensure the validity of cost-effectiveness analysis methodologies; difficulties arise in terms of in accessing the initial data and generating results of cost-effectiveness analysis studies. With a view to overcoming these limitations, WHO developed cost-effectiveness analysis tools to be used by Member States at national level.

One of these tools is WHO-CHOICE, developed by WHO to simplify the use of cost-effectiveness analysis in the field of disease control, to standardize the methodology used by WHO Member States and to ensure comparability of data.

The results of WHO-CHOICE methodology application can be used as a basis for defining priorities within the framework of health care programmes. The approach has many attributes, the first of which is that application of the WHO-CHOICE methodology is based on a so-called "generalized" approach, which enables the limits of economic studies carried out in specific contexts to be averted. In the case of specific population health problems, the rule is that, after having chosen the intervention aiming to solve it, more detailed cost-effectiveness analysis is to be carried out.

Another important feature of WHO-CHOICE methodology is that it assesses the effectiveness of each intervention and combinations thereof under a null hypothetical situation, whereby interventions to reduce the disease burden or risk factors are absent. This allows comparison of the cost-effectiveness of different interventions, providing additional evaluation results relating to the effectiveness by modifying the current situation for each intervention.

The third feature of the methodology is that all interventions are independent of each other. The results of interventions used within WHO-CHOICE programme are not competing, similarly to the occurrence of only a single disease condition in the modelled situation.

Another feature is that the impact of an intervention is modelled for a period of 100 years, where the intervention itself is implemented within a period of 10 years. At the end of the implementation period the previous trend is taken and used to model the change in population health status for the next 90 years. [6]

4.2 Impact assessment of interventions

According to WHO-CHOICE methodology, the analysis of alcohol consumption control was carried out based on six interventions able to reduce the burden of the hazardous consumption of alcohol. They were applied both separately and combined.

1. Increase in the tax rate for alcoholic beverages by 25%.
2. Increase in the tax rate on alcoholic beverages by 50%.
3. Restriction of access to alcoholic beverages in commercial facilities.
4. Comprehensive advertising ban.
5. Roadside breath-testing for blood alcohol content in motor vehicle drivers.
6. Brief interventions involving counseling to at-risk drinkers, carried out by the primary care physician.

The first prerequisite to be observed while carrying out the cost-effectiveness analysis of interventions relating to alcohol consumption control is to establish the health hazard produced in the event of non-intervention, that is, to determine the null hypothetical situation, when absolutely nothing is done.

Mortality, morbidity, prevalence and other epidemiological indices will differ from those characteristic of the current situation in the event of null intervention. These differences in the epidemiology of diseases led to the formation of a population structure that differs from the current one.

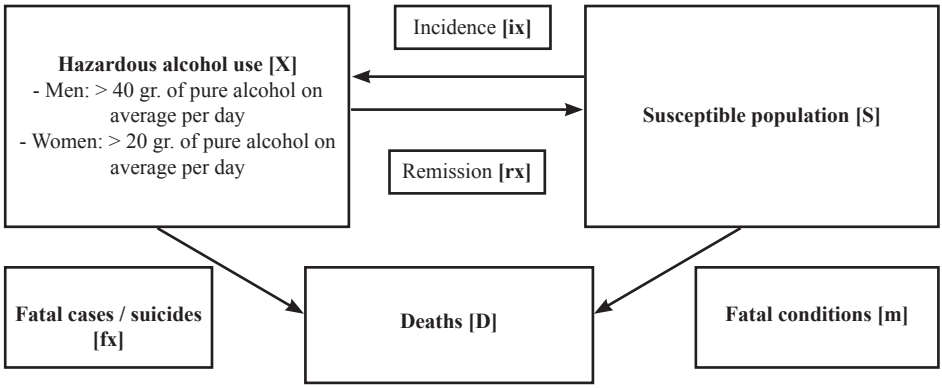
The current epidemiological situation determined by the set of currently applied interventions is used as a starting point for establishing the null situation. After morbidity, prevalence, fatal cases, disease duration and mortality have been

6 Further information regarding WHO-CHOICE methodology can be found on the WHO web site (www.who.int/choice, accessed 29 November 2011).

determined in the null situation, the data are used to determine the population health hazard for the null situation and for situations resulting from the disease control interventions using the population model entitled PopMod (Fig. 4.1).

Within the framework of the analysis two intervention scenarios were modelled for the next 100 years: (1) null situation analysis, without applying interventions; and (2) analysis of the impact of the interventions applied to the natural course of morbidity for a period of 10 years (after the epidemiological situation is restored). The difference between these two scenarios shows health benefits resulting from health interventions, expressed in healthy years of life gained. The result obtained is adjusted by applying a discount rate of 3% and the number of years lost is balanced by weighting the age (age-weights), as per the rule applied by WHO in studies relating to the global burden of disease (WHO, 2008).

Fig. 4.1. The population model as regards alcohol consumption



Source: WHO, 2011a.

The need to apply the discount rate and age-weighting is the result of using a socioeconomic approach to interpreting the impact of the interventions. Reduction of the result value in time is a tool regularly used in economic and health analyses to ensure the link between disease burden dynamics and economic results of it, to analyze the cost-effectiveness of the long-term investment. Age-weighting gives different value to years of life lost at different ages and is based on the internationally accepted opinion that gives preference to years lived as a young adult compared to those lived as an elderly person or child.

Data on population structure and mortality (by age group), number of live births and disability weighting for different conditions are used in the modelling of health losses.

Application of the PopMod model allows evaluation of the improvement of population health status or averted burden of disease resulting from alcohol consumption control interventions as compared with the situation when nothing is done (that is, with a null intervention situation).

4.3 Cost estimate for alcohol control interventions

Estimation of intervention costs in the WHO-CHOICE programme is carried out based on three principles: common approach to all costs for all interventions, quantification of costs at the level of the resource unit [Q (quantity) x P (price)] and quantification of all economic costs (as opposed to financial ones).

Within the framework of the analysis, the costs were estimated for the whole of society. The applied model does not indicate the source from which these costs are covered, for example, state budget, compulsory medical insurance fund, contribution on the part of the patient or her/his family, or other sources. Furthermore, the result of analysis does not indicate to what extent the amount of financial resources allocated to the state budget has been modified due to the introduction of the increase in taxes on undesirable social goods (alcoholic beverages, tobacco, etc.). This is because, from the societal perspective, only the source of the funds can be modified, not the amount. The costs of resources required to implement interventions were strictly quantified during the analysis.

