Addiction and Lifestyles in Contemporary Europe: Reframing Addictions Project (ALICE RAP)

Avoidable cost: a report of the social cost attributable to the abuse of alcohol, illegal drugs and tobacco, with the estimate of the avoidable costs associated with key policy actions

Deliverable 6.2, Work Package 6

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Authors:

Poland
Zofia Mielecka-Kubień
Katarzyna Okulicz-Kozaryn
Artur Bartoszewicz
Krzysztof Brzózka
Marta Zin-Sędek

Portugal
Fernanda Feijão

Catalonia (Spain)
Joan Colom
Anna Garcia-Altés
Nuria Ibáñez
Lidia Segura

Italy
Alessandra Liquori O'Neil
Luca Di Censi
Francesco Fabi
Eva M. Stambøl
Carla Rossi
Leif Villadsen
Jonathan Lucas

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Executive summary

Aim

In situations where resources which can be assigned by country authorities for dealing with the negative consequences of alcohol, tobacco and illegal drugs are limited, it is very important to have information about where these resources could be best allocated. In addition to information on the estimation of social costs, valuable indicators can give estimations of the avoidable part of the costs of substances. Therefore, the Deliverable 6.2 of Work Package 6 of ALICE RAP project had several aims:

1. To estimate the potential benefit resulting from decreased exposure to alcohol, tobacco and illegal drugs in Poland, Portugal and Catalonia (Spain) in terms of decreased mortality, years of life loss and GDP loss (see Part I).
2. To estimate how many lives could be saved if mortality rates in a given country were equal to the lowest ones among the three countries participating in the Alice Rap WP6, i.e. Poland, Portugal and Catalonia (Spain) (see Part I).
3. To identify the scale of changes in the values of various socio-economic costs resulting from alcohol drinking in Poland, as a result of applying alcohol minimum unit pricing (see Part II).
4. To analyze the costs illegal drug control posed to the criminal justice system of three EU countries, Poland, Portugal and Spain in 2010-2011. (Part III)

Methods

Part I

The estimation of avoidable costs of alcohol, smoking and illegal drugs for Poland, Portugal and Catalonia (Spain) – for population age [15-64) – is based on *Feasible Minimum* and *Arcadian Normal* concepts. All calculations are based on the ALICE RAP Deliverable 6.1 *Social costs: a report specifying the costs of addiction to societies*[1].

In the estimation of *Feasible Minimum* risk factors distributions are shifted according to changes in exposure (understood here as changes in prevalence of consumption of the three addictive substances). It has been assumed that exposure decreases successively by 10%, 20% and 50%; exposure equal to 0% denotes results of estimation based on empirical data. This approach was used to estimate potential changes in mortality rates, as well as in potential changes in number of years of life lost. Finally, as with reduced exposure, lower mortality and lower number of years of life lost, the productivity loss (labour costs) caused by premature mortality related to alcohol, smoking and use of illegal drugs decreases, the value of GDP which could be produced if in 2010 there were no premature mortality related to alcohol drinking, smoking or drugs use in Poland, Portugal and Catalonia (Spain) was calculated.

In order to estimate an *Arcadian Normal*, instead of using epidemiological data from which the *Feasible Minimum* can be calculated, the lowest recorded rates of mortality from certain causes which had been achieved in a country are compared to the mortality rates from these causes achieved in other countries. Since three countries (Poland, Portugal and Catalonia (Spain)) were included in the ALICE RAP WP6, the use of *Arcadian Normal* in this report is limited to these three countries. Mortality rates for alcohol, smoking and use of illegal drugs related causes of deaths have been calculated, according to gender and groups of

[1](http://www.alicerap.eu/resources/documents/doc_download/219-deliverable-06-1-social-costs-of-addiction.html)

causes of death. Then how many lives could be saved if mortality rates in a given country were equal to the lowest ones among the compared countries was estimated.

Part II

To estimate the financial benefits resulting from the introduction of a minimum price for alcohol unit, two methods of assessing social costs were used:

1. Official valuation used in public cost-benefit analyses of the loss of human life (from the HEATCO report on the costs of individual road accidents for 2010).
2. The results of the Deliverable 6.1 report *Social costs: a report specifying the costs of addiction to societies* of the ALICE RAP project, and the socio-economic costs of consumption of alcoholic beverages in Poland, identified in it.

The price and income elasticities of demand for alcohol were obtained from the research by Laboratory of Applied Mathematics in Economics at the Faculty of Management, University of Science and Technology in Krakow. The analysis was performed with the use of the data for the year 2010, and in the event of absence of the possibility of obtaining the relevant data, data for the period of 2009-2012 were used. In the study, the minimum price in the range of 1.50 PLN to 3.00 PLN (approximately 0.37 – 0.75 €) was adopted; however, the final analysis has been presented for the minimum price of 2.00 PLN (app. 0,5 €) per 10 grams of pure alcohol.

Part III

This study estimates only the direct costs for the following three criminal justice sectors: police, justice (prosecution and courts) and prison. The domestic distribution of resources for drug control in Poland, Portugal and Spain is subsequently compared among the three countries to highlight the differences within the framework of the type of drug control legislation in place.

For the police law enforcement, supply reduction sector and judiciary sector, the estimate was obtained for 2010 from national and international institutional sources (EUROSTAT, CEPEJ). For the prison sector, the estimate of costs for drug-related detention was obtained for the year 2011 from national sources and European Annual Penal Statistics. The costs for the three sectors considered, public police, justice and prisons, were subsequently normalized for GDP, population, purchasing power parity and mean salary values of the three countries, in order to compare the costs of the three countries with the different levels of economic development and population size.

Results

Part I

<u>Effects of changes of exposure on potential changes in mortality and years of life lost</u>

For the male population it can be observed that if the percent of alcohol consumers was 10% lower in each of the categories of drinkers, the mortality attributed to alcohol would be lower in Poland by 3.3%; in Portugal by 5.3% and in Catalonia (Spain) by 3.4% of the empirical number of deaths attributed to alcohol. If the percent of alcohol consumers was 20% lower in each category of drinkers, the mortality would be diminished by 6.8% in Poland; 11.1% in Portugal and 7.5% in Catalonia (Spain). If exposure to alcohol was reduced by 50%the estimated percentage of potentially saved lives would be as high as 19.8% in Poland; 31.4% in Portugal and 23.5% in Catalonia (Spain).Corresponding results for the population of women in

Poland are: 5.2%; 10.8% and 29.2%; in Portugal: 7.1%; 14.4% and 37.8%; inCatalonia (Spain): 6.4%; 13.2% and 35.9%.

These results suggest that the benefits of changes of alcohol exposure in terms of reduced mortality rates could be the highest in Portugal and the lowest in Poland. However, expressed in numbers of saved lives indicate, that in Poland 348 men should stay alive if the percent of alcohol consumers was 10% lower, while in Portugal it would be 60 men. When the 50% reduction of alcohol exposure is assumed, these numbers increase to 2114 of saved lives in Poland and 353 in Portugal. Also, the number of potentially saved years of life due to lower exposure to alcohol in Poland is about 5 times higher than in Portugal and 20 times higher than in Catalonia (Spain).

The results of potential changes in mortality due to hypothetical decreasing tobacco exposure by 10%, 20 and 50% in three countries suggest the highest gains in Portugal (for male population mortality reduction by 3.4%, 7.3% and 22.3% respectively), followed by Poland (2.2%, 4.6%, 12.6%) and Catalonia (Spain) (1.4%, 2.8% 7,6%). Expressed in the numbers of saved lives these results indicate the highest numbers of avoided deaths in Poland (2082 if the exposure is reduced by 50%) and the lowest in Catalonia (Spain) (115 respectively). For the population of women, similar potential changes in tobacco attributable mortality rates are observed. In terms of years of life potentially saved due to lower exposure to smoking Poland could gain over 50 thousand years of lives of population in age of professional activity (in case of reduction of exposure by 50%), while Portugal less than 15 thousand of years and Catalonia (Spain) about 4 thousand.

The results of potential changes in mortality due to hypothetical decreasing illegal drug exposure by 10%, 20 and 50% three countries suggest the highest gains in Poland (for male population mortality reduction by 15.9%, 23.5% and 48.1% respectively), followed by Portugal (6.3%, 10.9%, 34.2%) and Catalonia (Spain) (2.8%, 6.1%, 19.7%). Expressed in the numbers of saved lives these results indicate the highest numbers of avoided deaths in Poland (132) compared to 29 in Portugal and 30 in Catalonia (Spain) if the exposure is reduced by 50%. For the population of women, similar potential changes in illegal drug attributable mortality rates are observed. If the exposure to illegal drugs is reduced by 50% in Poland more than 4 thousand years of population in age of professional activity could be saved, while in Portugal and Catalonia (Spain) it could be more than one thousand.

With the reduced mortality and number of years lost, the loss of GDP in Poland in 2010 could be hypothetically 6.0 mln € lower, if the prevalence of alcohol consumers was reduced by 10%; 12.5 mln € lower, if the prevalence was reduced by 20%; whereas with a 50% reduction the loss of GDP could be 35.7 mln € lower than the one estimated under the assumption of empirical number of premature deaths.

The loss of GDP in Portugal in 2010 could be hypothetically 1.5 mln € lower if the prevalence of alcohol consumers was reduced by 10%; 3.2 mln € lower if the prevalence was reduced by 20%; whereas with a 50% reduction the loss of GDP could be 8.9 mln € lower than the one estimated under the assumption of empirical number of premature deaths.

The loss of GDP in Catalonia (Spain) in 2010 could be hypothetically 0.7 mln € lower if the prevalence of alcohol consumers was reduced by 10%; 1.6 mln € lower if the prevalence was reduced by 20%; whereas with a 50% reduction the loss of GDP could be 4.7 mln € lower than the one estimated under the assumption of empirical number of premature deaths.

In all three countries, similar values as in case of alcohol, are obtained in the case of smoking, while they are substantially lower for illegal drugs.

Comparison of countries based on *Arcadian Normal*

In the case of men the lowest mortality rates for causes of deaths attributed to alcohol were observed in Catalonia (Spain), then in Portugal – in Poland they were the highest. In the case of women, the lowest mortality rates for cardiovascular diseases, gastrointestinal, metabolic and endocrine conditions, injuries, 100% alcohol and total were found in Catalonia (Spain), while for neoplasms and other chronic and acute conditions – in Portugal.

Using these three countries, Poland has the most to gain – if mortality rates for causes of death related to alcohol in Poland were as low as in Catalonia (Spain) or for two causes of deaths in Portugal, 10 158 lives could be saved in year 2010, i.e. 78.4% of deaths attributed to alcohol in the population of men and 67.9% of those in the population of women.

Portugal could gain the lives of 610 people, that is 48.5% of number of deaths attributed to alcohol in the population of men and 22.8% of those deaths in the population of women. Catalonia (Spain) could gain 40 lives, that is 1.8% of the number of deaths related to alcohol.

For men, the lowest mortality rates for respiratory diseases, neoplasms and total attributed to smoking were observed in Catalonia (Spain); for fire deaths and cardiovascular diseases in Portugal – whereas they were the highest in all cases in Poland. In the case of women, the lowest mortality rates for all causes of death were found in Portugal, the highest – in Poland. Poland is the country with the most to gain if mortality rates for causes of death related to smoking in Poland were as low as in Portugal or as in Catalonia (Spain) 11 896 lives could be saved in year 2010, i.e. 53.2% of the deaths attributed to smoking in the population of men and 76.8% of these deaths in the female population.

Portugal could gain the lives of 186 men, that is, 4.5% of the number of deaths attributed to smoking in the population of men. Catalonia (Spain) could save 186 lives, that is 1.9% of number of deaths related to smoking in the male population and 17.5% in the population of women.

In the case of illegal drugs, the jurisdiction with the most to gain is Catalonia (Spain) – if mortality rates for causes of deaths related to the use of illegal drugs in Catalonia (Spain) were as low as in Poland or in Portugal, 152 lives could be saved in year 2010, i.e. 74.7% of deaths attributed to use of illegal drugs in the population of men, and 88.2% of those in the population of women.Portugal could gain the lives of 105 people, that is, 62.8% of the number of deaths attributed to the use of drugs in the population of men, and 45.7% in the population of women. Poland could gain 148 lives, that is, 26.3% of the number of deaths related to the use of drugs in the male population and 71.7% in the female population.

Part II

On the Polish market, all three types of alcohol, but especially beer and wine, are characterised by inelastic demand. Vodka can be classified as a luxury good in a complementary relationship with beer.

As a result of the introduction of the proposed value of the reference minimum price for alcohol serving (2 PLN per 10 grams of pure alcohol) no change is observed in the volume of consumption of beers with alcohol content of 3.5%. Beers with alcohol content of 4.5% and above become clearly less commercially attractive and their demand falls within a short period from 4.92% to as little as 37.49%, while in the long term, as a result of stabilisation and return of a part of consumers despite the increased prices, a decline in demand is estimated at the value of 4.00% for beers with alcohol content of 4.5% to as much as 30.46% for beers with alcohol content of 9.5%. Simultaneously, with a decrease in demand for beer, a drop in demand for vodka would be observed, reaching the level of 5,93-46,88% in the short-term period and 5,05-39,91% in the long term, depending on the type of the analysed vodka.

Assuming a share in the consumption of alcoholic beverages in 2010 in the following proportions: 55.2% of beer, 9.3% of wine, and 35.5% of vodka and liqueurs jointly, the total change in demand for alcoholic beverages, weighted by the consumption structure should reach -20.7% in a short-term period, and -17.3% in the long term. As a result of the introduction of a minimum price reference in the amount of PLN 2.00 and the resulting price changes regarding individual alcoholic beverages, the total decline in demand for beer in a short-term period will reach 17.5%, while in the long-term - 14.2%; in the case of wine, such decrease will be 0.7% and 1%, respectively, while in the case of spirits, it will reach the value of 34.3% and 24.4%.

The estimated annual reduction of the basic socio-economic cost of alcohol consumption in Poland – which is premature mortality due to alcohol abuse - as a result of the application of a reference minimum price of 2.00 PLN in the short term will amount to 830,580,826.26 €, while in the long term - 693,658,997.70 € annually.

If the cost of premature mortality resulting from the abuse of alcohol was excluded, the total annual value of the remaining limited socio-economic costs would amount to 132,436,464.13 € annually.

Part III

In line with the type of the national drug control legislation, differences among the countries were found in both the distribution and the quota of investment made in the law enforcement, supply reduction sector, the judiciary sector and prison sector.

Poland's drug control expenditure is higher in the police sector, followed by the justice sector and having a smaller percentage for prisons. Portugal shows the most substantial expenditure for prisons, followed by police and justice costs. Spain's drug control highest expenditure is for police, followed by the costs for detention and for the justice sector. Overall, Spain, which is the richest country, is also the country with the highest drug control cost bearing upon its criminal justice system, followed by Poland. Portugal spends significantly less than the other two countries, even if with very high burden on the prison system.

When the total expenditure for the justice sector is considered, both in absolute numbers and relative to GDP and population, Poland is the country with the highest expenditure for the justice sector and the law enforcement and the lowest expenditure for prisons, followed by Spain which presents a similar scenario. Portugal confirms its high drug related prison costs, followed by justice and police sector costs.

In very general terms, the estimate was found to be consistent with the type of drug control legislation enacted in the three countries. Poland's zero tolerance approach might have been, at the time, responsible for the very high costs in the police and justice sector. These high costs, however are not matched in the prison sector, which may indicate that very few people arrested and processed for drug related offences are eventually sent to jail.

Spain shows a scenario similar to other countries in Europe, where depenalization is enacted of the personal use and possession of drugs, but this is still maintained within the realm of criminal justice. Here, the highest cost is for law enforcement, which is also justified by Spain's geographical position as a transit country, followed by prison costs, which may be related to the level of tolerance of the law enforcement authorities towards recording and prosecuting possession of drugs for personal use, but may also indicate the possible allocation of resources to expand harm reduction and treatment policies for drug users in prison.

In Portugal the highest costs are in the prison sector, and because the estimate was based on the cost per prisoner and not on staff salaries, this high investment may be suggestive of the country's efforts to ensure drug trafficking is punished, but also to ensure the necessary resources for drug related treatment and rehabilitation of drug users in jail within the health-focused approach of its drug legislative framework.

Conclusion

There are significant opportunities for saving lives lost because of drinking alcohol, smoking or using illegal drugs. Of the three countries studied here, Poland is in the worst situation in regards to alcohol and smoking, and Catalonia (Spain) in the case of use of illegal drugs. The prevalence of use of addictive substances is not the only cause influencing the results above – they depend also on differences in general mortality rates, which is especially important in the case of Poland, where general mortality rates are much higher than in Portugal or Catalonia (Spain).

In spite of many differences among the three compared countries concerning prevalence rates, general mortality rates, life expectation, value of GDP per capita etc., it can be clearly seen that in every case the benefits coming from reduced exposure for alcohol, smoking and use of illegal drugs are substantial, both in the level of premature mortality attributed to the three considered addictive substances as well as in the potential gain of GDP value.

The Polish example shows that a powerful tool to reduce alcohol related social costs may be the introduction of minimum prices per alcohol unit. An important value of benefits stemming from this measure should clearly focus analytical and legislative work towards the rapid introduction of the proposed solutions. It is recommended to continue the research in the analysed scope, especially in the area of identifying demand and price relationship between different types of alcoholic beverages, changes in consumer behaviour and the consequences of the aforementioned proposals for public finances (tax revenue to the state budget). It can be expected that the proposed model of intervention in alcohol prices will have a positive impact on revenues from VAT and will remain indifferent to excise duty.

In three countries participating in the study there is a clear relationship between the types of drug laws and the costs for the criminal justice system. However, due to the peculiar characteristics and the complexities of the illegal drug market and drug control strategies in place in each country, further analysis could provide useful insights in the types and size of investments made within the three criminal justice sectors and whether these investment priorities are efficiently supporting their national drug control strategies and the effective implementation and delivery of policies and services.