Implementation of various interventions requires costs to be calculated according to the resource cost(s). The WHO-CHOICE programme separates resources depending on the type of costs, the field in which the intervention is to be implemented and the time frame for doing so, as well as the specificity and level of the organizations carrying out the intervention (national, regional), and the source of the resources. To ensure the comparability of data at the international level, the model recommends the additional classification of the implementation costs, whereby the exchange rate is applied.

Costs included in the analysis are divided into recurrent (personnel costs, utilities, transportation costs, per diems for training, etc.) and lump-sum expenses (purchase of buildings, transport facilities, etc.). The initial costs of the intervention are calculated, along with the maintenance costs.

Depending on the type of costs, they are divided into the categories "fixed" and "variable". Fixed costs include those required to initiate and maintain the control strategy and do not depend on the number of people employed (costs for central administration, monitoring of activities, elaborating normative acts). Variable costs depend on the number of people involved in the strategy (they ensure communication with target groups or individuals employed to monitor the implementation of the intervention within the specified area, and so on).

According to the field of implementation, the costs are divided into those for planning, administration, media coverage, training, monitoring, and so on.

Depending on the period of time involved, the WHO-CHOICE methodology distinguishes costs for the period of initiating the intervention and that of maintaining it. These two periods are delimited, as the costs required to initiate the intervention may be much higher in the process of its implementation. It is important to distribute them throughout the whole intervention period and to quantify them, applying the annual rate of discount.

Costs and required resources differ according to the scale of the intervention; therefore, costs are delimited according to the level of the organization. This level can be administrative (central and local levels) or can involve different institutions providing medical services (medical institution level, patient level, programme or system level, or even local or regional institution level).

Costs are estimated both separately for each intervention, and in combinations of different interventions relating to alcohol control. Modelling scenarios – a possibility made available by the WHO-CHOICE programme – is very important for analysing the real situation and obtaining accurate results.

4.4 Interpreting results

Applying the WHO-CHOICE methodology to analyse disease control interventions gives the opportunity to evaluate both the cost-effectiveness of each intervention separately and the cumulative cost-effectiveness of several interventions. The intervention is evaluated as being cost-effective or not based on the calculated cost for a year of life saved, compared with the situation when no action is taken (that is, non-intervention).

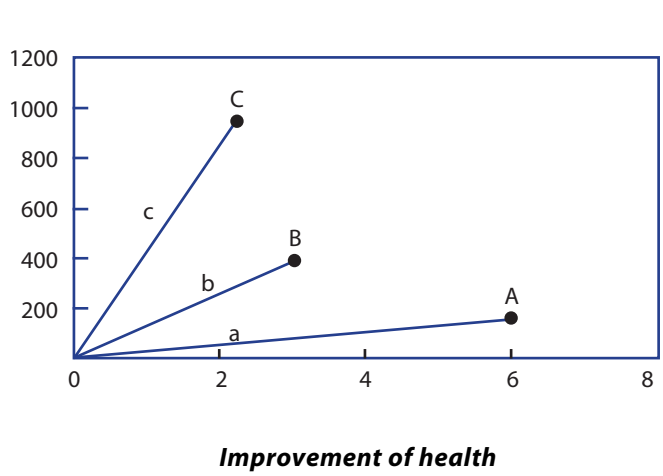
Use of cumulative indices in assessing the cost-effectiveness of interventions is recommended most often as the best way to select different combinations of interventions. Cumulative cost-effectiveness expresses the cost-effectiveness obtained by adding a new intervention to the intervention that is currently being implemented.

The analysed interventions can be considered mutually exclusive, or can be applied simultaneously. Therefore, every decision regarding the initiation of the intervention application should begin with providing the answer to the question: Can the identified intervention be implemented simultaneously with another intervention or not?

Cost-effectiveness evaluation is shown in the graphical presentation of costs and effects, whereby costs are placed on the vertical axis and effects on the horizontal one. Cost-effectiveness is indicated by the degree of the angle created, starting with the origin and the intersection point with the costs axis and the effects axis. The smaller slope indicates a more cost-effective intervention.

Fig. 4.2 shows a hypothetical situation when interventions A, B and C (with lines indicating the cost-effectiveness of these) can be implemented simultaneously. Intervention A is the most cost-effective and it should be selected for implementation, followed by interventions B and C.

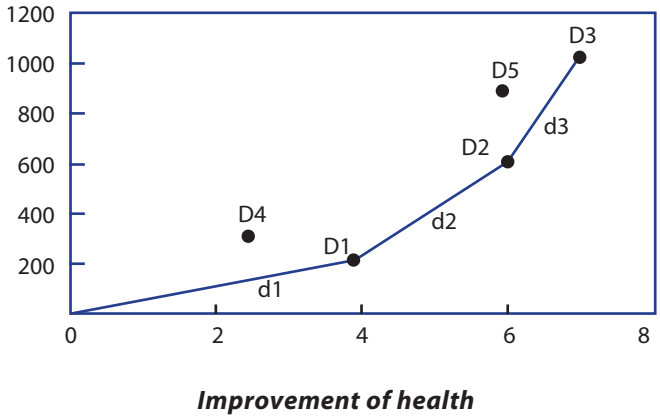
Fig. 4.2. Costs and benefits of mutually compatible strategies



Source: WHO, 2011a.

Fig. 4.3 shows a hypothetical example of mutually excluding interventions. The linear graph shows that the most cost-effective intervention is intervention D1; intervention D2 is less effective and immediately follows it, but cannot be implemented simultaneously with intervention D1. To implement intervention D2, that is, to ensure the transition from intervention D1 to intervention D2, additional costs are incurred, but these will produce additional effects.

Fig. 4.3. Costs and benefits of mutually excluding strategies



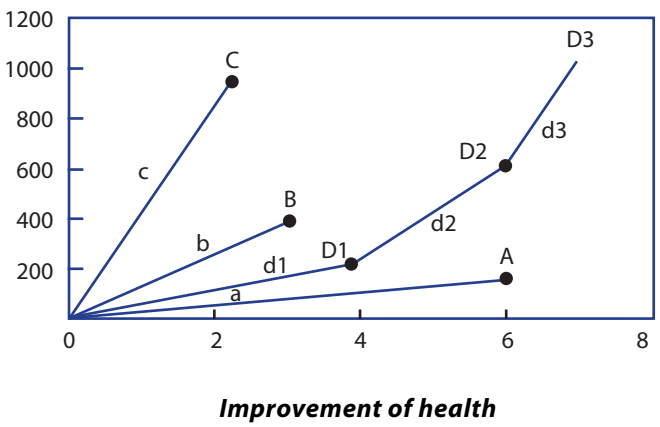
Source: WHO, 2011a.

Additional costs and effects shown in Figure 4.3 are indicated by line *d*. This indicates that, in the case of non-simultaneous interventions, the selection of the next intervention depends on the level reached by the previous intervention. In graphical presentation, intervention D1 is followed by interventions D2 and D3. Together they form the extension path of interventions, which shows the best combination of interventions for different levels of resources.

Interventions D4 and D5 shown on the chart (Fig. 4.3) do not constitute part of the mutually implemented interventions and they will not be selected if cost-effectiveness is the only choice criterion, because, when they are compared with interventions placed on the extension path, they are the least cost-effective. It is worth mentioning that in reality, the decision-making process is also influenced by other circumstances, which include a wide variety of ethical, social and political conditions to be considered alongside the cost-effectiveness criteria.

The abovementioned rules can be combined only in situations in which the interventions being analysed include both strategies that can be implemented simultaneously and mutually exclusive ones. Fig. 4.4 illustrates the following situation. A selection of interventions is carried out based on the smallest slope, and a comparison is made between the slope determined by the origin (cost-effectiveness rate) and previously selected interventions (cumulative rate of cost-effectiveness).

Fig. 4.4. Costs and benefits of mutually compatible and mutually excluding strategies



Source: WHO, 2011a.

Based on the results shown in Fig. 4.4, in terms of cost-effectiveness, the first selected intervention is intervention A. The next intervention chosen is intervention D1, as the slope of the *d1* line is the next smallest. To select the third intervention, the slopes of lines *b* and *c* are compared with the slope of line *d2*, which represents the substitution of the intervention D1 by intervention D2. As a result, intervention B is selected, as line *b* has the smallest slope. Following the same logic, interventions D2, C and D3 are selected to follow.

The division of interventions into cost-effective and not cost-effective is determined by the norms and values of the society and commonly accepted evaluation limits for those values. In accordance with recommendations of the WHO Commission on Macroeconomics and Health, such a division can be carried out based on the GDP per capita; in 2010 in Moldova this constituted MDL 20 171. According to these recommendations, the following distinctions can be made:

- highly cost-effective interventions – the cost of a healthy year of life gained is less than GDP per capita (up to MDL 20 171);
- cost-effective interventions – the cost of a healthy year of life gained is from 1 to 3 times GDP per capita (MDL 20 171–60 513);
- interventions that are not cost-effective – the cost of a healthy year of life gained is more than 3 times GDP per capita (more than MDL 60 513).

4.5 Contextualization

The WHO-CHOICE methodology developed by WHO is primarily applied for the purposes of carrying out cost-effectiveness analyses of disease control interventions at the regional level (Reinap et al., 2005). In order to carry out evaluative analyses of the cost-effectiveness of disease control strategies at country level, WHO-CHOICE methodology data are interpolated with the country-specific data. The process of data harmonization is called contextualization, which involves implementing the following steps:

1. understanding the WHO-CHOICE methodology;
2. collecting data required for carrying out the cost-effectiveness analysis of disease control strategies;
3. evaluating the data validity by means of a focus group and their input into a computerized program;
4. analysing the data, evaluating the results obtained and their presentation.

At the first stage the Ministry of Health of the Republic of Moldova – with technical support from the WHO Regional Office for Europe – organized a 2-day workshop. Within the framework of the event, theoretical aspects were presented relating to the application of the cost-effectiveness analysis in the field of disease control; the WHO-CHOICE methodology was presented, and the possibility (and necessity) of contextualizing WHO-CHOICE methodology data to the country situation was discussed.

With a view to carrying out the cost-effectiveness analysis of control strategies relating to the hazardous use of alcohol, the second phase of the study focused on collecting data in the required fields, such as: demographic data, epidemiological data conditioned by hazardous use of alcohol, data on coverage costs for control interventions, and so on.

4.5.1 Demographic and epidemiological data

For the analysis of the cost-effectiveness of hazardous alcohol consumption control interventions, official demographic data were used, provided by the National Bureau of Statistics. These data were specified according to the PopMod population model software, which is a constituent part of the WHO-CHOICE methodology.

For the analysis, certain epidemiological data were used, such as alcoholism prevalence and incidence, remission of alcoholism cases and deaths caused by alcohol, calculated per 1000 people. All the data have been disaggregated by age group (5–15 years; 15–30 years; 30–45 years; 45–60 years; 60–70 years; 70–80 years; over 80 years) and gender. The data were provided by the National Center for Health Management and the Republican Narcologic Dispensary. Data from specialized international scientific journals were also used, when national data were not available.

To ensure the relevance of epidemiological data concerning the hazardous use of alcohol provided by the National Center for Health Management and the Republican Narcologic Dispensary, the data were compared with WHO data.

4.5.2 Diseases caused by hazardous consumption of alcohol

According to the WHO-CHOICE methodology, the effectiveness of interventions is indicated by life years gained as a result of their application and based on data relating to the prevalence of alcoholism, along with indicators that describe the severity of disease manifestation.

The severity of disease manifestation is expressed by the reduction in quality of life of the person suffering from the disease; that is, the disability weighting, the severity of which varies between 0 (perfect health status, there is no loss in quality of life of the individual) and 1 (worst health status, 100% of loss in quality of life). According to WHO data (WHO, 2008), the burden of diseases caused by hazardous use of alcohol, depending on the age and gender of the person, is between 0.122 and 0.137.

4.5.3 Interventions and their effectiveness

The WHO-CHOICE methodology defines intervention as any action that enables health loss caused by the conditions under analysis to be halted or averted, which in this case relates to the hazardous consumption of alcohol. The analysis included interventions which – according to international literature – have contributed to decreasing health losses, with significant positive effects for the population (or groups of population) health.