1. Introduction

The EU-wide project "Addiction and Lifestyles in Contemporary Europe: Reframing Addiction Projects (ALICE RAP)" is a five year research project co-financed by the European Commission. ALICE RAP is examining the challenges posed by addictions and lifestyles to the cohesion, organization and functioning of contemporary European societies. Addiction to alcohol, tobacco, illegal drugs and gambling/gaming, as well as addiction-related harms and costs, are being studied through a multidisciplinary approach and foresight analysis. The project comprises seven major areas and twenty-one work packages.

ALICE RAP aims to stimulate and feed evidence into a comprehensive public dialogue and debate on current and alternative approaches to addictions. It also underpins the need for a coordinated, Europe-wide strategy to reduce addiction-related harm based on best practices implemented in various Member States. The project contributes to build a European capacity on addiction policies and related research, offering scientific support for policy development and governance across Europe.

Work Package 6

In Work Package 6, entitled 'Costing Addiction', within Area 2 'Counting Addiction', four objectives were formulated:

1. Determine the social costs attributable to the abuse of alcohol, illegal drugs and tobacco as well as gambling/gaming and addiction for three EU countries with different policies with respect to illegal drugs.
2. Analyze the relationships between policies and costs in these countries, especially for costs occurring in the criminal sector.
3. Estimate avoidable costs associated with key policy actions.
4. Specify costs of addiction to the society.

Objectives 1 and 4 were addressed in the first deliverable D6.1 *Social costs: a report specifying the costs of addiction to societies*[2], consisting of two separate parts:

1. Abuse of alcohol, illegal drugs and tobacco (Mielecka-Kubień et al.)
2. Gambling and gaming (Derevensky & Remmers)

The decision that the gambling report would be treated as a separate part of D6.1 reflects significant differences between gambling/gaming and psychoactive substance use and abuse addictive behaviours and risks, as well as thetypes of costs associated with them. Finally, due to unavailability of crucial data it was not possible to assess social costs of gambling and gaming in Poland, Portugal and Catalonia (Spain). As Derevensky & Remmers concluded, more research effort to collect data useful for estimation of social costs of gambling/gaming is needed in order to further elaborate on this topic for the three participating countries.

Social costs of psychoactive substance use and abuse in all three participating countries were estimated in D6.1 (Mielecka-Kubień et al.) giving the basis for elaboration of this deliverable (D6.2), which covers objectives 2 and 3 of WP6. In Part I of D6.2 avoidable costs associated with decreased alcohol, tobacco and illicit drug consumption, resulting in lower mortality rates and therefore benefits in productivity, are estimated. Part II presents the estimation of potential introduction of alcohol minimum unit price in Poland. Part III analyzes the relationships between policies and costs in these countries, especially for costs occurring in the criminal sector.

[2] (http://www.alicerap.eu/resources/documents/doc_download/219-deliverable-06-1-social-costs-of-addiction.html)

1.1 Key findings from D6.1

The report by Jeffrey L. Derevensky and Pieter Remmers attempted to examine the social costs related specifically to gambling. Based upon the available data, the following summarizes the key findings:

- An analysis of the social impact of gambling is extremely difficult given the lack of consensus and agreement as to how to measure the overall impacts.
- The available data used to assess the social impact of problem gambling impact varied greatly across the three countries studied. Significant data gaps and inconsistencies were evident, with data not being systematically collected, unavailable, or dated.
- Given the lack of systematic data collection, lack of comparable data, and lack of reliability of the data no reliable estimates of the social costs are possible at this time.
- In spite of the lack of reliable data, there is clear indication from these three countries and comparable work done internationally that there is evidence suggesting both benefits as well as social costs related to the expansion of gambling.
- The SEIG model (Anielski & Braaten, 2008) is proposed as a framework for future consideration in order to reliably assess the economic and social costs of gambling within the EU.

There is little doubt that additional, systematic research within the EU is necessary in order to reliably assess the economic and social costs associated with gambling availability and expansion.

A description of national policies in regard to alcohol, tobacco and illicit drugs in Poland, Portugal and Catalonia (Spain) indicated much more cross-country similarities than differences. Policies regarding taxes and excise fees; restrictions of legal substances availability, purchase and advertisement; access to health and social services and the criminal sector in all EU member states are based on the same international guidelines and agreements.

The most significant differences between participating countries concerned the penal system perspective on illicit drugs. Generally speaking, in Portugal, a large proportion of offenses related to drugs is classified as misdemeanors, while in Poland and Spain – as crimes. Moreover, in Portugal, there are separate categories in the penal code classifying crimes committed in a state of intoxication or under the influence of a narcotic drug or psychotropic. In Poland, such offences are not distinguished in the penal code but alcohol or drug intoxication is taken into account by a court passing the judgment. In Spain and Portugal, possession of small amounts of drugs for personal use is not a crime while in Poland it is, although legal "proceedings might be discontinued."

Minor differences in policies generating/influencing social costs of substance addiction may be summarized as follows:

- With regard to taxes and fees - in Portugal and Catalonia (Spain) tobacco selling is a subject of licensing, while in Poland sale of cigarettes does not require a permit. In all countries alcohol selling is licensed.
- In terms of the availability of alcohol and tobacco the regulations in the countries under study are similar (a ban on tobacco advertising, sales / use of tobacco and alcohol in specific locations, e.g. schools).
- In all three countries tobacco advertisement is prohibited. In Portugal alcohol beverage commercials and in Poland beer commercials are permissible under certain conditions; Spain allows to advertise alcoholic beverages with an alcohol content of less than 20% in places where it can not be sold or consumed.
- In all three countries the sale of tobacco to persons under 18 years of age is prohibited, but there are significant differences in the sale of alcohol. In Poland and Spain, the age limit is 18 years, while in Portugal – 16 years. Poland and Portugal apply a ban on the sale of alcoholic beverages to

persons indicating a state of intoxication. In addition, the Polish legislation prohibits selling alcoholic beverages on credit, and the Portuguese – to people who are "intellectually disable".

- Policies regulating access to healthcare are very similar across countries. Simply, the treatment is free of charge or mostly free.
- In all countries addicted people, under certain conditions, may be supported by social welfare systems. Portugal has a specific social care help for drug users (tobacco addicts or alcoholics were not included). In Poland and Spain there is – free of charge - support for children (psychological and socio-therapeutic).
- In all countries sickness benefits depend on the length of the exemption. In Poland, the state budget covers the costs in the event of dismissal over 33 days, shorter leaves are paid by an employer. In Portugal, the employee does not receive benefits for the first 3 days of release; between 4 and 15 days an employer is responsible for the provision, and from the day 16 – it is the duty of the state budget or a private insurer.
- It is difficult to capture cross-country legal differences concerning prevention, education and research. In all countries these activities are mandatory.
- Other regulations: In Poland, function alcohol sobering station, in Spain - "crisis units", and in Portugal - 'commissions for dissuasion (due to the fact that drug use is an offense).

1.2 Social costs of addictions in Poland, Portugal and Catalonia (Spain)

Since there are no major differences in alcohol, tobacco and drug policies in Poland, Portugal and Catalonia (Spain), it may be concluded that the cross-country differences in social financial costs of addiction are to a lower extent related to national legislations and to higher extent - to other factors. Of course, the key determinant is exposure to alcohol, tobacco and illicit drugs causing health deterioration. Also health risks attributable to substance abuse are significantly different in each country, which reflects more global health status differences and other general inequalities between Poland and the two other countries (e.g. in GDP per capita or public expenditures oh healthcare).

Total financial costs, for the costs items where estimation was possible on the basis of available data, assessed for Portugal are equal to 987.1 million Euros (0,57% of GDP) and for Catalonia (Spain) - 247.5 million Euros (0,13% of GDP). The total burden for the public budget attributable to psychoactive substances is very similar in Poland and Portugal, and significantly lower in Catalonia (Spain). While the healthcare costs accounts for the similar percentage of GDP in Poland (0,11%) and in Catalonia (Spain) (0,10%), it is much higher in Portugal (0,47%). This difference is caused by very high healthcare costs of treating, firstly – tobacco, and secondly - alcohol attributable diseases in Portugal, estimated as 0,29% and 0,15% of GDP, and reflects the methodological differences in data collection between countries. For Portugal, healthcare costs were imputed on the basis of earlier Portuguese comparative study on the costs and burden of tobacco and alcohol diseases . For Poland and Catalonia (Spain), healthcare costs reported by various institutions for 2010 were used for the estimations.

As mentioned above, the most significant differences between participating countries concern the penal system perspective on the illicit drugs. Generally speaking, in Portugal, a large proportion of offenses related to drugs are classified as misdemeanors, while in Poland and Spain - as crimes.

According to our study results, these legal differences are translated into criminal sector social costs attributable to drugs, showing the lowest costs in Portugal approximately, 53 mln Euro, and higher in Catalonia (Spain) (38-121 mln Euro) and Poland – 112 mln Euro.

PART I

Avoidable social costs of addiction

Zofia Mielecka-Kubień

1. Method of estimation

In situations where resources which can be assigned by country authorities for dealing with negative consequences of substance abuse are limited, it is very important to have information about where these resources could be best allocated. In addition to information on the estimation of social costs, valuable indicators can give estimations of the avoidable part of the costs of substance abuse.

According to [Collins et al. 2006[3], p.12] ….*Avoidable costs are those costs which are amenable to public policy initiatives and behavioural changes* … and ….*provide an indication of the benefits potentially available to the community as a whole as result of directing public resources to the prevention or reduction of substance abuse.* And further, in their chapter *The concept of avoidability* (ibid., p.21), they indicate: *The first step in estimating avoidable burden is to conceptualise the attributable burden of disease; that is, the burden of a given disease in a given population that is identified as due to a specific exposure to a risk factor or multiple risk factors. … Based on the conceptualization of attributable burden, it is then possible to introduce the term avoidable burden of disease. The latter term denotes the proportion of disease burden that can be reduced by changing the current exposure distribution to an alternative, more favoured, exposure distribution.*

In practice, two approaches to the estimation of avoidable costs are usually applied: *Feasible Minimum* and *Arcadian Normal.* As indicated in the quoted Guidelines [ibid., p.22]:

One method of achieving an estimate of a Feasible Minimum is the use of the classic epidemiological approach, deriving the attributable burden from calculations of relative risk and the prevalence. From this calculation of the attributable burden, both past and future risk factor distributions can be estimated, which also provide data to enable the calculation of a Feasible Minimum. This approach can be modelled to demonstrate the difference between the attributable and the avoidable burden.

In order to estimate a *Feasible Minimum* researchers try to answer the question: *What would happen if risk factor distributions shifted to different counterfactual scenarios?* (Murray and Lopez, 1999, quoted after Collins et al. 2006, p.23).

In order to estimate an *Arcadian Normal*, instead of using epidemiological data from which the feasible minimum can be calculated, the lowest recorded rates of mortality from certain causes which had been achieved in a country are compared to the mortality rates from these causes achieved in other countries.

The estimation of avoidable costs of substance abuse (alcohol, smoking and drugs) in this report for Poland, Portugal and Catalonia (Spain) – for population age [15-64) – is based on both of the above described concepts.

In the estimation of *Feasible Minimum* risk factors distributions are shifted according to changes in exposure (understood here as changes in prevalence of consumption of the three addictive substances). It has been assumed that exposure decreases successively by 10%, 20% and 50%; exposure equal to 0% denotes results of estimation based on empirical data.

In the case of alcohol it has been assumed that the lower prevalence in one category of drinkers shifts drinkers to the next category, i.e. *hazardous* drinkers to *harmful* drinkers, *harmful* drinkers to *low level* drinkers, *low level* drinkers to *abstainers*. The situation where, for example, *hazardous* drinkers become *abstainers* has not been considered. It has been also assumed that changes in mortality in 100%

[3]Colins D., Lapsley H., Brochu S., Easton B., Perez-Gomez A., Rehm J., Single E. (2006). *International Guidlines for Estimation of the Avoidable Costs of Substance Abuse*, Health Canada.

attributable to alcohol drinking were adequate to the ones in mortality partly attributable to alcohol drinking. For smoking the potential changes in prevalence shift individuals from the *smokers* category to the *former smokers* category, whereas in the case of drugs the shift is from *users* to *non-users.* It has been assumed that changes in mortality in 100% attributable to use of illicit drugs were adequate to the ones in mortality partly attributable to use of drugs. Presented results are based on the ALICE RAP Deliverable 6.1 *Social costs: a report specifying the costs of addiction to societies*[4].

It should be strongly stressed that, as there are people who simultaneously drink and smoke, drink and use drugs, smoke and use drugs or drink, smoke and use drugs, deaths of some people are counted twice or even three times, so, strictly speaking, the numbers of deaths related to each of the three substances (and other results based on mortality estimates) should not be added up, as the sums are overestimated. Any comparisons of the results according to the kind of addictive substance should be treated with caution, as a rough approximation. Unfortunately, the information currently available does not allow to eliminate the double (or triple) counting.

2. Effects of changes of exposure on potential changes in mortality

2.1 Poland

Tables 2.1-2.6 and figures 2.1-2.9 present the results of potential changes in mortality due to hypothetical decreasing exposure of the Polish population age [15-64) to alcohol, smoking and use of illicit drugs. As mentioned above, it has been assumed that the prevalence of consumers of the three addictive substances decreases subsequently by 10%, 20% and 50%.

2.1.1 Alcohol

Table 2.1 presents hypothetical changes in the distribution of alcohol consumers according to prevalence hypothetically reduced by 10%, 20% and 50%. It can be observed that as prevalence decreases, the percent of abstainers increases, whereas the percent of harmful drinkers decreases.

Table 2.1 Changes in distribution of alcohol consumers (%) according to reduced exposure

TYPE OF CONSUMER	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
LOW LEVEL	62.3	56.6	51.4	35.6	45.3	41.8	38.2	27.7
HAZARDOUS	9.3	9.4	9.6	10.2	10.2	9.8	9.4	8.3
HARMFUL	11.2	10.0	8.9	5.5	6.4	5.7	5.1	3.2
ABSTAINERS	17.3	24.0	30.2	48.7	38.2	42.7	47.2	60.8
TOTAL	100	100	100	100	100	100	100	100

Source: author's own.

Hypothetical changes in the distribution of alcohol consumers would cause potential changes in mortality attributed to alcohol. The corresponding results are presented in table 2.2.

For the male population in Poland it can be observed that if the percent of alcohol consumers was 10% lower in each of the categories of drinkers, the mortality attributed to alcohol would be lower by 348 persons, i.e. 3.3% of the empirical number of deaths attributed to alcohol; by 729 persons (6.8%) if the percent of alcohol consumers was 20% lower in each category of drinkers; and by 2114 persons (19.8%) lower if exposure to alcohol was reduced by 50%.

[4] (http://www.alicerap.eu/resources/documents/doc_download/219-deliverable-06-1-social-costs-of-addiction.html)

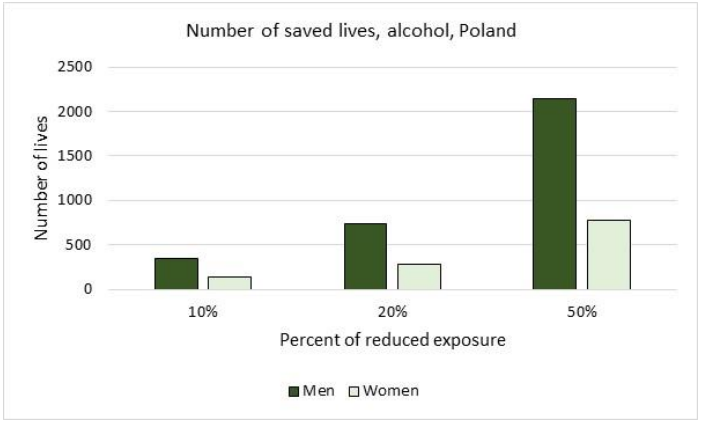
Table 2.2 Potential changes in mortality from different causes related to alcohol according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
NEOPLASMS	1293	1235	1173	960	713	671	627	485
CARDIOVASCULAR DISEASES	518	511	498	410	385	362	335	250
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS	316	303	289	241	83	81	79	65
OTHER CHRONIC AND ACUTE CONDITIONS	232	227	222	206	50	49	47	42
INJURIES	3637	3525	3405	2991	540	517	493	412
TOTAL PARTLY	5996	5801	5587	4808	1772	1679	1581	1254
100% ALCOHOL	4676	4524	4357	3750	862	817	769	610
TOTAL	10672	10325	9943	8558	2634	2496	2350	1864
NUMBER OF SAVED LIVES	X	348	729	2114	x	138	283	769
PERCENT	X	3.3	6.8	19.8	x	5.2	10.8	29.2

Source: author's own.

Corresponding results for the population of women are: 138 persons (5.2%), 283 persons (10.8%) and 769 persons (29.2%). The estimated numbers of potentially saved lives in Poland, for each reduction in exposure, are presented in figure 2.1.

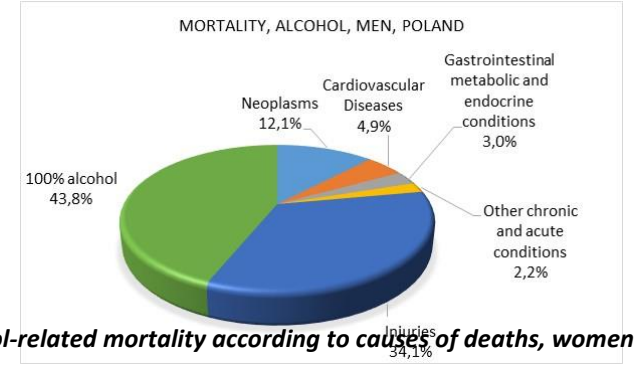
Figure 2.1 Number of potentially saved lives according to reduced exposure to alcohol



Source: author's own.

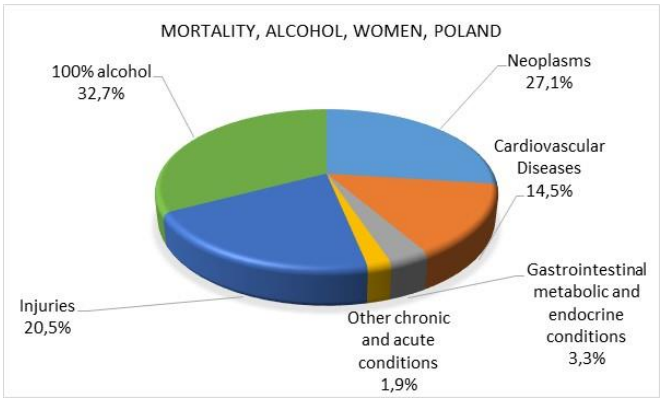
Figures 2.2 and 2.3 present the structure of mortality attributed to alcohol according to groups of causes of deaths for men and women. In accordance with method of estimation the structure remains the same regardless of the percent of reduced exposure. It can be observed that in the population of men deaths in 100% attributable to alcohol and deaths for injuries are predominant, while in the female population deaths due to neoplasms rank in second place.

Figure 2.2 Structure of alcohol-related mortality according to causes of deaths, men



Source: author's own.

Figure 2.3 Structure of alcohol-related mortality according to causes of deaths, women



Source: author's own.

2.1.2 Smoking

Table 2.3 presents hypothetical changes in the distribution of smokers according to prevalences hypothetically reduced by 10%, 20% and 50%. One can observe that as the prevalence of smokers decreases, the percent of former smokers automatically increases, from 21.8% in the population of men in empirical distribution to a 41.8% when the prevalence of smokers decreases by 50%, and from 11.3% to 24.4% in the population of women.

Table 2.3 Changes in distribution of smokers (%) according to reduced exposure

TYPE OF SMOKER	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
DAILY SMOKERS	39.9	35.9	31.9	20.0	26.1	23.5	20.9	13.1
FORMER SMOKERS	21.8	25.8	29.8	41.8	11.3	13.9	16.5	24.4
NEVER SMOKERS	38.3	38.3	38.3	38.3	62.6	62.6	62.6	62.6
TOTAL	100	100	100	100	100	100	100	100

Source: author's own.

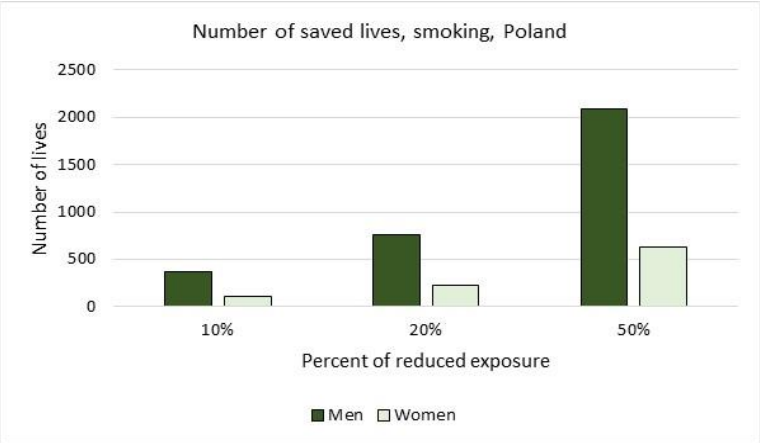
Table 2.4 Potential changes in mortality from different causes related to smoking according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
NEOPLASMS	9673	9572	9463	9073	2925	2870	2811	2602
CARDIOVASCULAR DISEASES	6212	5954	5685	4804	897	849	800	641
RESPIRATORY DISEASES	610	597	584	542	205	196	187	157
FIRE DEATHS	43	42	41	37	7	7	7	6
TOTAL	16538	16166	15774	14456	4034	3923	3805	3405
NUMBER OF SAVED LIVES	x	372	764	2082	x	111	229	629
PERCENT	x	2.2	4.6	12.6	x	2.8	5.7	15.6

Source: author's own.

It can be observed (table 2.4) that if the percent of smokers was 10% lower, the mortality attributed to smoking in the male population would decrease by 372 persons, i.e. 2.2% of empirical number of deaths attributed to smoking; by 764 persons (4.6%) if the percent of smokers was 20% lower; and by 2082 persons (12.6%) if the exposure to smoking was reduced by 50%. Corresponding results for the population of women are: 111 persons (2.8%), 229 persons (5.7) and 629 persons (15.6%). Figure 2.4 summaries these estimated numbers of lives potentially saved in Poland.

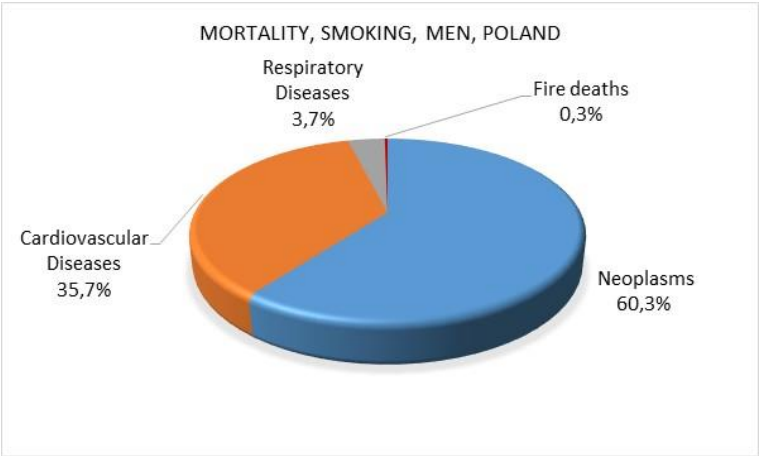
Figure 2.4 Number of potentially saved lives according to reduced exposure to smoking



Source: author's own.

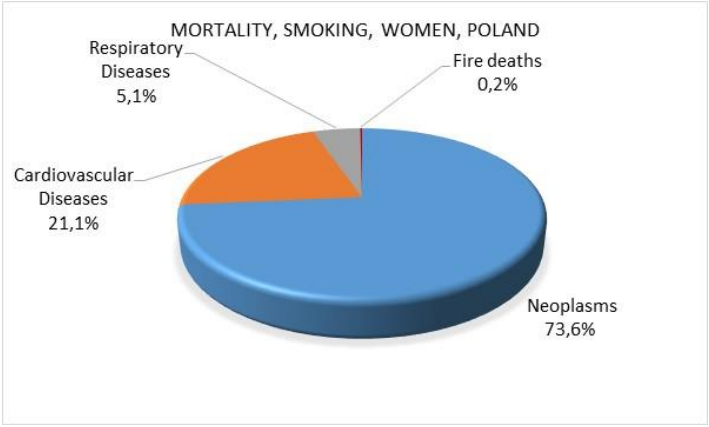
Figures 2.5 and 2.6 present the structure of mortality attributed to smoking, by groups of causes of deaths for men and women. In the population of men deaths due to neoplasms and cardiovascular diseases are predominant, while in thepopulation of women the percent of deaths due to neoplasms is significantly higher.

Figure 2.5 Structure of smoking-related mortality according to causes of deaths, men



Source: author's own.

Figure 2.6 Structure of smoking-related mortality according to causes of deaths, women



Source: author's own.

2.1.3 Drugs

Table 2.5 presents the hypothetical reduction of the number of users of illicit drugs in Poland by 10%, 20% and 50%.

Table 2.5 Changes in number of drugs users according to reduced exposure

EXPOSURE REDUCED BY	0%	10%	20%	50%
NUMBER OF DRUGS USERS	159 264	143 338	127 411	79 632

Source: author's own.

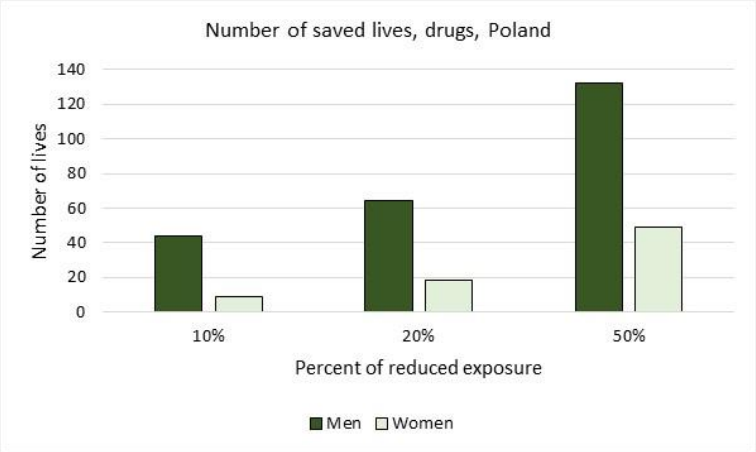
It can be observed (table 2.6) that if the percent of drug users was 10% lower, the mortality attributed to the use of illicit drugs would drop by 44 persons in the male population, i.e. 15.9% of empirical number of deaths attributed to use of illicit drugs; by 65 persons (23.5%) if the percent of drugs users was 20% lower; and by 132 persons (48.1%) with a prevalence reduced by 50%. Corresponding results for the population of women are: 9 persons (8.7%), 19 persons (17.7%) and 49 persons (46.2%). Estimated numbers of potentially saved lives in Poland with a reduced exposure to use of illicit drugs are presented in figure 2.7.

Table 2.6 Potential changes in mortality from different causes related to use of drugs according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
PARTLY	110	92	84	55	30	27	25	16
100% DRUGS	156	130	118	78	76	69	63	41
TOTAL	266	222	201	134	106	97	87	57
NUMBER OF SAVED LIVES	x	44	65	132	x	9	19	49
PERCENT	x	15.9	23.5	48.1	x	8.7	17.7	46.2

Source: author's own.

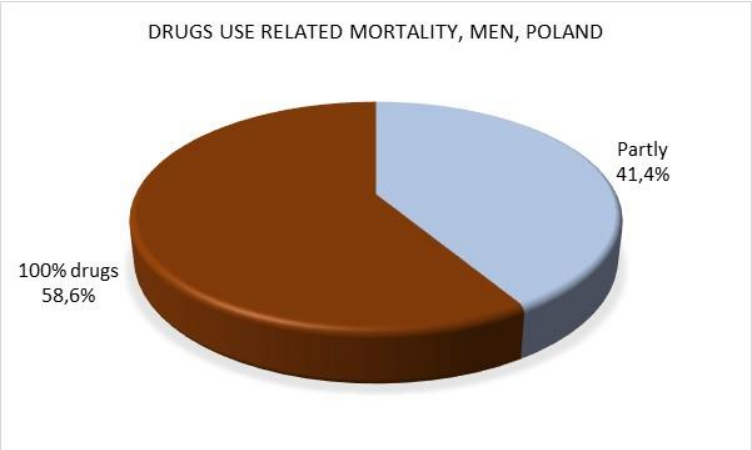
Figure 2.7 Number of potentially saved lives according to reduced exposure to use of illicit drugs



Source: author's own.

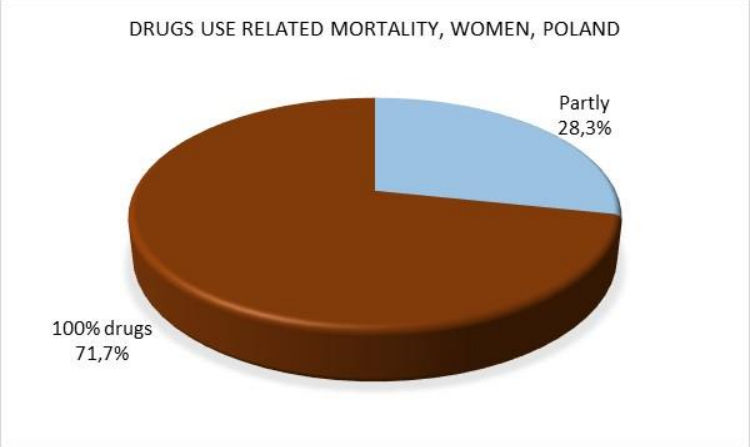
There are some differences in the structure of mortality attributed to the use of illicit drugs according to causes of deaths between the male and female populations (fig. 2.8 and 2.9) – for women more deaths are in 100% attributable to the use of illicit drugs.

Figure 2.8 Structure of drugs-related mortality according to causes of deaths, men



Source: author's own.

Figure 2.9 Structure of drugs-related mortality according to causes of deaths, women



Source: author's own.

2.2 Portugal

2.2.1 Alcohol

Table 2.7 presents hypothetical changes in the distribution of alcohol consumers according to a prevalence hypothetically reduced by 10%, 20% and 50%. One can observe that as prevalence decreases, the percent of abstainers increases and whereas the percents of harmful, hazardous and low level drinkers decrease.

Table 2.7 Changes in distribution of alcohol consumers (%) according to reduced exposure

TYPE OF CONSUMER	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
LOW LEVEL	61.5	56.4	51.2	35.6	37.8	34.6	31.5	22.0
HAZARDOUS	9.7	8.9	8.1	5.6	6.2	5.7	5.2	3.6
HARMFUL	1.5	1.4	1.2	0.8	1.0	0.9	0.8	0.5
ABSTAINERS	27.2	33.4	39.5	58.0	55.0	58.8	62.6	73.9
TOTAL	100	100	100	100	100	100	100	100

Source: author's own.

Hypothetical changes in the distribution of alcohol consumers caused potential changes in mortality attributed to alcohol. Table 2.8 presents these results.

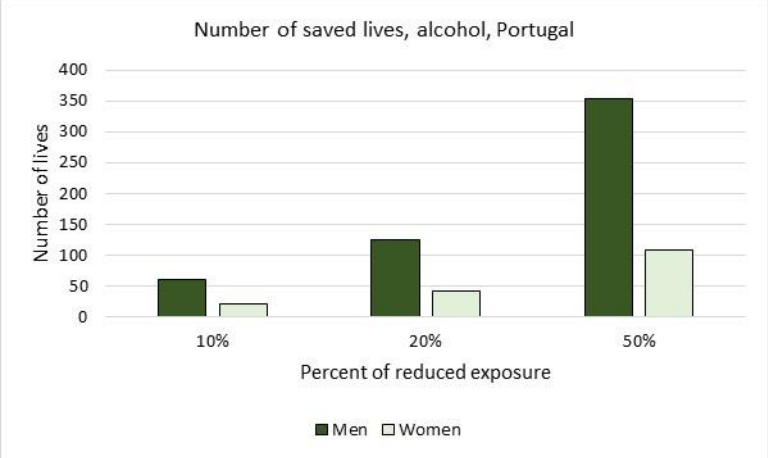
Table 2.8 Potential changes in mortality from different causes related to alcohol according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
NEOPLASMS	317	299	279	213	103	95	87	63
CARDIOVASCULAR DISEASES	-39	-33	-28	-15	15	14	13	10
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS	49	47	44	36	14	14	13	10
OTHER CHRONIC AND ACUTE CONDITIONS	16	15	14	11	6	5	5	4
INJURIES	272	255	237	177	50	46	42	31
TOTAL PARTLY	615	583	547	422	188	174	161	117
100% ALCOHOL	508	481	452	348	98	91	84	61
TOTAL	1123	1063	999	770	286	265	245	178
NUMBER OF SAVED LIVES	x	60	125	353	x	20	41	108
PERCENT	x	5.3	11.1	31.4	x	7.1	14.4	37.8

Source: author's own.

As shown in table 2.8, if the percent of alcohol consumers decreased by 10% in each category of drinkers, the mortality attributed to alcohol in Portugal would be 60 persons less in the male population, i.e. 5.3% of empirical number of deaths of men attributed to alcohol; 125 persons less (11.1%) if the percent of male alcohol consumers dropped by 20% in each category of drinkers; and 353 persons less (31.4%) with an exposure to alcohol reduced by 50%. Corresponding results for the female population are: 20 persons (7.1%), 41 persons (14.4%) and 108 persons (37.8 %). The estimated numbers of potentially saved lives in Portugal due to decreased exposure to the use of alcohol are presented in figure 2.10.

Figure 2.10 Number of potentially saved lives according to reduced exposure to alcohol

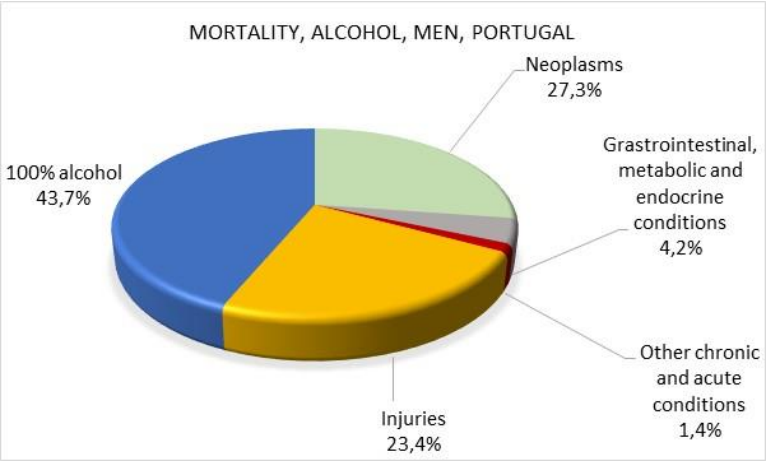


Source: author's own.

Figures 2.11 and 2.12 present the structure of mortality attributed to alcohol according to groups of causes of deaths for men and women in Portugal. In accordance with method of estimation, the structure remains the same regardless of the percent of reduced exposure. It should be mentioned that in the population of men in regard to cardiovascular diseases drinking alcohol saved more lives than caused deaths for some of the diseases of this group of causes of deaths, which can be considered as a protective effect of alcohol (value of relative risk coefficient for some of cardiovascular diseases was less than 1).