4.5.4 Hazardous consumption of alcohol

According to the WHO-CHOICE methodology, the analysis of the cost-effectiveness of hazardous alcohol use defines a hazardous level of alcohol consumption as a daily amount of 20 gr. of pure alcohol for women and 40 gr. for men. The aim of the interventions is to reduce both the number of people with hazardous alcohol use practices and the quantity of alcohol consumed.

Interventions aimed at decreasing alcohol consumption can be divided into four separate types of intervention:

1. legislative interventions (increase in tax on alcoholic beverages; limiting access to the sale of alcoholic beverages; ban on alcohol

advertising; reduce the legal blood alcohol content limit for driving, etc.);

2. health service interventions directed at reducing the negative consequences of drinking and alcohol intoxication, and counselling to at-risk drinkers;
3. interventions directed to increase awareness of population regarding harmful effects of the hazardous use of alcohol;
4. .intervention at community level and at workplace.

Alcohol taxation strategy focuses on reducing the number of new cases of alcohol abuse and therefore decreasing the overall consumption of alcohol. The effects of taxation on alcohol consumption are expressed in terms of price elasticity, which indicates changes in alcohol consumption produced by a 1% increase in the price of alcoholic beverages. The value of price elasticity for alcoholic beverages in the WHO-CHOICE model varies between 0.3 (for the most preferred alcoholic beverages) and 1.5 (for the least preferred ones).

Taxation interventions applied in the model include fixed taxes on alcoholic beverages for the year 2010 and interventions involving tax increases by 25% and 50%. During the course of the intervention the interdependent relationship was considered between the tax increase for alcoholic beverages and the increased consumption of untaxed alcohol.

The strategy of testing drivers for blood alcohol concentration levels and prohibiting them from driving a car in a state of alcoholic intoxication can positively affect the number of road deaths and injuries, both of drivers and other road users. The constant, across-the-board practice of testing for blood alcohol concentration reduces mortality from road accidents by 18% if compared with not testing and, according to the WHO-CHOICE methodology, an increase in testing for blood alcohol concentration reduces traumatism from road accidents by up to 15% (Reinap et al., 2005). Availability of alcohol can be reduced dramatically by prohibiting and limiting access to it at commercial facilities. However, this intervention is less realistic because it requires significant resources for the enforcement of laws prohibiting sales of alcoholic beverages. The major and most difficult problem to solve relates to the production and consumption of unlicensed alcohol, with no controls.

A more moderate and realistic intervention regulating the availability of alcoholic beverages is to limit the times at which alcohol can legally be sold. For example, prohibiting the sale of alcoholic beverages at weekends and the marketing of alcoholic beverages around the clock are measures that reduced alcohol consumption and decreased health problems caused by alcohol in Scandinavian countries. Based on studies carried out in these countries, the WHO-CHOICE model estimated that by limiting access to alcoholic beverages the number of new cases of alcohol abuse can be decreased by 1.5–3.0%, and fatal cases resulting from alcohol-related road accidents can be reduced by 1.5–4.0% (Reinap et al., 2005).

The impact of banning the advertising of alcoholic beverages is estimated by the WHO-CHOICE methodology to provide a decrease in the hazardous consumption of alcohol by 2.0–4.0%.

The only intervention that includes the component of patient costs is the scenario in which counselling is provided by family doctors for individuals that are at risk of alcohol dependence. The intervention consists of psychosocial counselling and four visits to the family doctor, during which alcohol consumption problems are discussed. The counselling is focused on reducing alcohol abuse by decreasing the duration of alcohol abuse episodes and aiming to improve the health individuals' health status.

4.5.5 Conclusions relating to contextualization

To ensure better cohesion with the local situation in the Republic of Moldova, the data provided by the WHO-CHOICE tool have been contextualized to correspond with the country-specific situation. Contextualization was carried out based on demographic and epidemiological data.

Items calculated per unit, such as costs for medicines, visits to the family doctor and those associated with carrying out the intervention (including administrative costs) were updated to reflect accurately the situation in the Republic of Moldova in 2010.

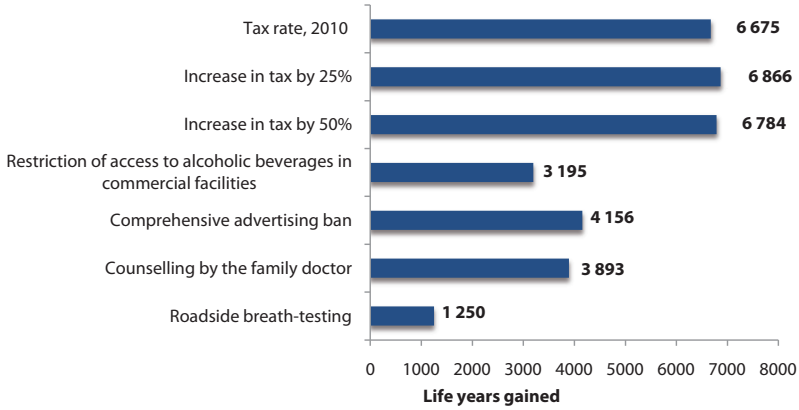
5. Cost-effectiveness analysis results for the hazardous alcohol consumption control strategies

The cost-effectiveness analysis of the hazardous consumption of alcohol control strategies was focused on measuring the effectiveness and cost-effectiveness of interventions applied in this field in the Republic of Moldova in 2010, and comparing them with the alcohol consumption control strategies provided by the WHO-CHOICE tool. Within the study, interventions were analysed involving broad population coverage, through: tax increases on alcoholic beverages; limiting access to alcoholic beverages in commercial facilities; brief interventions involving counselling to at-risk drinkers by a primary care doctor; and a comprehencive advertising ban.

The effectiveness of the interventions is expressed in disability-adjusted life years averted; or the inverse is, healthy years of life gained. Life years lost comprises years of premature death and years lost due to diseases brought about by the hazardous use of alcohol.

Analysis of the results of applying the WHO-CHOICE methodology indicates that the most effective intervention to reduce alcohol consumption for the Republic of Moldova is the increase in tax on alcoholic beverages by 25%, which saves 6 866 healthy years of life annually. The least effective strategy to reduce alcohol consumption is breath testing drivers for blood alcohol content, which leads to a saving of 1 250 of healthy life years within a year and is 5.5 times less effective if compared with the 25% increase in tax (Fig. 5.1).

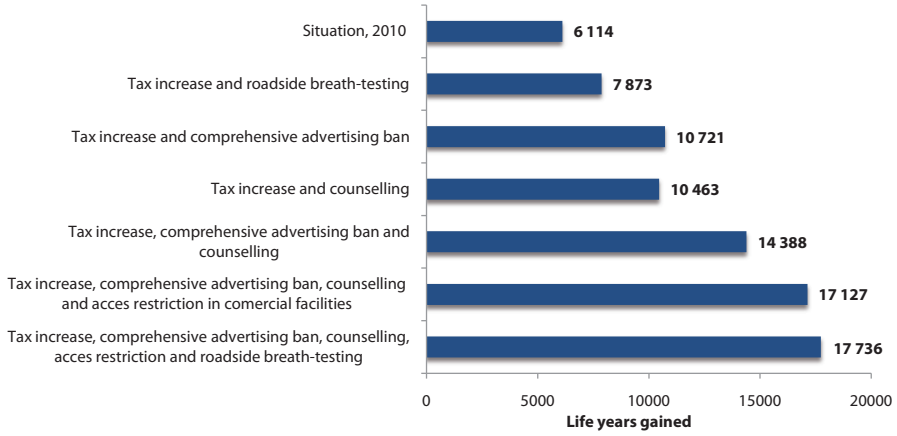
Fig. 5.1. Effectiveness of interventions in healthy years of life gained (DALY averted) within a year (separate interventions)



Increasing tax on alcoholic beverages by 50% allows saving of 6 784 healthy years of life each year, which is 82 fewer healthy years of life gained if compared with the intervention of increasing the tax by 25%. The fact that the strategy of increasing the tax by 50% is less effective than that of increasing it by 25% is explained by the higher share of untaxed alcoholic beverages. More than a half of the total alcohol consumed by the population of the Republic of Moldova (WHO, 2011b) is not sold at commercial outlets, and these products are therefore not taxed.

Having analysed the effectiveness of strategies aiming to reduce alcohol consumption by combining them, it can be stated that the best result is obtained when all the interventions analysed by the WHO-CHOICE methodology are combined. This allows to gain 17 736 of healthy years of life annually (Fig. 5.2).

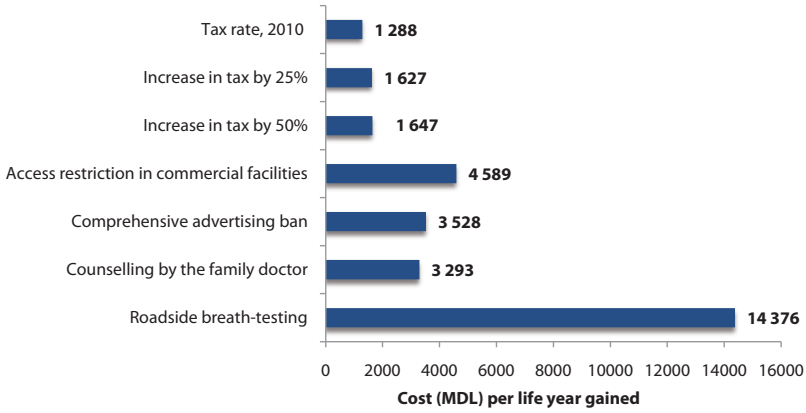
Fig. 5.2. Effectiveness of interventions in healthy years of life gained (DALY averted) within a year (combined interventions)



The results of the analysis indicate that the most cost-effective separate intervention to control alcohol use in the Republic of Moldova is the one whereby the tax rate applied to alcoholic beverages in 2010 (quantified as MDL 1 288 per healthy years of life gained) was followed by an increase in the tax on alcoholic beverages, first by 25% and then by 50%. The least cost-effective intervention to control alcohol consumption was the expansion of roadside breath-testing of drivers for blood alcohol content, with the estimated value of MDL 14 376 per healthy year of life gained within the period of a year (Fig. 5.3).

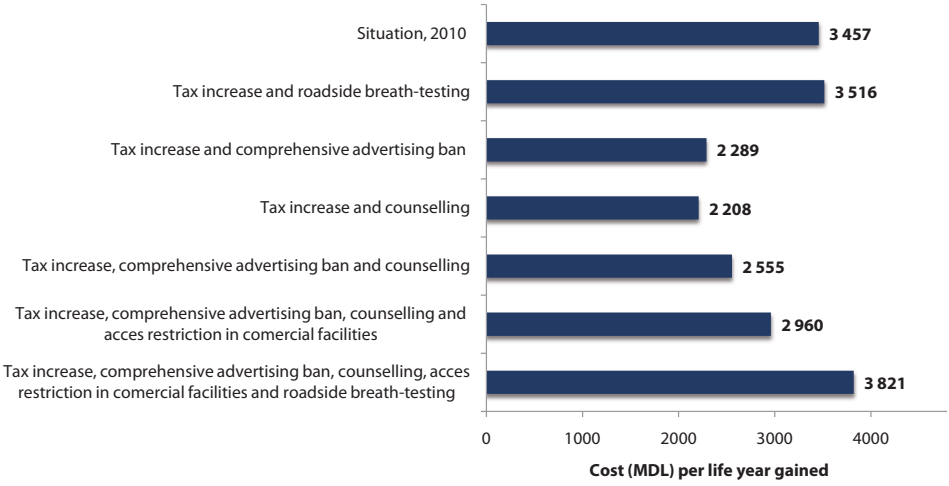
It is worth mentioning that all interventions under analysis – in conformity with the recommendations of the WHO Commission on Macroeconomics and Health – are highly cost-effective because the cost of a life year saved is less than the GDP per capita, which in 2010 constituted MDL 20 171. Breath-testing drivers for blood alcohol content is also a highly cost-effective intervention, despite the fact that this intervention is 11 times more expensive than the most cost-effective one (namely, the tax rate applied in 2010).

Fig. 5.3. Cost-effectiveness interventions shown in average cost (lei) per healthy year of life gained (DALY averted) within a year (separate interventions)



The most cost-effective combined strategies are the tax increase and the counselling to at-risk drinkers by the family doctor, followed by the increase in tax and comprehensive advertising ban (Fig. 5.4).