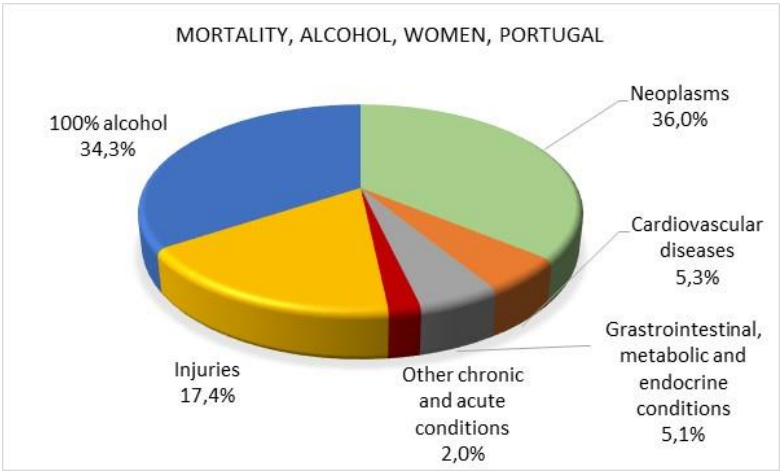
In the population of men deaths in 100% attributable to alcohol and deaths for injuries were predominant, while in the population of women deaths due to neoplasms were the most frequest, followed by deaths in 100% attributable to alcohol.

Figure 2.11 Structure of alcohol-related mortality according to causes of deaths, men



Source: author's own.
Remark: deaths for cardiovascular diseases are not presented.

Figure 2.12 Structure of alcohol-related mortality according to causes of deaths, women



Source: author's own.

2.2.2 Smoking

Table 2.9 presents hypothetical changes in the distribution of smokers according to a prevalence hypothetically reduced by 10%, 20% and 50%. One can observe that as the prevalence of smokers decreases, the percent of former smokers automatically increases, in population of men from 50.6% in empirical distribution to 75.3%, when prevalence of smokers decreases by 50%, and from 81.1% to 90.5% respectively in the population of women.

Table 2.9 Changes in distribution of smokers (%) according to reduced exposure

TYPE OF SMOKER	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
DAILY SMOKERS	27.7	25.0	22.2	13.9	10.6	9.6	8.5	5.3
FORMER SMOKERS	21.7	19.5	17.3	10.8	8.3	7.5	6.7	4.2
NEVER SMOKERS	50.6	55.5	60.5	75.3	81.1	83.0	84.8	90.5
TOTAL	100	100	100	100	100	100	100	100

Source: author's own.

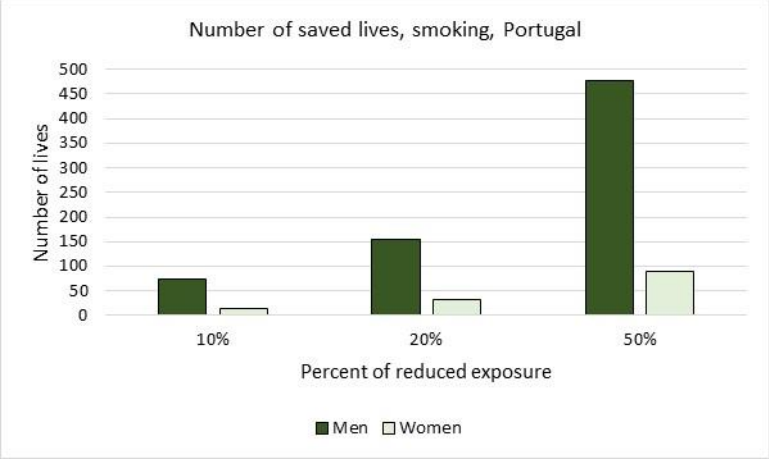
Table 2.10 Potential changes in mortality from different causes related to smoking according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
NEOPLASMS	1709	1663	1610	1389	201	190	177	131
CARDIOVASCULAR DISEASES	294	272	249	171	28	25	23	15
RESPIRATORY DISEASES	128	123	117	95	15	14	13	9
FIRE DEATHS	0	0	0	0	0	0	0	0
TOTAL	2131	2057	1976	1655	244	229	213	155
NUMBER OF SAVED LIVES	x	73	155	476	x	15	31	89
PERCENT	x	3.4	7.3	22.3	x	6.2	12.9	36.6

Source: author's own.

As shown in table 2.10, if the percent of smokers decreased by 10%, mortality attributed to smoking in the male population would drop by 73 persons, i.e. 3.4% of empirical number of deaths attributed to smoking; by 155 persons (7.3%) if the percent of smokers was 20% lower; and by 476 persons (22.3%) with exposure to smoking reduced by 50%. Corresponding results for the Portuguese population of women are: 15 persons (6.2%), 31 persons (12.9) and 89 persons (36.6%). The estimated numbers of potentially saved lives in Portugal are presented in figure 2.13.

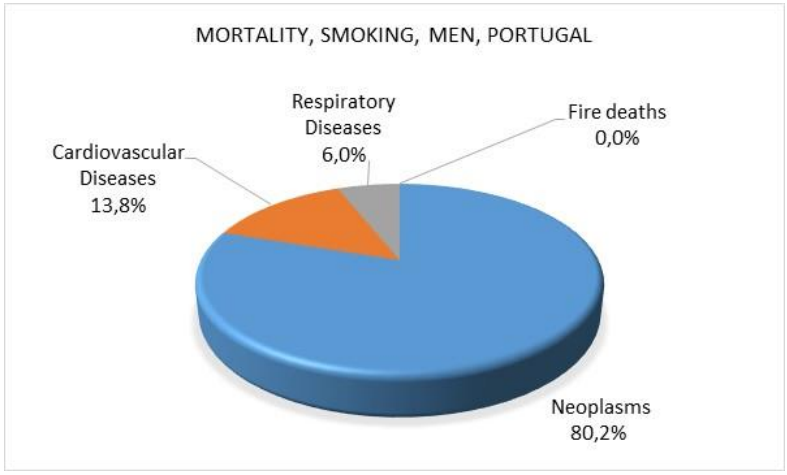
Figure 2.13 Number of potentially saved lives according to reduced exposure to smoking



Source: author's own.

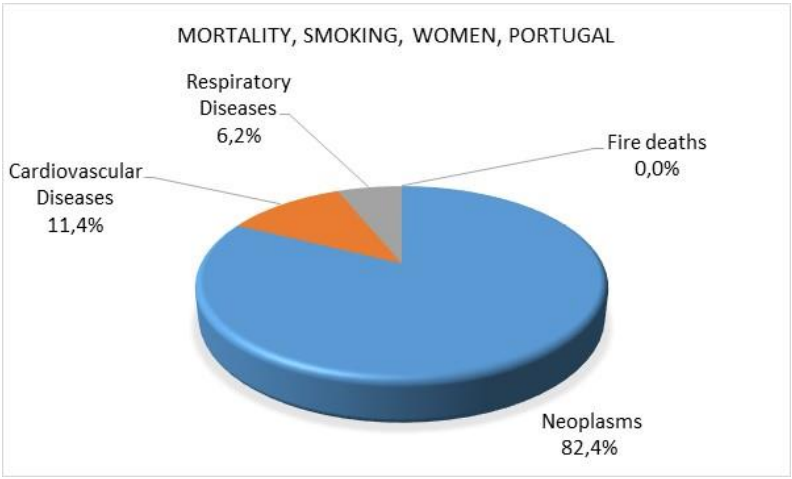
Figures 2.14 and 2.15 present the structure of mortality attributed to smoking according to groups of causes of deaths for men and women. The predominant group of causes of death attributed to smoking for both Portuguese men and women are neoplasms, whereas the percent of deaths due to cardiovascular diseases in both populations is low.

Figure 2.14 Structure of smoking-related mortality according to causes of deaths, men



Source: author's own.

Figure 2.15 Structure of smoking-related mortality according to causes of deaths, women



Source: author's own.

2.2.3 Drugs

Table 2.11 presents the hypothetical reduction of users of illicit drugs by 10%, 20% and 50% in Portugal.

Table 2.11 Changes in percent of drugs users according to reduced exposure

EXPOSURE REDUCED BY	0%	10%	20%	50%
PERCENT OF DRUGS USERS				
MEN	4.0	3.6	3.2	2.0
WOMEN	1.3	1.2	1.1	0.7

Source: author's own.

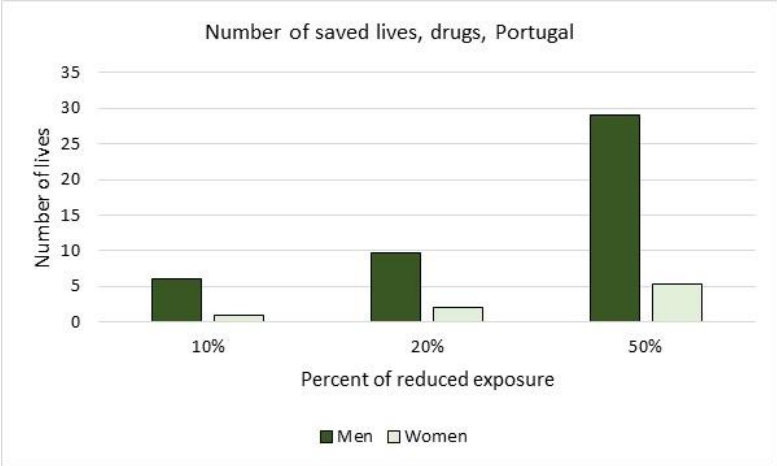
As shown in table 2.12, if the percent of drug users in Portugal decreased by 10%, mortality attributed to the use of illicit drugs would drop, in the population of men, by 6 persons, i.e. 6.3% of empirical number of deaths attributed to use of illicit drugs; by 10 persons (10.9%) if the percent of drugs users was 20% lower; and by 29 persons (34.2%) with a prevalence reduced by 50%. Respective results for the population of women are: 1 person (6.8%), 2 persons (15.7%) and 5 persons (44.1%). The estimated numbers of potentially saved lives due to decreased exposure to the use of illicit drugs in Portugal are presented in figure 2.16.

Table 2.12 Potential changes in mortality from different causes related to use of drugs according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
PARTLY	74	69	66	51	14	13	13	9
100% DRUGS	21	20	19	15	0	0	0	0
TOTAL	95	89	85	66	14	13	12	9
NUMBER OF SAVED LIVES	x	6	10	29	x	1	2	5
PERCENT	x	6.3	10.9	34.2	x	6.8	15.7	44.1

Source: author's own.

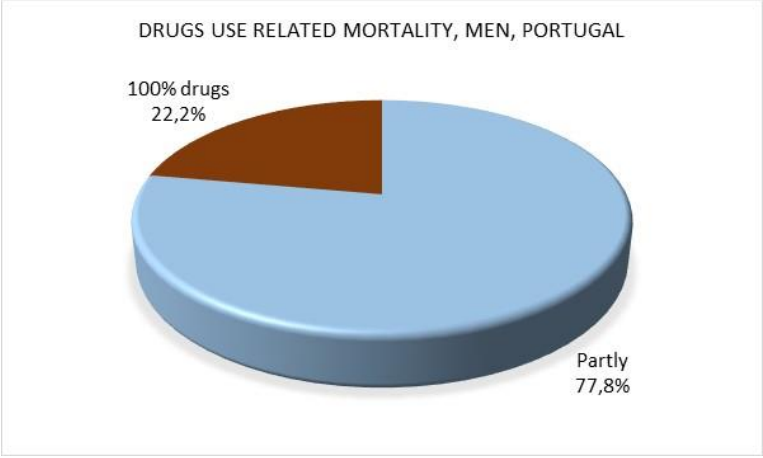
Figure 2.16 Number of potentially saved lives according to reduced exposure to use of drugs



Source: author's own.

There are some differences in the structure of mortality attributed to use of illicit drugs according to causes of deaths between the populations of men (fig. 2.17) and women in Portugal – for women all deaths were partly attributed to use of illicit drugs.

Figure 17 Structure of drugs-related mortality according to causes of deaths, men



Source: author's own.

2.3 Catalonia (Spain)

2.3.1 Alcohol

Table 2.13 presents hypothetical changes in the distribution of alcohol consumers according to prevalences hypothetically reduced by 10%, 20% and 50%. One can observe that, as prevalence decreases, the percent of abstainers grows, whereas the percents of harmful, hazardous and low level drinkers decrease.

Table 2.13 Changes in distribution of alcohol consumers (%) according to reduced exposure

TYPE OF CONSUMER	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
LOW LEVEL	78.1	71.0	63.9	42.6	72.9	66.5	60.0	40.5
HAZARDOUS	7.0	7.0	6.9	6.6	8.1	7.5	6.9	5.1
HARMFUL	6.2	5.6	5.0	3.1	2.1	1.9	1.7	1.1
ABSTAINERS	8.7	16.5	24.3	47.7	16.8	24.1	31.4	53.3
TOTAL	100	100	100	100	100	100	100	100

Source: author's own.

As shown in table 2.14, if the percent of alcohol consumers decreased by 10% in each category of drinkers, the mortality attributed to alcohol would fall by 15 persons in the Catalan male population, i.e. 3.4% of empirical number of deaths attributed to alcohol; by 31 persons (7.5%) if the percent of alcohol consumers was 20% lower in each category of drinkers; and by 94 persons (23.5%) with exposure to alcohol reduced by 50%. Corresponding results for the female population in Catalonia are: 12 persons (6.4%), 25 persons (13.2%) and 69 persons (35.9 %). Figure 2.18 summarises the estimated numbers of potentially saved lives due to a decreased exposure to alcohol use in Catalonia (Spain).

Table 2.14 Potential changes in mortality from different causes related to alcohol according to reduced exposure

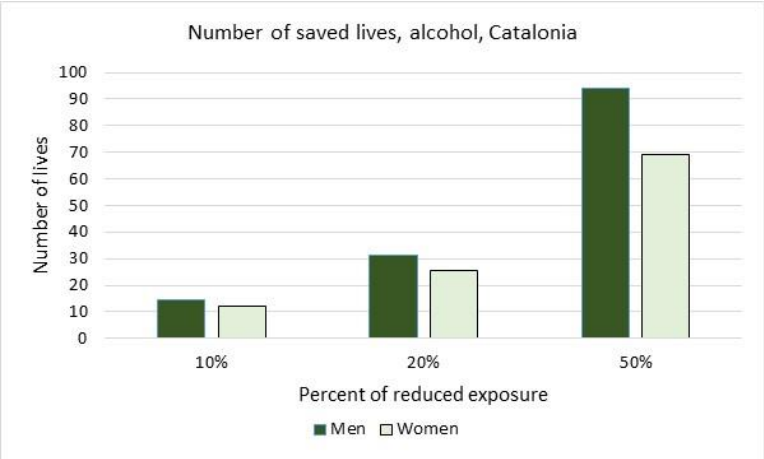
CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
NEOPLASMS	170	161	151	116	110	102	94	67
CARDIOVASCULAR DISEASES	-37	-31	-26	-12	7	7	7	6
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS	20	19	19	16	5	5	4	3
OTHER CHRONIC AND ACUTE CONDITIONS	7	7	6	6	5	5	5	4
INJURIES	173	166	159	135	28	27	25	19
TOTAL PARTLY	333	322	309	261	155	145	135	100
100% ALCOHOL	99	96	92	77	37	35	32	24
TOTAL	432	418	401	338	192	180	167	123
NUMBER OF SAVED LIVES	x	15	31	94	x	12	25	69
PERCENT	x	3.4	7.5	23.5	x	6.4	13.2	35.9

Source: author's own.

Figures 2.19 and 2.20 present the structure of mortality attributed to alcohol according to groups of causes of deaths for men and women in Catalonia (Spain). In accordance with method of estimation, the structure remains the same regardless of percent of reduced exposure. It should be mentioned that (as found in Portugal) in the population of men in regard to cardiovascular diseases drinking alcohol saved more lives than caused deaths for some of the diseases of this group of causes of deaths, which can be considered as a protective effect of alcohol (value of relative risk coefficient for some of cardiovascular diseases was less than 1).

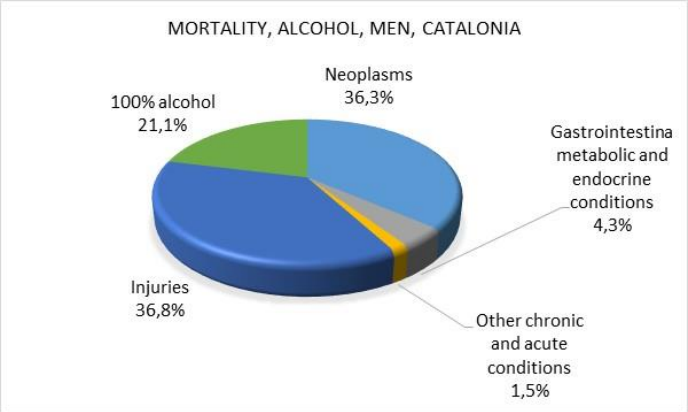
For men, the predominant category was deaths in 100% attributable to alcohol followed by deaths for injuries and neoplasms, while in the population of women deaths for neoplasms were the leading category.

Figure 2.18 Number of potentially saved lives according to reduced exposure to alcohol



Source: author's own.

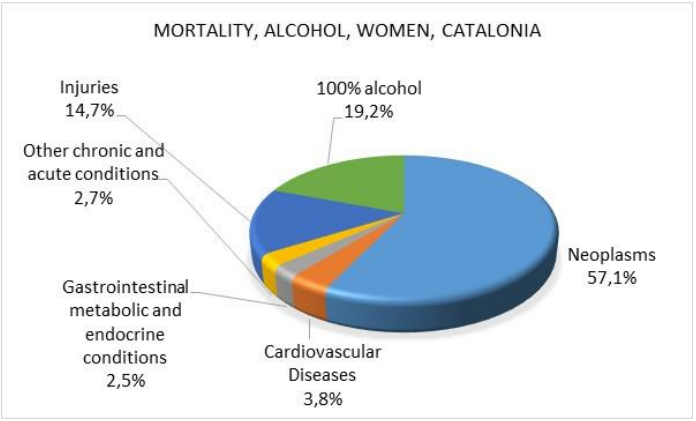
Figure 2.19 Structure of alcohol-related mortality according to causes of deaths, men



Source: authors' own.

Remark: deaths for cardiovascular diseases are not presented.

Figure 2.20 Structure of alcohol-related mortality according to causes of deaths, women



Source: author's own.