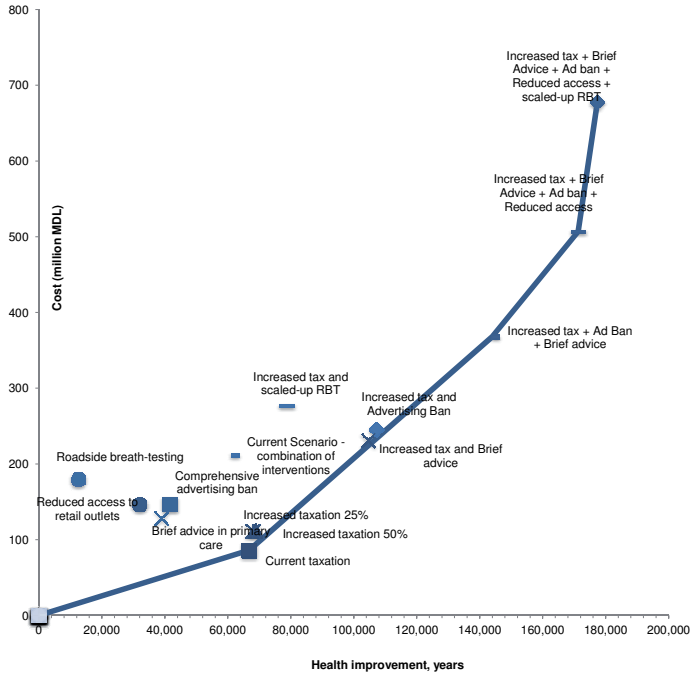
Fig. 5.4. Cost-effectiveness interventions shown in average cost (lei) per healthy year of life gained (DALY averted) within a year (combined interventions)



Combined strategies for alcohol consumption control in the Republic of Moldova implemented within a period of 10 years (Fig. 5.5) – according to the data obtained by applying the WHO-CHOICE tool – are to be recommended for implementation in the following order:

1. increasing taxes on alcoholic beverages;
2. combining the strategies of increasing tax, comprehensive advertising ban and providing counselling to at-risk drinkers by the family doctor;
3. combining the strategies of increase tax, comprehensive advertising ban, providing counselling by the family doctor and restricting access to alcoholic beverages in commercial facilities;
4. implementing all interventions relating to alcohol consumption control simultaneously.

Fig. 5.5. Cumulative cost–effectiveness interventions shown in additional cost (lei) per additionally gained healthy year of life (DALY averted) implemented within a period of 10 years



The analysis of the cost, effectiveness and annual cost-effectiveness of the interventions relating to alcohol consumption control implemented in the Republic of Moldova within a period of 10 years reveals the benefits for society obtained by increasing tax, in combination with other interventions. This provides the opportunity to gaine 17 736 healthy years of life each year at the cost of MDL 3 821 per healthy year of life gained, compared with 6 114 healthy years of life gained in 2010 at the cost of MDL 3 457 per healthy year of life year gained (Table 5.1).

Table 5.1. Cost, effectiveness and annual cost-effectiveness of control interventions relating to alcohol consumption applied in the Republic of Moldova over a period of 10 years

Intervention description	Annual cost (million MDL)	Annually DALY averted	Cost-effectiveness (MDL per DALY averted)	Cumulative cost-effectiveness* (MDL per DALY averted)
Current situation (2010)	21,14	6114	3457	Dominat
Current tax	8,59	6675	1288	1288
Increase tax by 25%	11,17	6866	1627	Dominat
Increase tax by 50%	11,17	6784	1647	Dominat
Restriction of access in commercial facilities	14,65	3195	4589	Dominat
Comprehensive advertising ban	14,67	4156	3528	Dominat
Counselling of patients by family doctor	12,82	3893	3293	Dominat
Testing drivers for blood alcohol concentration	17,97	1250	14376	Dominat
Combination 1: Increase tax and driver testing	27,68	7873	3516	Dominat
Combination 2: Increase tax and comprehensive advertising ban	24,54	10721	2289	Dominat
Combination 3: Increase tax and counselling by family doctor	23,1	10463	2208	Dominat
Combination 4: Increase tax, comprehensive advertising ban and counselling by family doctor	36,76	14388	2555	3652
Combination 5: Increase tax, counselling by family doctor, comprehensive advertising ban, restriction of access	50,69	17127	2960	5086
Combination 6: Increase tax, counselling by family doctor, comprehensive advertising ban, restriction of access and breath testing drivers for blood alcohol content	67,76	17736	3821	28026

Note: * Additional cost for a supplementary life year gained by supplementing the next intervention.

The results of analysing the effectiveness and cost-effectiveness of alcohol consumption control strategies reveal their responsiveness to the quantity of untaxed alcohol. Within the framework of the evaluation scenarios were modelled aiming to reduce by up to 30% the untaxed alcohol consumption in the Republic of Moldova, which constitutes more than half the alcohol consumption in the country. If implemented, these interventions could bring about considerable improvements in the health status of the population (Table 5.2).

Table 5.2. Effectiveness and cost–effectiveness of control strategies regarding alcohol consumption obtained by modelling scenarios aimed to reduce the quantity of untaxed alcohol

Intervention denomination	Quantity of untaxed alcohol, 2010		Quantity of untaxed alcohol reduced up to 45%		Quantity of untaxed alcohol reduced up to 35%		Quantity of untaxed alcohol reduced up to 30%	
	Annually DALY averted	Cost-effecti-veness (MDL per DALY averted)	Annually DALY averted	Cost-effecti-veness (MDL per DALY averted)	Annually averted DALY	Cost-effecti-veness (MDL per DALY averted)	Annually averted DALY	Cost-effecti-veness (MDL per DALY averted)
Current situation (2010)	6114	3457	9521	2220	9521	2220	9521	2220
Current tax	6675	1288	8045	1068	8045	1068	8045	1068
Increase tax by 25%	6866	1627	9651	1157	11421	978	12308	908
Increase tax by 50%	6784	1647	10621	1052	12571	889	13548	825
Restriction of access in commercial facilities	3195	4589	3857	3802	3857	3802	3857	3802
Comprehensive advertising ban	4156	3528	5041	2909	5041	2909	5041	2909
Counselling of patients by family doctor	3893	3293	5952	2155	5952	2155	5952	2155
Breath testing drivers for blood alcohol content	1250	14376	1222	14707	1222	14707	1222	14707
Combination 1: Increase tax and driver testing	7873	3516	11606	2385	13517	2048	14474	1913
Combination 2: Increase tax and comprehensive advertising ban	10721	2289	15349	1599	17260	1422	18217	1347
Combination 3: Increase tax and counselling by family doctor	10463	2208	16241	1423	18152	1273	19200	1209
Combination 4: Increase tax, comprehensive advertising ban and counselling by family doctor	14388	2555	20965	1754	22857	1609	23805	1545
Combination 5: Increase tax, counsel-ling by family doctor, comprehensive advertising ban, restriction of access	17127	2960	24197	2095	26049	1946	26978	1879
Combination 6: Increase tax, counselling by family doctor, comprehensive advertising ban, restriction of access and breath testing drivers for blood alcohol content	17736	3821	24557	2760	26351	2572	27250	2487