2.3.2 Smoking

Table 2.15 presents hypothetical changes in distribution of smokers in Catalonia (Spain) according to prevalence hypothetically reduced by 10%, 20% and 50%. As in the other countries, as the prevalence of smokers decreases, the percent of former smokers automatically increases, in population of men from 26.5% in empirical distribution to 40.6% when the prevalence of smokers decreases by 50%, and from 16.8% to 27.6% respectively in the population of women.

Table 2.15 Changes in distribution of smokers (%) according to reduced exposure

TYPE OF SMOKER	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
DAILY SMOKERS	28.1	25.3	22.5	14.0	21.5	19.3	17.2	10.7
FORMER SMOKERS	26.5	29.4	32.2	40.6	16.8	19.0	21.1	27.6
NEVER SMOKERS	45.4	45.4	45.4	45.4	61.7	61.7	61.7	61.7
TOTAL	100	100	100	100	100	100	100	100

Source: author's own.

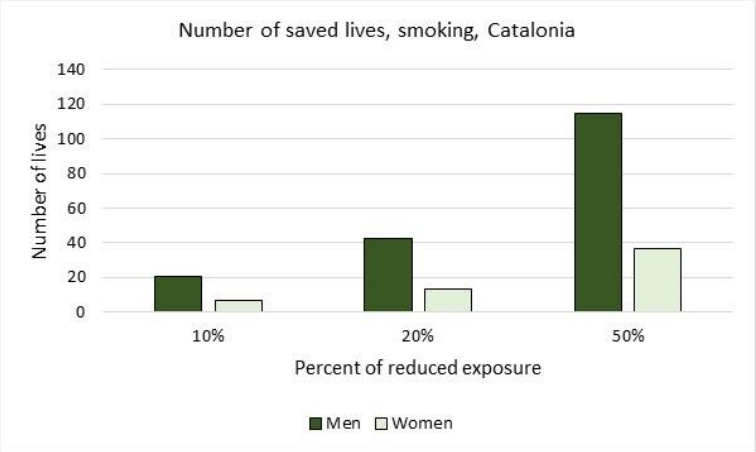
If the percent of smokers was 10% lower, as shown in table 2.16, mortality attributed to smoking in the male population would fall by 21 persons, i.e. 1.4% of empirical number of deaths attributed to smoking; by 43 persons (2.8%) if the percent of smokers was 20% lower, and by 115 persons (7.6%) with an exposure to smoking reduced by 50%. Corresponding results for the population of women are: 6 persons (2.2%), 13 persons (4.6) and 36 persons (12.9%). The estimated numbers of potentially saved lives in Catalonia (Spain) with reduced exposure to smoking are presented in figure 2.21.

Table 2.16 Potential changes in mortality from different causes related to smoking according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
NEOPLASMS	1169	1158	1147	1108	242	238	233	218
CARDIOVASCULAR DISEASES	277	267	257	225	41	39	37	31
RESPIRATORY DISEASES	64	64	63	62	12	12	11	10
FIRE DEATHS	1	1	1	1	0	0	0	0
TOTAL	1511	1490	1468	1396	296	289	283	260
NUMBER OF SAVED LIVES	x	21	43	115	x	6	13	36
PERCENT	x	1.4	2.8	7.6	x	2.2	4.6	12.9

Source: author's own.

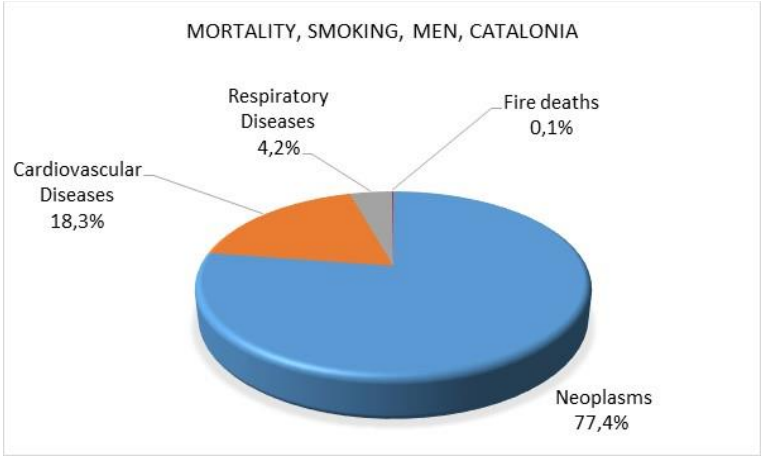
Figure 2.21 Number of potentially saved lives according to reduced exposure to smoking



Source: author's own.

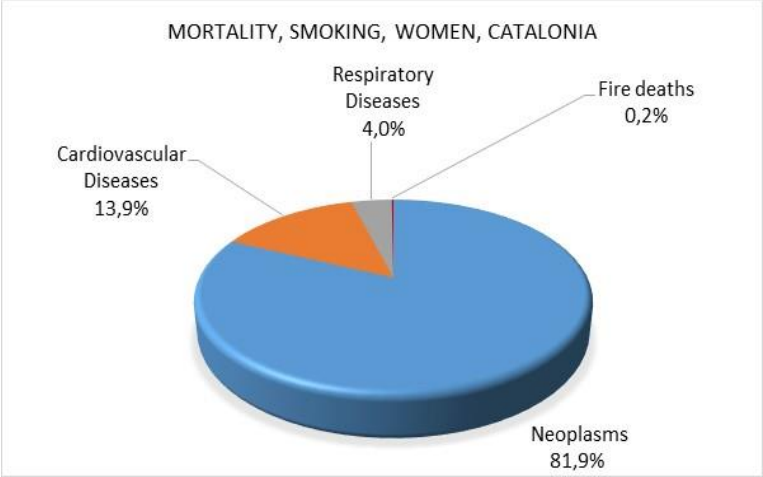
Figures 2.22 and 2.23 present the structure of mortality attributed to smoking according to groups of causes of deaths for men and women. In the case of Catalonia (Spain), the structure is very similar for both men and women –the predominant group is neoplasms, followed at a distance by deaths due to cardiovascular diseases in both populations.

Figure 2.22 Structure of smoking-related mortality according to causes of deaths, men



Source: author's own.

Figure 2.23 Structure of smoking-related mortality according to causes of deaths, women



Source: author's own.

2.3.3 Drugs

Table 2.17 presents a hypothetical reduction of users of illicit drugs by 10%, 20% and 50% in Catalonia (Spain).

Table 2.17 Changes in number of drugs users according to reduced exposure

EXPOSURE REDUCED BY	0%	10%	20%	50%
PERCENT OF DRUGS USERS				
MEN	15.7	14.1	12.5	7.8
WOMEN	7.5	6.7	6.0	3.7

Source: author's own.

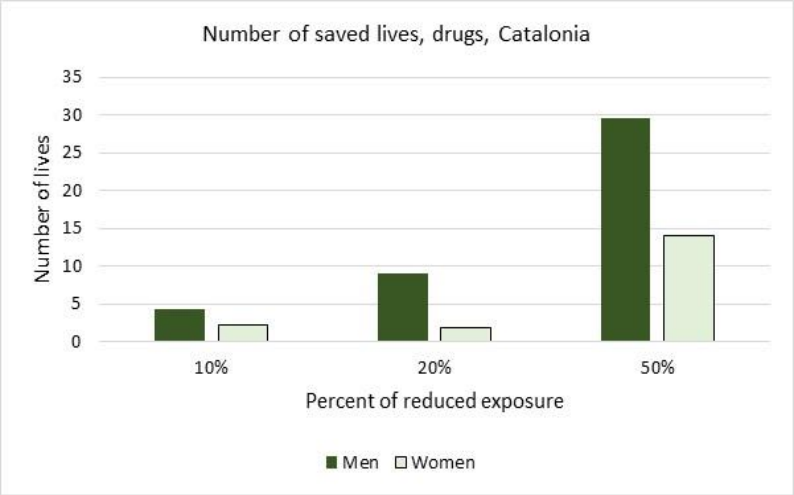
As shown in table 2.18, if the percent of drug users was 10% lower, mortality attributed to the use of illicit drugs for the Catalan male population would decrease by 4 persons, i.e. 2.8% of empirical number of deaths attributed to use of illicit drugs; by 9 persons (6.1%) if the percent of drugs users was 20% lower; and by 30 persons (19.7%) with a prevalence reduced by 50%. Corresponding results for the Catalan female population are: 2 persons (4.8%), 5 persons (10.2%) and 14 persons (30.9%). Figure 2.24 summarises the estimated numbers of potentially saved lives due to reductions in the exposure to use of illicit drugs in Catalonia (Spain).

Table 2.18 Potential changes in mortality from different causes related to use of drugs according to reduced exposure

CAUSES OF DEATHS	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
PARTLY	63	61	59	51	14	14	13	10
100% DRUGS	87	85	82	70	31	29	28	21
TOTAL	150	146	141	120	45	43	41	31
NUMBER OF SAVED LIVES	x	4	9	30	x	2	5	14
PERCENT	x	2.8	6.1	19.7	x	4.8	10.2	30.9

Source: author's own.

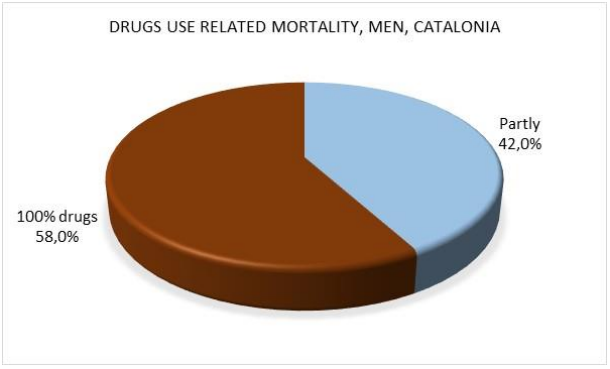
Figure 2.24 Number of potentially saved lives according to reduced exposure to use of drugs



Source: author's own.

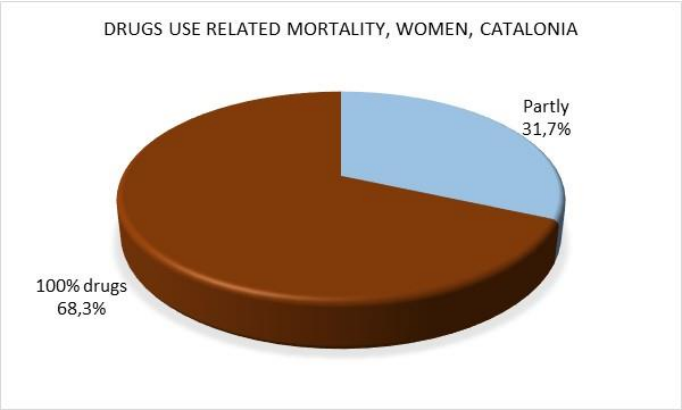
In Catalonia (Spain) there are only small differences in the structure of mortality attributed to the use of illicit drugs according to causes of deaths between men and women (figures 2.25 and 2.26)- in both cases the predominant cause of death are those 100% attributable to the use of illicit drugs.

Figure 2.25 Structure of drugs-related mortality according to causes of deaths, men



Source: author's own.

Figure 2.26 Structure of drugs-related mortality according to causes of deaths, women



Source: author's own.

2.4 Comparison of the countries – Use of "Arcadian normal"

Since three countries (Poland, Portugal and Catalonia (Spain)) were included in the ALICE RAP WP6 estimation and comparison of social costs of alcohol, smoking and illicit drugs, the use of "Arcadian Normal" in this report is limited to these three countries. Mortality rates for alcohol, smoking and use of illicit drugs related causes of deaths have been calculated, according to gender and groups of causes of death. Then we estimated how many lives could be saved if mortality rates in a given country were equal to the lowest ones among the compared countries.

2.4.1 Alcohol

Table 2.19 presents mortality rates related to drinking alcohol in Poland, Portugal and Catalonia (Spain), for population age [15-64), per 100,000 of populations.

Table 2.19 Mortality rates related to alcohol for population age [15-64), per 100,000 of population

CAUSES OF DEATHS	POLAND		PORTUGAL		CATALONIA (SPAIN)	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Neoplasms	9.5	5.2	9.3	2.9	6.7	4.4
Cardiovascular Diseases	3.8	2.8	-1.1	0.4	-1.4	0.3
Gastrointestinal, metabolic and endocrine conditions	2.3	0.6	1.4	0.4	0.8	0.2
Other chronic and acute conditions	1.7	0.4	0.5	0.2	0.3	0.2
Injuries	26.7	3.9	7.9	1.4	6.8	1.1
100% alcohol	34.4	6.3	14.9	2.7	3.9	1.5
Total	78.5	19.2	32.9	8.0	16.9	7.8

Source: author's own.

It can be seen that the highest mortality rates related to drinking alcohol are observed in Poland in the population of men – they are more than twice as high than in Portugal and more than four times higher than in Catalonia (Spain). Similar differences can be observed in the case of women – in Poland the mortality rates attributed to alcohol are nearly 2,5 times higher than in Portugal and Catalonia (Spain). Those differences are due to a higher prevalence of harmful and hazardous drinkers in Poland than in the remaining two countries, and to the negative sign for mortality for cardiovascular diseases (which is the result of less than one values of relative risk coefficients for some of the cardiovascular diseases) in Portugal and Catalonia (Spain), which means that a protective effect of alcohol predominates in the case of

these two countries over its negative effects. The other possible reason are higher general mortality rates in Poland than in Portugal or Catalonia (Spain), which also influences the level of alcohol related mortality, especially in the case of mortality partly attributed to alcohol.

Tables 2.20 and 2.21 present, for men and women, empirical mortality rates for causes of death related to alcohol in sequence from the lowest to the highest one, regardless of the country and causes of death. Columns 4-6 list the expected numbers of deaths, i.e. the numbers which would occur, if in the population age [15-64) respectively in Poland, Portugal and Catalonia (Spain) the mortality rates presented in column 3 existed.

Table 2.20 Mortality rates related to alcohol for population age [15-64), per 100 000 of population and expected values of number of deaths, men

COUNTRY	CAUSE OF DEATHS	MORTALITY RATE	EXPECTED NUMBER OF DEATHS		
			POLAND	PORTUGAL	CATALONIA (SPAIN)
1	2	3	4	5	6
Catalonia (Spain)	Cardiovascular Diseases	-1.4	-196	-49	-37
Portugal	Cardiovascular Diseases	-1.1	-154	-39	-29
Catalonia (Spain)	Other chronic and acute conditions	0.3	37	9	7
Portugal	Other chronic and acute conditions	0.5	64	16	12
Catalonia (Spain)	Gastrointestinal, metabolic and endocrine conditions	0.8	107	27	20
Portugal	Gastrointestinal, metabolic and endocrine conditions	1.4	195	49	37
Poland	Other chronic and acute conditions	1.7	232	58	44
Poland	Gastrointestinal, metabolic and endocrine conditions	2.3	316	79	59
Poland	Cardiovascular Diseases	3.8	518	130	97
Catalonia (Spain)	100% alcohol	3.9	527	133	99
Catalonia (Spain)	Neoplasms	6.7	907	228	170
Catalonia (Spain)	Injuries	6.8	920	231	173
Portugal	Injuries	7.9	1081	272	203
Portugal	Neoplasms	9.3	1263	317	237
Poland	Neoplasms	9.5	1293	325	243
Portugal	100% alcohol	14.9	2021	508	379
Catalonia (Spain)	Total	16.9	2302	579	432
Poland	Injuries	26.7	3637	914	683
Portugal	Total	32.9	4469	1123	839
Poland	100% alcohol	34.4	4676	1175	878
Poland	Total	78.5	10672	2682	2003

Source: author's own.

Table 2.21 Mortality rates related to alcohol for population age [15-64), per 100 000 of population and expected values of number of deaths, women

COUNTRY	CAUSE OF DEATHS	MORTALITY RATE	EXPECTED NUMBER OF DEATHS		
			POLAND	PORTUGAL	CATALONIA (SPAIN)
1	2	3	4	5	6
Portugal	Other chronic and acute conditions	0.2	22	6	4
Catalonia (Spain)	Gastrointestinal, metabolic and endocrine conditions	0.2	27	7	5
Catalonia (Spain)	Other chronic and acute conditions	0.2	28	7	5
Catalonia (Spain)	Cardiovascular Diseases	0.3	40	10	7
Poland	Other chronic and acute conditions	0.4	50	13	9
Portugal	Gastrointestinal, metabolic and endocrine conditions	0.4	56	14	10
Portugal	Cardiovascular Diseases	0.4	58	15	10
Poland	Gastrointestinal, metabolic and endocrine conditions	0.6	86	23	16
Catalonia (Spain)	Injuries	1.1	157	41	28
Portugal	Injuries	1.4	190	50	34
Catalonia (Spain)	100% alcohol	1.5	205	54	37
Portugal	100% alcohol	2.7	376	98	68
Poland	Cardiovascular Diseases	2.8	382	100	69
Portugal	Neoplasms	2.9	395	103	71
Poland	Injuries	3.9	540	141	97
Catalonia (Spain)	Neoplasms	4.4	611	159	110
Poland	Neoplasms	5.2	713	186	128
Poland	100% alcohol	6.3	862	225	155
Catalonia (Spain)	Total	7.8	1069	278	192
Portugal	Total	8.0	1096	286	197
Poland	Total	19.2	2634	686	474

Source: author's own.

Based on the results presented in tables 2.20 and 2.21, estimates of the number of lives which could be potentially saved if in a given country the mortality rates for given cause of deaths attributed to alcohol were the lowest (among the three compared countries) have been calculated. In the case of men the lowest mortality rates for causes of deaths attributed to alcohol were observed in Catalonia (Spain), then in Portugal – in Poland they were the highest. In the case of women, the lowest mortality rates for cardiovascular diseases, gastrointestinal, metabolic and endocrine conditions, injuries, 100% alcohol and total were found in Catalonia (Spain), while for neoplasms and other chronic and acute conditions – in Portugal. The results of this estimation are presented in table 2.22.

Table 2.22 Expected number of saved lives in Poland, Portugal and Catalonia (Spain) under the assumption of the lowest mortality rates for causes of deaths attributed to alcohol

CAUSES OF DEATHS	NUMBER OF POTENTIALLY SAVED LIVES					
	POLAND		PORTUGAL		CATALONIA (SPAIN)	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Neoplasms	387	319	90	x	x	1
Cardiovascular Diseases	714	342	10	5	x	x
Gastrointestinal, metabolic and endocrine conditions	208	60	22	7	x	x
Other chronic and acute conditions	195	28	7	x	x	39
Injuries	2717	382	40	9	x	x
100% alcohol	4149	657	375	44	x	x
Total	8370	1788	545	65	x	40

Source: author's own.
Note: when an "x" appears, this indicates that for this gender and specific cause of death, the country with an x presents the lowest mortality rate of the three countries considered.

It can be observed that, using these three countries, Poland has the most to gain – if mortality rates for causes of death related to alcohol in Poland were as low as in Catalonia (Spain) or for two causes of deaths in Portugal, 10 158 lives could be saved in year 2010, i.e. 78.4% of deaths attributed to alcohol in the population of men and 67.9% of those in the population of women.

Portugal could gain the lives of 610 people, that is 48.5% of number of deaths attributed to alcohol in the population of men and 22.8% of those deaths in the population of women. Catalonia (Spain) could gain 40 lives, that is 1.8% of the number of deaths related to alcohol.

2.4.2 Smoking

Table 2.23 presents the mortality rates for causes of death attributed to smoking in Poland, Portugal and Catalonia (Spain).

It can be observed that they are highest in Poland for both genders. These differences are presented in more detail in tables 2.24 and 2.25, which present the empirical mortality rates for causes of death related to smoking in sequence from the lowest to the highest one, regardless of the country and causes of death. Columns 4-6 list the expected numbers of deaths, i.e. the numbers which would occur if in population age [15-64) respectively in Poland, Portugal and Catalonia (Spain) the mortality rates presented in column 3 existed.

Table 2.23 Mortality rates related to smoking for population age [15-64), per 100 000 of population

CAUSES OF DEATHS	POLAND		PORTUGAL		CATALONIA (SPAIN)	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Neoplasms	71.1	21.3	50.0	5.6	45.8	9.8
Cardiovascular Diseases	45.7	6.5	8.6	0.8	10.8	1.7
Respiratory Diseases	4.5	1.5	3.8	0.4	2.5	0.5
Fire deaths	0.3	0.1	0.0	0.0	0.1	0.0
Total	121.6	29.3	62.3	6.8	59.2	11.9

Source: author's own.

Table 2.24 Mortality rates related to smoking for population age [15-64), per 100 000 of population and expected values of number of deaths, men

COUNTRY	CAUSE OF DEATHS	MORTALITY RATE	EXPECTED NUMBER OF DEATHS		
			POLAND	PORTUGAL	CATALONIA (SPAIN)
1	2	3	4	5	6
Portugal	Fire Deaths	0.0	0	0	0
Catalonia (Spain)	Fire Deaths	0.1	7	2	1
Poland	Fire Deaths	0.3	43	11	8
Catalonia (Spain)	Respiratory Diseases	2.5	341	86	64
Portugal	Respiratory Diseases	3.8	510	128	96
Poland	Respiratory Diseases	4.5	610	153	115
Portugal	Cardiovascular Diseases	8.6	1170	294	220
Catalonia (Spain)	Cardiovascular Diseases	10.8	1475	371	277
Poland	Cardiovascular Diseases	45.7	6212	1561	1166
Catalonia (Spain)	Neoplasms	45.8	6228	1565	1169
Portugal	Neoplasms	50.0	6798	1709	1276
Catalonia (Spain)	Total	59.2	8051	2024	1511
Portugal	Total	62.3	8478	2131	1591
Poland	Neoplasms	71.1	9673	2431	1815
Poland	Total	121.6	16538	4157	3104

Source: author's own.

Table 2.25 Mortality rates related to smoking for population age [15-64), per 100 000 of population and expected values of number of deaths, women

COUNTRY	CAUSE OF DEATHS	MORTALITY RATE	EXPECTED NUMBER OF DEATHS		
			POLAND	PORTUGAL	CATALONIA (SPAIN)
1	2	3	4	5	6
Portugal	Fire Deaths	0.0	0	0	0
Catalonia (Spain)	Fire Deaths	0.0	3	1	0
Poland	Fire Deaths	0.1	7	2	1
Portugal	Respiratory Diseases	0.4	58	15	10
Catalonia (Spain)	Respiratory Diseases	0.5	66	17	12
Portugal	Cardiovascular Diseases	0.8	107	28	19
Poland	Respiratory Diseases	1.5	205	53	37
Catalonia (Spain)	Cardiovascular Diseases	1.7	229	60	41
Portugal	Neoplasms	5.6	772	201	139
Poland	Cardiovascular Diseases	6.5	897	234	162
Portugal	Total	6.8	937	244	169
Catalonia (Spain)	Neoplasms	9.8	1345	350	242
Catalonia (Spain)	Total	11.9	1643	428	296
Poland	Neoplasms	21.3	2925	762	527
Poland	Total	29.3	4034	1051	727

Source: author's own.

Based on results presented in tables 2.24 and 2.25 we have calculated estimates of the number of lives which could be potentially saved, if in a given country the mortality rates for a given cause of death attributed to smoking were the lowest (among the three compared countries). For men the lowest

mortality rates for respiratory diseases, neoplasms and total attributed to smoking were observed in Catalonia (Spain); for fire deaths and cardiovascular diseases in Portugal – whereas they were the highest in all cases in Poland. In the case of women, the lowest mortality rates for all causes of death were found in Portugal, the highest – in Poland. The results of this estimation are presented in table 2.26.

Table 2.26 Expected number of saved lives in Poland, Portugal and Catalonia (Spain) under the assumption of the lowest mortality rates for causes of deaths attributed to smoking

CAUSES OF DEATHS	NUMBER OF POTENTIALLY SAVED LIVES					
	POLAND		PORTUGAL		CATALONIA (SPAIN)	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Neoplasms	3445	2153	143	x	x	103
Cardiovascular Diseases	5042	790	x	x	57	22
Respiratory Diseases	269	147	42	x	x	1
Fire Deaths	43	7	x	x	1	1
Total	8799	3097	186	x	59	127

Source: author's own.

It can be observed that Poland is the country with the most to gain again – if mortality rates for causes of death related to smoking in Poland were as low as in Portugal or as in Catalonia (Spain)l, 11 896 lives could be saved in year 2010, i.e. 53.2% of the deaths attributed to smoking in the population of men and 76.8% of these deaths in the female population.

Portugal could gain the lives of 186 men, that is, 4.5% of the number of deaths attributed to smoking in the population of men. Catalonia (Spain) could save 186 lives, that is 1.9% of number of deaths related to smoking in the male population and 17.5% in the population of women.

2.4.3 Drugs

In table 2.27 the mortality rates for Poland, Portugal and Catalonia (Spain) attributed to use of illicit drugs are presented. It can be seen that the mortality rates are highest in Catalonia (Spain), and the lowest, for men in Poland, and for women in Portugal, both in cases where deaths were 100% attributable to the use of illicit drugs as well as in cases where deaths were partly attributed to use of drugs.

Table 2.27 Mortality rates related to use of illicit drugs for population age [15-64), per 100 000 of population

CAUSES OF DEATHS	POLAND		PORTUGAL		CATALONIA (SPAIN)	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Partly	0.9	0.2	2.2	0.4	2.5	0.6
100% drugs	1.1	0.6	0.6	0.0	3.4	1.3
Total	2.0	0.8	2.8	0.4	5.9	1.8

Source: author's own.

These details are presented with more detail in tables 2.28 and 2.29, where the empirical mortality rates for causes of deaths related to use of illicit drugs in sequence from the lowest to the highest one regardless of the country and causes of deaths are presented. Columns 4-6 list the expected numbers of deaths, i.e. the numbers which would occur, if the mortality rates presented in column 3 existed in population age [15-64) respectively in Poland, Portugal and Catalonia (Spain).

Table 2.28 Mortality rates related to use of illicit drugs for population age [15-64), per 100 000 of population and expected values of number of deaths, men

COUNTRY	CAUSE OF DEATHS	MORTALITY RATE	EXPECTED NUMBER OF DEATHS		
			POLAND	PORTUGAL	CATALONIA (SPAIN)
1	2	3	4	5	6
Portugal	100% drugs	0.6	84	21	16
Poland	Partly	0.9	119	30	22
Poland	100% drugs	1.1	156	39	29
Poland	Total	2.0	275	69	52
Portugal	Partly	2.2	293	74	55
Catalonia (Spain)	Partly	2.5	335	84	63
Portugal	Total	2.8	377	95	71
Catalonia (Spain)	100% drugs	3.4	464	117	87
Catalonia (Spain)	Total	5.9	799	201	150

Source: author's own.

Table 2.29 Mortality rates related to use of illicit drugs for population age [15-64), per 100 000 of population and expected values of number of deaths, women

COUNTRY	CAUSE OF DEATHS	MORTALITY RATE	EXPECTED NUMBER OF DEATHS		
			POLAND	PORTUGAL	CATALONIA (SPAIN)
1	2	3	4	5	6
Portugal	100% drugs	0.0	0	0	0
Poland	Partly	0.2	30	8	5
Portugal	Partly	0.4	55	14	10
Portugal	Total	0.4	55	14	10
Poland	100% drugs	0.6	76	20	14
Catalonia (Spain)	Partly	0.6	80	21	14
Poland	Total	0.8	106	28	19
Catalonia (Spain)	100% drugs	1.3	172	45	31
Catalonia (Spain)	Total	1.8	252	66	45

Source: author's own.

Based on results presented in tables 2.28 and 2.29 estimates of the number of lives which could be potentially saved, if in a given country the mortality rates for given cause of deaths attributed to use of illicit drugs were the lowest (among the three compared countries) have been calculated. The results of this estimation are presented in table 2.30.

Table 2.30 Expected number of lives saved in Poland, Portugal and Catalonia (Spain) under assumption of the lowest mortality rates for causes of deaths attributed to use of illicit drugs

CAUSES OF DEATHS	NUMBER OF POTENTIALLY SAVED LIVES					
	POLAND		PORTUGAL		CATALONIA (SPAIN)	
	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Partly	x	x	59	46	41	9
100% drugs	72	76	x	x	71	31
Total	72	76	59	46	112	40

Source: author's own.

In this case, the jurisdiction with the most to gain is Catalonia (Spain) – if mortality rates for causes of deaths related to the use of illicit drugs in Catalonia (Spain) were as low as in Poland or in Portugal, 152 lives could be saved in year 2010, i.e. 74.7% of deaths attributed to use of illicit drugs in the population of men, and 88.2% of those in the population of women.

Portugal could gain the lives of 105 people, that is, 62.8% of the number of deaths attributed to the use of drugs in the population of men, and 45.7% in the population of women. Poland could gain 148 lives, that is, 26.3% of the number of deaths related to the use of drugs in the male population and 71.7% in the female population.

2.5 Conclusion

There are significant opportunities for saving lives lost because of drinking alcohol, smoking or using illicit drugs. Of the three countries studied here, Poland is in the worst situation in regards to alcohol and smoking, and Catalonia (Spain) in the case of use of illicit drugs.

As mentioned above, the prevalence of use of addictive substances is not the only cause influencing the results above – they depend also on differences in general mortality rates, which is especially important in the case of Poland, where general mortality rates are much higher than in Portugal or Catalonia (Spain). A protective effect of alcohol, which could be observed in Portugal and Catalonia (Spain) in regard to cardiovascular diseases, especially in population of men, also has a certain influence.

3. Estimation of number of years of life lost and productivity loss

3.1 Years of life lost

3.1.1 Poland

Tables 3.1-3.3 present the results of estimating the number of years of life lost due to alcohol consumption, smoking and use of illicit drugs according to gender and age in Poland in 2010, taking into account a hypothetical reduction of exposure for alcohol, smoking and use of drugs. The estimation is based on data on life expectancy for Poland (2010) and previously estimated empirical and expected number of deaths caused by alcohol drinking, smoking[5] and use of drugs in gender/age classes. In accordance with method of estimation, the percent of saved years of life are adequate to those of saved lives (for alcohol – table 2.2, for smoking – table 2.4, for drugs – table 2.6).

It can be observed (table 3.1) that if the prevalence of male alcohol consumers was reduced by 10% in each category of drinkers, Poland could gain in the population of men nearly 10 thousand years of their lives; with a reduction by 20% – nearly 20 thousand; and with a reduction by 50% – nearly 57 thousand years of their lives, all in age of professional activity {[18-64) in 2010, here [15-64)}. For women, the corresponding numbers are: about 4, 9 and 24 thousand years of life. As in Poland the upper limit of age of professional activity for women in 2010 was equal to 60 years, the numbers of potentially saved years of life in that age were a little lower than presented in table 3.1, i.e.: 3662.7, 7525.5 and 20 503.3 years of life according to the decrease of exposure.

[5] The numbers presented in table 3.2 for empirical number of deaths are slightly different from those in table 5.1.2 (Del.6.1), where only daily smokers were taken into account.

Table 3.1 Potential changes in number of years of life lost attributed to alcohol according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	11064.8	10693.1	10295.0	8903.7	2862.6	2743.3	2615.9	2174.4
20-24	19527.8	18870.5	18164.8	15686.3	3064.2	2936.0	2799.1	2324.4
25-29	19951.5	19288.9	18576.4	16070.5	3397.3	3249.4	3092.1	2552.3
30-34	23741.9	22978.2	22152.7	19225.6	4654.5	4432.9	4198.6	3405.9
35-39	26982.8	26126.2	25196.1	21876.2	6722.7	6393.5	6046.1	4876.8
40-44	29826.8	28889.6	27866.3	24177.4	8759.2	8320.5	7857.9	6304.5
45-49	37975.9	36795.6	35501.4	30805.2	11070.6	10506.9	9913.2	7925.6
50-54	48228.6	46711.2	45036.6	38891.6	16306.8	15453.2	14554.2	11545.8
55-59	44538.0	43063.6	41433.4	35437.3	15826.8	14966.2	14061.9	11051.6
60-64	28853.2	27846.2	26732.5	22640.9	11062.9	10430.3	9767.5	7575.0
TOTAL	290691.2	281263.1	270955.1	233714.7	83727.4	79432.2	74906.5	59736.3
BENEFIT	x	9428.1	19736.1	56976.5	x	4295.2	8820.9	23991.1

Source: author's own.

It can be observed[6] (table 3.2) that if, in turn, the prevalence of smokers was reduced by 10%, Poland could gain in the population of men over 8 thousand years of their lives; with a reduction by 20% – over 16.5 thousand; and with a reduction by 50% – over 40 thousand years of their lives in age of professional activity. For women the corresponding numbers are: over 3, 6 and nearly 17 thousand years of life. In age of women professional activity the numbers of potentially saved years of life would be: 2166.5, 4410.2 and 12031.9 years of life according to the decrease of exposure.

Table 3.2 Potential changes in number of years of life lost attributed to smoking according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	706.4	689.0	670.4	616.5	207.2	198.5	189.6	161.0
20-24	1270.0	1228.8	1185.1	1054.3	490.4	466.4	441.6	361.8
25-29	2520.6	2433.3	2339.5	2047.7	738.5	702.8	665.7	544.6
30-34	4368.3	4212.4	4045.1	3512.8	1089.9	1039.9	988.0	819.2
35-39	7643.2	7369.3	7077.8	6131.0	2204.9	2050.3	1958.9	1660.6
40-44	16175.5	15655.8	15107.0	13280.1	3849.9	3713.3	3570.5	3096.2
45-49	32700.2	31796.0	30847.4	27662.8	9529.4	9185.1	8881.4	7854.1
50-54	74850.1	73070.5	71190.4	64825.5	23378.3	22687.5	22010.3	19688.4
55-59	105106.6	102844.6	100474.7	92426.5	32444.7	31722.8	30816.9	27715.4
60-64	99631.5	97623.9	95519.0	88409.1	32365.8	31496.5	30579.7	27480.1
TOTAL	344972.3	336923.6	328456.4	299966.2	106298.9	103263.2	100102.7	89381.4
BENEFIT	X	8048.8	16515.9	45006.1	x	3035.7	6196.2	16917.5

Source: author's own.

In the case of drugs (table 3.3), if the prevalence of users of illicit drugs was reduced by 10%, Poland could gain in the population of men over 1.4 thousand years of their lives; with a reduction by 20% – over 2 thousand; and with a 50% reduction – over 4.6 thousand years of their lives in age of professional activity. For women the corresponding numbers are: nearly 0.4, over 0.7 and nearly 2 thousand years of life. In age of women professional activity the numbers of potentially saved years of life would be: 354.7, 703.6, 1812.7 years of life according to the decrease of exposure.

[6] The numbers presented in table 3.2 for empirical number of deaths are slightly different from those in table 5.1.2 (Del.6.1), where only daily smokers were taken into account.

Table 3.3 Potential changes in number of years of life lost attributed to use of illicit drugs according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	331.3	248.9	225.5	150.0	254.5	250.6	226.0	147.7
20-24	1311.8	1075.2	974.3	647.3	528.3	481.7	434.4	283.8
25-29	2057.2	1695.2	1535.9	1020.1	376.4	337.7	304.8	199.9
30-34	1844.6	1559.8	1413.5	939.3	439.7	389.1	350.8	229.2
35-39	944.8	793.0	718.6	477.4	703.6	627.3	565.6	369.6
40-44	1019.2	896.0	811.9	539.2	391.7	373.5	336.8	220.2
45-49	799.4	737.1	667.6	442.8	344.7	306.5	276.4	180.7
50-54	613.3	556.7	504.0	333.9	508.9	459.0	413.8	270.3
55-59	379.1	345.1	312.4	206.8	358.1	325.6	293.5	191.6
60-64	199.4	198.3	179.4	118.6	235.5	205.5	185.2	120.8
TOTAL	9500.2	8105.3	7343.2	4875.5	4141.2	3756.5	3387.2	2213.8
BENEFIT	X	1394.9	2156.9	4624.6	x	384.7	753.9	1927.3

Source: author's own.