Analysing various scenarios relating to control strategies for the hazardous consumption of alcohol in the Republic of Moldova has clearly demonstrated the benefits obtained by society, manifested by an improvement in population health and a reduction in the burden of disease caused by the hazardous use of alcohol. For all the strategies analysed, the cost of one healthy year of life gained is below the level of GDP per capita, which clearly identifies them as highly cost-effective interventions.

6. Conclusions and recommendations

Alcohol consumption the Republic of Moldova is a phenomenon with multiple negative effects on population health, which in turn produce a range of unfavourable consequences of a medical, social, economic and cultural nature. The fact that the Republic of Moldova ranks high among the countries with the largest amount of pure alcohol consumed per capita has obliged the Ministry of Health to develop and implement policies to mitigate the situation. Considering the cost, effectiveness and cost-effectiveness of these policies is a precondition for achieving the objective set out by the Ministry of Health – to reduce the burden of disease brought about by hazardous alcohol consumption – enabled by the support of the WHO Regional Office for Europe.

The results obtained by the analysis (carried out by applying the WHO-CHIOCE methodology developed by WHO) indicate that all control strategies relating to the hazardous consumption of alcohol modelled for the Republic of Moldova are highly cost-effective. This finding is backed by the recommendations of the WHO Commission for Macroeconomics and Health (WHO Commission on Macroeconomics and Health, 2001), suggesting that interventions which cost less than the level of GDP per capita can be considered highly cost-effective. Therefore, investing in solving problems caused by the hazardous consumption of alcohol is beneficial from both a medical and an economic point of view.

One of the major conclusions drawn from the analysis of the effectiveness and cost-effectiveness of the alcohol consumption control strategies is their responsiveness to the quantity of untaxed alcohol. Study results indicate that the most effective alcohol consumption control strategy is increasing tax on alcoholic beverages by 25%, followed by increasing it by 50%. However, the most cost-effective intervention is that of the tax rate applied in the year 2010. Increasing tax on alcoholic beverages by 25% and by 50% produces additional positive effects, but involves additional costs to be borne by society and, as a result, these strategies are less cost-effective.

Many positive effects are achieved by combining the strategies for alcohol consumption control. It is important to mention that combining interventions

resulting from the analysis presents a cost-effective method for improving population and also indicates that many more healthy years of life can be gained by increasing taxation, as well as by expanding the coverage of the intervention measures already applied.

With a view to enhancing the application of hazardous alcohol consumption control strategies and ensuring results in terms of improving population health status, the following approach is recommended:

1. elaborating and implementing measures to reduce the quantity of untaxed alcohol produced, including that produced in household conditions;
2. enforcing normative acts relating to reducing access to alcoholic beverages in commercial facilities and those relating to breath testing drivers for blood alcohol content;
3. combining strategies relating to alcohol consumption control implemented within a period of 10 years, as a mechanism for multiplying the effects, recommended for implementation in the following order:
    a) increasing taxes on alcoholic beverages;
    b) combining the strategies of increasing tax, comprehensive advertising ban and providing counselling to at-risk drinkers by the family doctor;
    c) combining the strategies of increase tax, comprehensive advertising ban, providing counselling to at-risk drinkers by the family doctor and restricting access to alcoholic beverages in commercial facilities;
    d) implementing all interventions relating to alcohol consumption control simultaneously.

Study results indicate that, in terms of cost-effectiveness, all interventions are recommended for implementation. At the same time, cost-effectiveness analysis is only one of the resources used by policy-makers in making decisions on how to bring about population health improvement.

7. Discussion

The data from the analysis of the alcohol consumption control strategies indicate that the interventions are highly-effective and cost-effective in economic terms, and their implementation will generate significant results in terms of improving population health.

That said, some obstacles were identified during the analysis process. One such obstacle was the lack of availability of epidemiological data regarding the hazardous consumption of alcohol. It was particularly difficult to establish the incidence and prevalence of the hazardous consumption of alcohol disaggregated by age group (5–15 years; 15–30 years; 30–45 years; 45–60 years; 60–70 years; 70–80 years; over 80 years). Statistical data available at the National Center for Health Management are disaggregated only by gender.

To overcome this, several sociological (populational) surveys on alcohol consumption in the country have been studied, and statistical data analysed relating to hazardous alcohol consumption in countries that have characteristics comparable to those of the Republic of Moldova (Romania, the Russian Federation, Ukraine, Estonia). For confirmation the statistical data – adjusted for disaggregation purposes – were discussed with experts in the field.

For the purposes of analysing the effectiveness and cost-effectiveness of alcohol consumption control strategies, these obstacles were overcome; however, to enable accurate monitoring and evaluation of their implementation, the quality of collection and reporting of statistical data on alcohol consumption must be improved. Statistics are to be disaggregated by gender, age, area of residence, and occupation.

The cost-effectiveness analysis of the alcohol consumption control strategies does not determine the monetary value of life years gained as a result of the implementation of the interventions. Monetary limits – indicating whether the intervention is cost-effective or not – are set based on the results obtained. The limit applied for this analysis was based on the level of GDP per capita, which in 2010 in the Republic of Moldova constituted MDL 20 171, and the value of a life

year can be estimated by the value of resources produced on average per person per year.