3.1.2 Portugal

Tables 3.4-3.6 present the results of estimating the number of years of life lost due to alcohol consumption, smoking and use of illicit drugs according to gender and age in Portugal in 2010, taking into account a hypothetical reduction of exposure for alcohol, smoking and use of drugs. The estimation is based on data on life expectancy for Portugal (2010) and previously estimated empirical and expected number of deaths caused by alcohol drinking, smoking and use of drugs in gender/age classes. In accordance with method of estimation, the percent of saved years of lives are adequate to those of saved lives (for alcohol – table 2.8, for smoking – table 2.10, for drugs – table 2.12).

Table 3.4 Potential changes in number of years of life lost attributed to alcohol according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	518.1	481.9	444.2	320.9	153.5	142.3	130.7	93.2
20-24	891.0	828.8	764.0	551.6	229.6	212.6	195.1	138.8
25-29	1226.4	1147.1	1063.7	785.6	268.0	248.1	227.6	162.1
30-34	1697.5	1591.7	1480.1	1104.1	452.1	419.4	385.6	277.6
35-39	2479.2	2338.7	2188.6	1671.1	867.2	805.3	741.4	536.4
40-44	4107.4	3882.6	3641.0	2797.0	1296.8	1207.2	1114.3	813.7
45-49	5428.3	5138.0	4824.7	3723.2	1559.0	1447.6	1332.5	962.9
50-54	5964.0	5651.4	5312.2	4107.7	1880.7	1749.6	1614.0	1176.1
55-59	5404.8	5129.7	4829.6	3754.2	1670.9	1552.8	1430.8	1038.7
60-64	4650.1	4415.4	4158.8	3236.3	1237.3	1150.3	1060.2	770.4
TOTAL	32367.0	30605.3	28706.8	22051.7	9615.1	8935.2	8232.2	5970.0
BENEFIT	x	1761.6	3660.2	10315.3	x	679.9	1382.9	3645.1

Source: author's own.

It can be observed (table 3.4) that if the prevalence of male alcohol consumers was reduced by 10% in each category of drinkers, Portugal could gain in the population of men over 1.7 thousand years of their lives; with a reduction by 20% – over 3.6 thousand; and with a 50% reduction – over 10 thousand years of their lives in age of professional activity {in 2010 for men and women [16-64), here [15-64)}. For women the corresponding numbers are: about 0.7, 1.4 and 3.6 thousand years of life.

Table 3.5 Potential changes in number of years of life lost attributed to smoking according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	56.2	51.8	47.2	31.9	3.0	2.7	2.4	1.6
20-24	103.9	95.8	87.3	58.9	33.1	30.2	27.2	17.8
25-29	130.5	120.6	110.1	75.0	37.6	34.3	30.9	20.2
30-34	264.3	244.4	223.3	152.4	81.3	73.8	66.2	42.5
35-39	1478.2	1412.4	1341.0	1079.2	246.3	229.1	211.1	150.7
40-44	4432.2	4290.3	4132.5	3513.5	818.5	772.9	723.8	546.3
45-49	8368.4	8103.5	7807.9	6636.0	1006.4	950.0	889.0	667.5
50-54	12268.4	11872.8	11430.7	9672.1	1587.3	1493.3	1391.9	1026.9
55-59	13021.0	12577.9	12083.5	10127.3	1828.1	1716.2	1595.4	1162.7
60-64	13279.7	12793.4	12254.5	10157.0	1669.4	1556.6	1436.3	1018.2
TOTAL	53402.9	51562.8	49518.1	41503.3	7310.9	6859.0	6374.1	4654.3
BENEFIT	x	1840.1	3884.9	11899.6	x	451.9	936.8	2656.6

Source: author's own.

If, in turn, the prevalence of smokers was reduced by 10%, Portugal could gain (table 35) in the male population over 1.8 thousand years of their lives; with a reduction by 20% – over 3.8 thousand, and with a reduction by 50% – nearly 12 thousand years of their lives in age of professional activity. For women respective numbers are: over 0.4, 0.9 and 2.6 thousand years of life in age of professional activity.

Table 3.6 Potential changes in number of years of life lost attributed to use of illicit drugs according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-29	139.9	133.2	125.7	96.9	49.8	46.7	43.3	31.1
30-34	267.3	254.3	240.0	185.1	64.8	60.7	56.3	40.4
35-39	785.0	751.9	714.7	567.6	96.7	90.6	84.0	60.3
40-44	765.0	730.5	691.8	540.5	117.0	109.6	101.7	73.0
45-49	550.5	523.3	493.1	377.7	76.7	71.9	66.6	47.8
50-54	453.2	429.2	402.8	304.3	114.8	107.6	99.8	71.6
55-59	185.2	175.1	164.0	123.3	21.3	20.0	18.5	13.3
60-64	72.0	67.5	62.8	45.9	20.4	19.1	17.7	12.7
TOTAL	3218.1	3065.1	2894.9	2241.3	561.5	526.3	488.0	350.3
BENEFIT	x	153.1	323.2	976.8	x	35.3	73.6	211.3

Source: author's own.

In the case of drugs (table 3.6), if the prevalence of users of illicit drugs was reduced by 10%, Portugal could gain in the population of men over 0.15 thousand years of their lives; with a 20% reduction – over 0.3 thousand; and with a reduction by 50% – nearly 1 thousand years of their lives in age of professional activity. For women the corresponding numbers are: nearly 0.04, over 0.07 and nearly 0.2 thousand years of life in age of professional activity.

3.1.3 Catalonia (Spain)

Tables 3.7-3.9 present the results of estimating the number of years of life lost due to alcohol consumption, smoking and use of illicit drugs according to gender and age in Catalonia (Spain) in 2010, taking into account a hypothetical reduction of exposure for alcohol, smoking and use of drugs. The estimation is based on data on life expectancy for Catalonia (Spain) (2010) and previously estimated empirical and expected number of deaths caused by alcohol drinking, smoking and use of drugs in gender/age classes. In

accordance with method of estimation, the percent of saved years of lives are adequate to those of saved lives (for alcohol – table 2.14, for smoking – table 2.16, for drugs – table 2.18).

Table 3.7 Potential changes in number of years of life lost attributed to alcohol according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	559.0	551.6	528.9	448.5	272.0	267.7	255.0	210.8
20-24	801.1	792.0	757.6	636.3	252.1	232.8	221.6	182.0
25-29	889.7	830.0	793.9	667.0	232.4	233.9	222.1	180.1
30-34	1138.8	1074.8	1030.5	876.6	372.1	354.5	330.4	249.6
35-39	1065.0	1047.8	1016.2	901.3	434.1	395.5	363.1	256.3
40-44	1134.6	1114.1	1076.9	934.3	867.7	793.6	730.3	519.0
45-49	1957.3	1893.8	1819.0	1533.9	1235.7	1168.1	1082.8	798.0
50-54	2239.8	2157.8	2071.2	1739.1	1187.2	1118.3	1036.3	762.4
55-59	2079.5	2012.6	1931.3	1610.3	1172.2	1096.9	1016.0	746.4
60-64	1856.9	1789.9	1716.0	1426.4	866.8	858.1	795.7	586.2
TOTAL	13721.7	13264.5	12741.3	10773.7	6892.2	6519.2	6053.2	4490.6
BENEFIT	x	457.2	980.4	2948.0	x	372.9	839.0	2401.6

Source: author's own.

One can observe (table 3.7) that if the prevalence of male alcohol consumers was reduced by 10% in each category of drinkers, Catalonia (Spain) could gain in the population of men over 0.5 thousand years of their lives; with a 20% reduction – over 0.9 thousand; and with a reduction by 50% – nearly 3 thousand years of their lives in age of professional activity {in 2010 for men and women [16-64), here [15-64)}. For women the corresponding numbers are: about 0.4, 0.8 and 2.4 thousand years of life.

Table 3.8 Potential changes in number of years of life lost attributed to smoking according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	71.2	67.1	62.9	49.3	34.0	33.0	31.8	27.8
20-24	284.0	288.1	278.8	248.1	87.9	84.3	80.5	68.1
25-29	286.5	277.8	268.7	238.8	136.4	131.8	127.0	111.1
30-34	317.1	309.0	300.5	272.6	85.3	81.8	78.2	67.1
35-39	1034.8	1004.2	972.5	869.1	423.6	413.6	403.0	366.7
40-44	2003.9	1963.5	1912.2	1744.1	1118.2	1092.6	1065.4	972.2
45-49	5008.6	4924.0	4835.2	4538.5	1739.9	1705.9	1670.3	1551.8
50-54	8254.3	8137.0	8006.6	7568.9	2096.6	2064.8	2022.8	1880.7
55-59	10626.2	10497.5	10356.9	9890.9	2208.4	2168.4	2119.1	1951.7
60-64	11048.1	10935.2	10808.4	10396.0	1802.3	1756.8	1709.0	1550.2
TOTAL	38934.6	38403.5	37802.6	35816.2	9732.7	9533.0	9307.3	8547.4
BENEFIT	x	531.1	1132.0	3118.4	x	199.7	425.4	1185.3

Source: author's own.

If the prevalence of smokers was reduced by 10%, Catalonia (Spain) could gain (table 3.8), in the population of men, over 0.5 thousand years of their lives; with a reduction by 20% – over 1.1 thousand; and with a 50% reduction – over 3.1 thousand years of their lives in age of professional activity. For women respective numbers are: over 0.2, 0.4 and 1.1 thousands years of life in age of professional activity.

For drugs (table 3.9), if the prevalence of users of illicit drugs was reduced by 10%, Catalonia (Spain) could gain in the population of men over 0.15 thousand years of their lives; with a reduction by 20% – over 0.33 thousand; and with a 50% reduction – over 1 thousand years of their lives in age of professional activity. These numbers for the female population in Catalonia (Spain) are: nearly 0.09, over 0.11 and nearly 0.6 thousand years of life in age of professional activity.

Table 3.9 Potential changes in number of years of life lost attributed to use of illicit drugs according to reduced exposure

AGE	NUMBER OF YEARS OF LIFE LOST							
	MEN, EXPOSURE REDUCED BY:				WOMEN, EXPOSURE REDUCED BY:			
	0%	10%	20%	50%	0%	10%	20%	50%
15-19	71.9	69.9	67.6	57.8	0.0	0.0	0.0	0.0
20-24	75.3	73.2	70.7	60.5	0.0	0.0	0.0	0.0
25-29	286.5	278.4	269.1	230.1	152.9	145.5	137.2	105.5
30-34	806.1	783.3	757.1	647.3	325.8	310.0	292.4	224.8
35-39	1220.2	1188.5	1151.9	997.2	312.1	296.9	280.1	215.3
40-44	1108.3	1077.9	1042.9	895.5	417.0	396.8	374.2	287.7
45-49	1128.5	1098.2	1063.2	913.9	434.4	413.6	411.3	301.1
50-54	538.1	521.5	502.4	422.7	164.7	157.1	199.7	115.5
55-59	162.2	155.8	148.5	120.5	33.9	32.3	30.5	23.4
60-64	155.9	151.2	145.9	124.1	81.6	77.2	90.7	54.1
TOTAL	5553.0	5397.7	5219.3	4469.5	1922.3	1829.3	1816.0	1327.5
BENEFIT	x	155.3	333.7	1083.5	x	93.0	106.3	594.8

Source: author's own.

3.2 Productivity loss

With reduced exposure, lower mortality and lower number of years of life lost, the productivity loss (labour costs) caused by premature mortality related to alcohol, smoking and use of illicit drugs decreases. This section presents the results of estimating which value of GDP could be produced if there were no premature mortality related to alcohol drinking, smoking or drugs use in Poland, Portugal and Catalonia (Spain) in 2010, taking into account lower numbers of lives lost as an effect of potentially reduced exposure. Such estimation requires strong assumptions, such as:

- The employment rate among the persons in question would be the same as the employment rate among the whole (living) population in age of economic activity in the considered country in 2010; therefore it has been assumed that those persons would be employed in 2010.
- If these persons hadn't died prematurely in 2010, that is, if they had lived that one year longer, they could have produced the same average value of GDP as the other employed people in the considered country in 2010.

The resulting numbers were then compared to previously estimated values of GDP loss due to premature mortality related to drinking alcohol, smoking and use of drugs in empirical populations. As the loss of GDP followed by reduced exposure was lower, the difference is regarded as the potential benefit resulting from decreased exposure.

3.2.1 Poland

In 2010 the age of professional activity was [18-64) for men, and [18-59) for women in Poland, here [15-64) for men, and [15-59) for women. According to the *Statistical Yearbook of Poland* 2012, professional activity rate of the population aged 15 and more in Poland in 2010 was equal to 55.8%, (p.775) and value of GDP was equal to 354 159.24 mln €.

Table 3.10 presents the results of estimating the number of persons potentially employed in Poland, the value of GDP they could produce in 2010, and benefits which could be hypothetically gained, if the exposure to alcohol, smoking and drugs was reduced by 10%, 20% or 50%. Figure 28 illustrates the structure of potential benefits which could be achieved by a reduction of the prevalence of alcohol drinking, smoking and use of illicit drugs.

Table 3.10 Potential losses and benefits in productivity attributed to alcohol, smoking and use of illicit drugs according to exposure reduced adequately by 0%, 10%, 20% and 50%, Poland

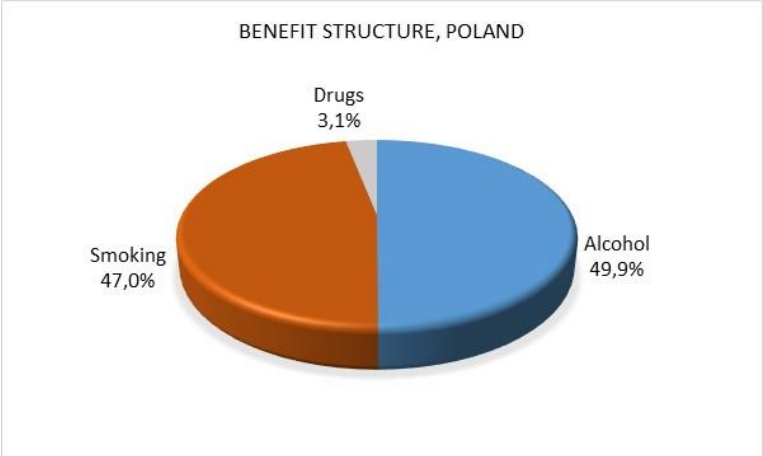
LIST	NUMBER OF POTENTIALLY EMPLOYED				LOSS OF GDP (MLN EUROS)				BENEFIT (MLN EUROS)			
	0%	10%	20%	50%	0%	10%	20%	50%	0%	10%	20%	50%
ALCOHOL												
MEN	5955	5761	5548	4775	132.2	127.9	123.1	106.0	x	4.3	9.0	26.2
WOMEN	1470	1393	1311	1040	32.6	30.9	29.1	23.1	x	1.7	3.5	9.5
TOTAL	7425	7154	6860	5816	164.8	158.8	152.2	129.1	x	6.0	12.5	35.7
SMOKING												
MEN	9229	9021	8802	8064	204.8	200.2	195.3	179.0	x	4.6	9.5	25.9
WOMEN	2251	2189	2123	1900	50.0	48.6	47.1	42.2	x	1.4	2.8	7.8
TOTAL	11480	11209	10925	9964	254.8	248.8	242.5	221.1	x	6.0	12.3	33.6
DRUGS												
MEN	148	129	116	77	3.3	2.9	2.6	1.7	x	0.4	0.7	1.6
WOMEN	59	54	49	32	1.3	1.2	1.1	0.7	x	0.1	0.2	0.6
TOTAL	207	183	165	109	4.6	4.1	3.7	2.4	x	0.6	0.9	2.2
ALCOHOL + SMOKING + DRUGS												
TOTAL	19112	18546	17950	15889	424.1	411.6	398.4	352.6	x	12.6	25.8	71.5

Source: author's own.

One can observe that the loss of GDP in Poland in 2010 could be hypothetically 6.0 mln € lower, if the prevalence of alcohol consumers was reduced by 10%; 12.5 mln € lower, if the prevalence was reduced by 20%; whereas with a 50% reduction the loss of GDP could be 35.7 mln € lower than the one estimated under the assumption of empirical number of premature deaths.

These numbers could be considered as the potential gain of GDP value resulting from a reduced exposure to alcohol. Values were similar to the alcohol ones in the case of smoking, while they were substantially lower for illicit drugs.

Figure 3.1 Structure of benefit (mln Euros) of potentially reduced exposure, Poland



Source: author's own.

3.2.2 Portugal

In Portugal the age of professional activity in 2010 was [16-64) for men and women. According to the *Statistical Yearbook of Poland* 2012, professional activity rate of population aged 15 and more in Portugal in 2010 was equal to 61.9%, (p.775) and the value of GDP per capita in Portugal was equal to 16 349.0 €.