It should be mentioned that the study presents alcohol consumption control strategies in terms of effectiveness and cost-effectiveness and does not provide results of the indirect impact of their implementation, such as increased labour productivity and the economic effects thereof, resulting from population health improvement. A wide variety of positive economic effects were obtained, but the original intention behind implementing the strategies was to reduce the hazardous consumption of alcohol with reference to the conditions by which they are caused.

8. References

Anderson P, Baumberg B (2006). Alcohol in Europe: a public health perspective. London: Institute of Alcohol Studies (http://ec.europa.eu/health-eu/news_alcoholineurope_en.htm, accessed 8 August 2011).

Baan R et al. (2007). Carcinogenicity of alcoholic beverages. Lancet Oncology, 8:292–293.

Expert Grup (2008). Alcohol consumption and abuse in the Republic of Moldova: evaluation of the situation and impact. Chisinau, Expert Grup (http://www.expert-grup.org/?go=biblioteca&n=61, accessed 5 September 2011).

Graham K et al. (1998). Current directions in research on understanding and preventing intoxicated agression. Addiction, 93:659–676

IARC (1998). Alcohol drinking. Monographs on the Evaluation of Carcinogenic Risks to Humans, 44:194–207.

Klag MJ et al. (1993). Alcohol use and blood pressure in an unacculturated society. Hypertension, 22:365–370.

Mann RE, Smart RG, Govoni R (2003). The epidemiology of alcoholic liver diseases. Alcohol Health & Research World, 27(3):209–219.

National Bureau of Statistics (2011). National Bureau of Statistics of the Republic of Moldova [web site]. Chisinau, National Bureau of Statistics of the Republic of Moldova (http://www.statistica.md/, accessed 5 September 2011).

National Center of Health Management (2008, 2009, 2010, 2011). Statistical Yearbook of the Health System of Moldova (for years 2008, 2009, 2010 and 2011). Chisinau, National Center of Health Management, Ministry of Health of the Republic of Moldova (http://www.cnms.md, accessed 20 September 2011).

NCPM [Moldova], ORC Macro (2006). Moldova demographic and health survey, 2005. Calverton, MA, National Scientific and Applied Center for Preventive Medicine of the Ministry of Health and Social Protection and ORC Macro.

Rehm J et al. (2010a). Alcohol as the risk factor for liver cirrhosis – a systematic review and meta-analysis. Alcohol & Alcohol Review, 29:437–445.

Rehm J et al. (2010b). The relation between different dimensions of alcohol consumption and burden of disease – an overview. Addiction, 105:817–843.

Reinap M et al. (2005). Cost–effectiveness of mental health interventions in Estonia. Tallinn, Healthcare Society in collaboration with Ministry of Social Affairs in Estonia and World Health Organization.

Taavi Lai et al. (2007). Costs, health effects and cost-effectiveness of alcohol and tobacco control strategies in Estonia. Health Policy 84(1):75-88

Tan-Torres Edejer T et al. (2003). Making choices in health: WHO guide to cost–effectiveness analysis. Geneva, World Health Organization.

Victor RG, Hansen J (1995). Alcohol and blood pressure – a drink a day... New England Journal of Medicine, 332:1782–1783.

WHO (2008). The global burden of disease: 2004 update. Geneva, World Health Organization.

WHO (2009). Global health risks: mortality and burden of disease attributable to selected major risks. Geneva, World Health Organization (http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf, accessed 8 August 2011).

WHO (2011a). Choosing interventions that are cost-effective (WHO-CHOICE) [web site]. Geneva, World Health Organization (http://www.who.int/choice/en/, accessed 2 December 2011).

WHO (2011b). Global status report on alcohol and health. Geneva, World Health Organization.

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

WHO Regional Office for Europe (2010). European status report on alcohol and health 2010. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2011). European Health for All database (HFA-DB) [online database]. Copenhagen, WHO Regional Office for Europe (http://data.euro.who.int/hfadb/, accessed 8 August 2011).

Zakhari S (1997). Alcohol and the cardiovascular system: molecular mechanisms for beneficial and harmful action. Alcohol Health & Research World, 21:21–29.

World Health Organization

REGIONAL OFFICE FOR Europe

The WHO Regional Office for Europe

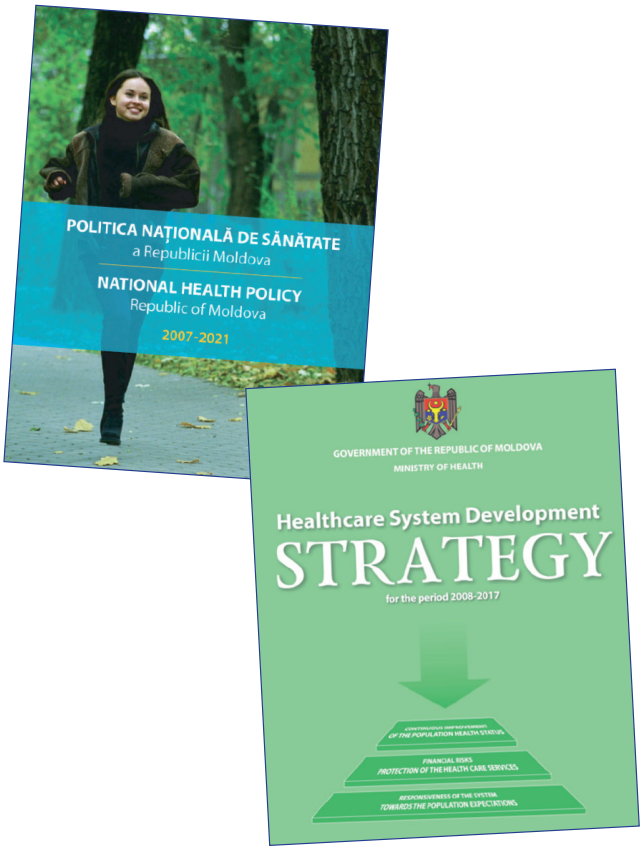
The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

Member States

Albania
Andorra
Armenia
Austria
Azerbaijan
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Netherlands
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
The former Yugoslav Republic of Macedonia
Turkey
Turkmenistan
Ukraine
United Kingdom
Uzbekistan

WHOLIS E96177
Original: ENGLISH

The policy papers series aims to strengthen the health system



WHO Regional Office for Europe
Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark
Tel.:+45 39 17 17 17. Fax +45 39 17 18 18
E-mail: postmaster@euro.who.int