Table 3.11 Potential losses and benefits in productivity attributed to alcohol, smoking and use of illicit drugs according to exposure reduced adequately by 0%, 10%, 20% and 50%, Portugal

LIST	NUMBER OF POTENTIALLY EMPLOYED				LOSS OF GDP (MLN EUROS)				BENEFIT (MLN EUROS)			
	0%	10%	20%	50%	0%	10%	20%	50%	0%	10%	20%	50%
ALCOHOL												
MEN	695	658	618	477	21.6	20.4	19.2	14.8	x	1.1	2.4	6.8
WOMEN	177	164	151	110	5.5	5.1	4.7	3.4	x	0.4	0.8	2.1
TOTAL	872	823	770	587	27.1	25.5	23.9	18.2	x	1.5	3.2	8.9
SMOKING												
MEN	1319	1274	1223	1024	40.9	39.5	37.9	31.8	x	1.4	3.0	9.1
WOMEN	151	142	132	96	4.7	4.4	4.1	3.0	x	0.3	0.6	1.7
TOTAL	1470	1415	1355	1120	45.6	43.9	42.0	34.8	x	1.7	3.6	10.9
DRUGS												
MEN	59	56	53	41	1.8	1.7	1.6	1.3	x	0.1	0.2	0.6
WOMEN	9	8	8	6	0.3	0.3	0.2	0.2	x	0.02	0.04	0.10
TOTAL	67	64	60	46	2.1	2.0	1.9	1.4	x	0.1	0.2	0.7
ALCOHOL + SMOKING + DRUGS												
TOTAL	2410	2302	2185	1753	74.7	71.4	67.8	54.4	x	3.3	7.0	20.4

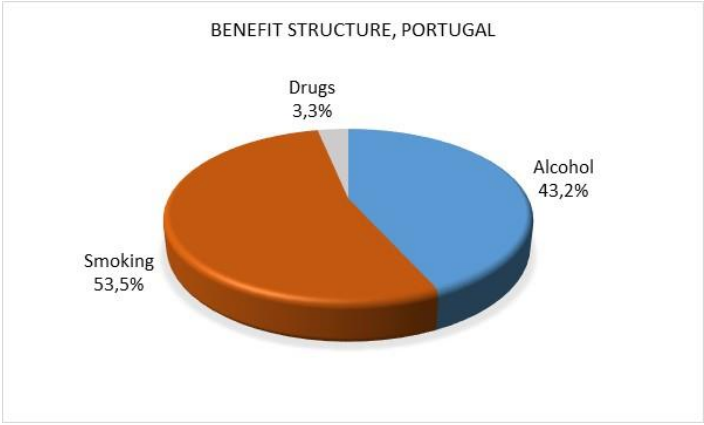
Source: author's own.

Table 3.11 presents results of estimating the number of persons potentially employed in Portugal, the value of GDP they could produce in 2010, and benefits which could be hypothetically gained if the exposure to alcohol, smoking and drugs was reduced by 10%, 20% or 50%. Figure 3.2 illustrates the structure of potential benefits which could be achieved by reductions in the prevalence of alcohol drinking, smoking and use of illicit drugs.

The loss of GDP in Portugal in 2010 could be hypothetically 1.5 mln € lower if the prevalence of alcohol consumers was reduced by 10%; 3.2 mln € lower if the prevalence was reduced by 20%; whereas with a 50% reduction the loss of GDP could be 8.9 mln € lower than the one estimated under the assumption of empirical number of premature deaths.

These numbers could be considered as the potential gain of GDP value resulting from a reduced exposure to alcohol. Slightly higher values were observed in the case of smoking than for alcohol, while they are substantially lower for illicit drugs.

Figure 3.2 Structure of benefit (mln Euros) of potentially reduced exposure, Portugal



Source: author's own.

3.2.3 Catalonia (Spain)

In 2010 the age of professional activity in Catalonia (Spain) was [16-64) for both men and women, here [15-64). According to the *Statistical Yearbook of Poland* 2012, the professional activity rate of population aged

15 and more in Spain in 2010 was equal to 59.3% (p.775). It has been assumed that the same rate was observed in 2010 in Catalonia (Spain). Value of GDP per capita in Catalonia (Spain) in 2010 was equal to 26 521.0 €.

Table 3.12 Potential losses and benefits in productivity attributed to alcohol, smoking and use of illicit drugs according to exposure reduced adequately by 0%, 10%, 20% and 50%, Catalonia (Spain)

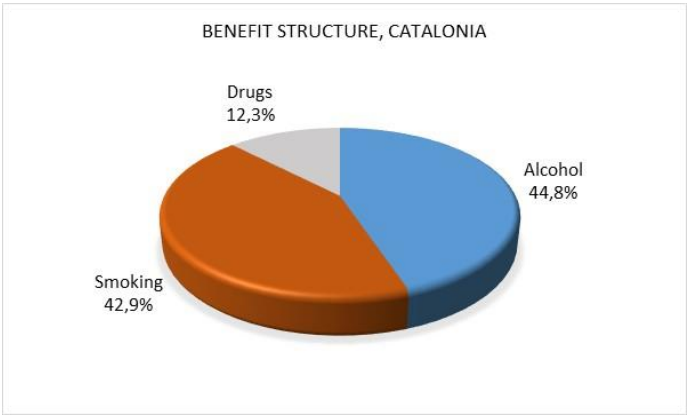
LIST	NUMBER OF POTENTIALLY EMPLOYED				LOSS OF GDP (MLN EUROS)				BENEFIT (MLN EUROS)			
	0%	10%	20%	50%	0%	10%	20%	50%	0%	10%	20%	50%
ALCOHOL												
MEN	256	248	238	200	12.6	12.2	11.7	9.9	x	0.4	0.9	2.8
WOMEN	113	107	99	73	5.6	5.3	4.9	3.6	x	0.3	0.7	1.9
TOTAL	369	354	337	274	18.2	17.5	16.6	13.5	x	0.7	1.6	4.7
SMOKING												
MEN	895	884	871	828	44.2	43.6	42.9	40.8	x	0.6	1.2	3.3
WOMEN	175	172	168	154	8.6	8.5	8.3	7.6	x	0.2	0.4	1.0
TOTAL	1070	1055	1038	982	52.8	52.0	51.2	48.4	x	0.7	1.6	4.4
DRUGS												
MEN	89	86	83	71	4.4	4.3	4.1	3.5	x	0.1	0.3	0.9
WOMEN	27	26	24	19	1.3	1.3	1.2	0.9	x	0.1	0.1	0.4
TOTAL	116	112	108	90	5.7	5.5	5.3	4.4	x	0.2	0.4	1.3
ALCOHOL + SMOKING + DRUGS												
TOTAL	1555	1522	1483	1345	76.7	75.0	73.1	66.3	x	1.6	3.6	10.3

Source: author's own.

Table 3.12 presents the results of estimating the number of persons potentially employed in Catalonia (Spain), the value of GDP they could produce in 2010, and benefits which could be hypothetically gained if exposure to alcohol, smoking and drugs was reduced by 10%, 20% or 50%. Figure 3.3 illustrates the structure of potential benefits which could be achieved by reducting the prevalence of alcohol drinking, smoking and use of illicit drugs.

The loss of GDP in Catalonia (Spain) in 2010 could be hypothetically 0.7 mln € lower if the prevalence of alcohol consumers was reduced by 10%; 1.6 mln € lower if the prevalence was reduced by 20%; whereas with a 50% reduction the loss of GDP could be 4.7 mln € lower than the one estimated under the assumption of empirical number of premature deaths. These numbers could be considered as the potential gain of GDP value resulting from a reduced exposure to alcohol. Similar values as in case of alcohol, are obtained in the case of smoking, while they are substantially lower for illicit drugs.

Figure 3.3 Structure of benefit (mln Euros) of potentially reduced exposure, Catalonia (Spain)



Source: author's own.

3.3 Conclusion

In spite of many differences among the three compared countries concerning prevalence rates, general mortality rates, life expectation, value of GDP per capita etc., it can be clearly seen that in every case the benefits coming from reduced exposure for alcohol, smoking and use of illicit drugs are substantial, both in the level of premature mortality attributed to the three considered addictive substances as well as in the financial consequences of their use.

References

Colins D., Lapsley H., Brochu S., Easton B., Perez-Gomez A., Rehm J., Single E. (2006). *International Guidelines for Estimation of the Avoidable Costs of Substance Abuse*, Health Canada.

4. Appendix

4.1 POLAND

4.1.1 Alcohol

Table 4.1.1 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Poland – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.575	0.584	0.590	0.593	0.594	0.591	0.585	0.576	0.564	0.547
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.575	0.584	0.590	0.593	0.594	0.591	0.585	0.576	0.564	0.547
Oesophageal cancer	C15	0.385	0.394	0.399	0.402	0.403	0.400	0.394	0.386	0.374	0.358
Colorectal cancer	C18-C20	0.061	0.063	0.064	0.065	0.065	0.064	0.063	0.061	0.058	0.054
Cancer of the liver and intrahepatic bile ducts	C22	0.199	0.205	0.209	0.211	0.211	0.210	0.206	0.200	0.192	0.181
Laryngeal cancer	C32	0.408	0.417	0.423	0.426	0.426	0.424	0.418	0.409	0.397	0.381
Breast cancer	C50	0.269	0.277	0.281	0.284	0.284	0.282	0.277	0.270	0.260	0.247
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.420	0.429	0.435	0.438	0.438	0.436	0.430	0.421	0.409	0.392
Coronary heart disease	I20-25	-0.133	-0.138	-0.142	-0.144	-0.145	-0.143	-0.139	-0.133	-0.126	-0.117
Cardiac arrhythmias	I47, I48	0.365	0.374	0.380	0.383	0.383	0.380	0.375	0.366	0.354	0.339
Haemorrhagic stroke	I60-I62	0.380	0.389	0.395	0.398	0.398	0.396	0.390	0.382	0.370	0.354
Ischaemic stroke	I63-I66	0.256	0.264	0.268	0.271	0.271	0.269	0.264	0.257	0.248	0.235
Oesophageal varices	I85, I98.2	0.658	0.667	0.672	0.675	0.675	0.673	0.668	0.659	0.648	0.632
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.657	0.665	0.671	0.674	0.674	0.671	0.666	0.658	0.646	0.631
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.699	0.706	0.712	0.714	0.714	0.712	0.707	0.700	0.689	0.674
Portal hypertension	K76.6	0.658	0.667	0.672	0.675	0.675	0.673	0.668	0.659	0.648	0.632
Cholelithiasis	K80	-0.064	-0.066	-0.068	-0.069	-0.069	-0.068	-0.067	-0.064	-0.061	-0.056
Acute and other chronic pancreatitis	K85, K86.1	0.339	0.347	0.353	0.356	0.356	0.353	0.348	0.340	0.328	0.314
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.586	0.595	0.601	0.604	0.604	0.601	0.596	0.587	0.574	0.558

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
INJURIES											
Pedestrian traffic accidents	V01-V10	0.425	0.434	0.440	0.443	0.444	0.441	0.435	0.426	0.414	0.397
Road traffic accidents - non pedestrian	V11-V89	0.530	0.540	0.546	0.549	0.549	0.547	0.541	0.532	0.519	0.502
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.642	0.651	0.656	0.659	0.659	0.657	0.651	0.643	0.631	0.615
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.512	0.521	0.528	0.531	0.531	0.528	0.522	0.513	0.500	0.483
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.120	0.124	0.127	0.128	0.128	0.127	0.124	0.120	0.115	0.108
Assault	X85-Y09, Y87.1	0.064	0.066	0.068	0.068	0.068	0.068	0.066	0.064	0.061	0.057

Source: ALICE RAP, Del.6.1, p.178 (table 8.1.1.2).

Table 4.1.2 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Poland – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.556	0.565	0.571	0.574	0.574	0.572	0.566	0.557	0.544	0.527
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.556	0.565	0.571	0.574	0.574	0.572	0.566	0.557	0.544	0.527
Oesophageal cancer	C15	0.366	0.375	0.380	0.383	0.383	0.381	0.375	0.367	0.355	0.340
Colorectal cancer	C18-C20	0.056	0.058	0.060	0.060	0.060	0.060	0.059	0.057	0.054	0.051
Cancer of the liver and intrahepatic bile ducts	C22	0.187	0.193	0.197	0.199	0.199	0.197	0.193	0.188	0.180	0.170
Laryngeal cancer	C32	0.389	0.398	0.404	0.407	0.407	0.404	0.398	0.390	0.378	0.362
Breast cancer	C50	0.254	0.261	0.266	0.268	0.268	0.266	0.261	0.254	0.245	0.233
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.400	0.409	0.415	0.418	0.418	0.416	0.410	0.401	0.389	0.373
Coronary heart disease	I20-25	-0.122	-0.127	-0.131	-0.133	-0.133	-0.131	-0.128	-0.123	-0.116	-0.107
Cardiac arrhythmias	I47, I48	0.349	0.358	0.363	0.366	0.366	0.364	0.358	0.350	0.339	0.324
Haemorrhagic stroke	I60-I62	0.360	0.369	0.375	0.378	0.378	0.375	0.370	0.362	0.350	0.335
Ischaemic stroke	I63-I66	0.237	0.244	0.249	0.251	0.251	0.249	0.245	0.238	0.229	0.217
Oesophageal varices	I85, I98.2	0.647	0.656	0.661	0.664	0.664	0.662	0.656	0.648	0.636	0.621

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.646	0.654	0.660	0.663	0.663	0.660	0.655	0.647	0.635	0.619
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.686	0.694	0.699	0.702	0.702	0.700	0.695	0.687	0.676	0.661
Portal hypertension	K76.6	0.647	0.656	0.661	0.664	0.664	0.662	0.656	0.648	0.636	0.621
Cholelithiasis	K80	-0.059	-0.062	-0.063	-0.064	-0.064	-0.063	-0.062	-0.059	-0.056	-0.052
Acute and other chronic pancreatitis	K85, K86.1	0.321	0.329	0.335	0.338	0.338	0.335	0.330	0.322	0.311	0.297
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.574	0.583	0.589	0.592	0.592	0.590	0.584	0.575	0.563	0.546
INJURIES											
Pedestrian traffic accidents	V01-V10	0.414	0.423	0.429	0.432	0.432	0.429	0.424	0.415	0.403	0.386
Road traffic accidents - non pedestrian	V11-V89	0.510	0.520	0.526	0.529	0.529	0.526	0.520	0.511	0.499	0.482
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.624	0.633	0.638	0.641	0.641	0.639	0.633	0.625	0.613	0.597
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.500	0.510	0.516	0.519	0.519	0.516	0.511	0.502	0.489	0.472
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.115	0.119	0.122	0.123	0.123	0.122	0.119	0.116	0.110	0.104
Assault	X85-Y09, Y87.1	0.061	0.063	0.065	0.066	0.066	0.065	0.063	0.061	0.058	0.055

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.1.3 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Poland – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.534	0.544	0.550	0.553	0.553	0.550	0.544	0.535	0.523	0.506
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.534	0.544	0.550	0.553	0.553	0.550	0.544	0.535	0.523	0.506
Oesophageal cancer	C15	0.346	0.354	0.360	0.363	0.363	0.360	0.355	0.347	0.335	0.320
Colorectal cancer	C18-C20	0.052	0.054	0.055	0.056	0.056	0.055	0.054	0.052	0.050	0.047
Cancer of the liver and intrahepatic bile	C22	0.174	0.180	0.184	0.186	0.186	0.184	0.181	0.175	0.168	0.159

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
ducts											
Laryngeal cancer	C32	0.368	0.377	0.383	0.386	0.386	0.383	0.378	0.369	0.357	0.342
Breast cancer	C50	0.237	0.244	0.249	0.251	0.252	0.249	0.245	0.238	0.229	0.217
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.379	0.388	0.394	0.397	0.397	0.394	0.389	0.380	0.368	0.353
Coronary heart disease	I20-25	-0.111	-0.116	-0.119	-0.121	-0.121	-0.120	-0.117	-0.112	-0.106	-0.098
Cardiac arrhythmias	I47, I48	0.332	0.341	0.346	0.349	0.349	0.347	0.341	0.333	0.322	0.307
Haemorrhagic stroke	I60-I62	0.339	0.348	0.353	0.356	0.356	0.354	0.348	0.340	0.329	0.314
Ischaemic stroke	I63-I66	0.217	0.224	0.228	0.230	0.230	0.228	0.224	0.218	0.210	0.199
Oesophageal varices	I85, I98.2	0.635	0.644	0.649	0.652	0.652	0.650	0.644	0.636	0.624	0.608
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.633	0.642	0.648	0.651	0.651	0.648	0.643	0.635	0.623	0.607
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.672	0.681	0.686	0.689	0.689	0.686	0.681	0.673	0.662	0.647
Portal hypertension	K76.6	0.635	0.644	0.649	0.652	0.652	0.650	0.644	0.636	0.624	0.608
Cholelithiasis	K80	-0.055	-0.057	-0.058	-0.059	-0.059	-0.058	-0.057	-0.055	-0.052	-0.048
Acute and other chronic pancreatitis	K85, K86.1	0.302	0.310	0.316	0.318	0.319	0.316	0.311	0.303	0.293	0.279
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.562	0.571	0.577	0.580	0.580	0.578	0.572	0.563	0.550	0.534
INJURIES											
Pedestrian traffic accidents	V01-V10	0.402	0.411	0.417	0.420	0.420	0.418	0.412	0.403	0.391	0.375
Road traffic accidents - non pedestrian	V11-V89	0.488	0.497	0.504	0.507	0.507	0.504	0.498	0.489	0.476	0.459
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.604	0.613	0.619	0.621	0.622	0.619	0.613	0.605	0.593	0.576
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.488	0.498	0.504	0.507	0.507	0.504	0.498	0.489	0.477	0.460
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.110	0.114	0.117	0.118	0.118	0.117	0.114	0.111	0.106	0.100
Assault	X85-Y09, Y87.1	0.058	0.060	0.062	0.063	0.063	0.062	0.061	0.059	0.056	0.052

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012],

[Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.1.4 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Poland – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.455	0.465	0.471	0.474	0.474	0.472	0.466	0.457	0.444	0.427
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.455	0.465	0.471	0.474	0.474	0.472	0.466	0.457	0.444	0.427
Oesophageal cancer	C15	0.277	0.285	0.290	0.292	0.292	0.290	0.285	0.278	0.268	0.255
Colorectal cancer	C18-C20	0.039	0.040	0.041	0.042	0.042	0.041	0.040	0.039	0.037	0.035
Cancer of the liver and intrahepatic bile ducts	C22	0.135	0.139	0.142	0.144	0.144	0.142	0.140	0.135	0.129	0.122
Laryngeal cancer	C32	0.297	0.305	0.310	0.313	0.313	0.311	0.306	0.298	0.287	0.274
Breast cancer	C50	0.185	0.191	0.194	0.196	0.197	0.195	0.191	0.186	0.178	0.168
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.306	0.314	0.319	0.322	0.322	0.320	0.315	0.307	0.296	0.282
Coronary heart disease	I20-25	-0.081	-0.084	-0.087	-0.088	-0.088	-0.087	-0.085	-0.081	-0.077	-0.071
Cardiac arrhythmias	I47, I48	0.276	0.283	0.288	0.291	0.291	0.289	0.284	0.277	0.267	0.254
Haemorrhagic stroke	I60-I62	0.266	0.273	0.278	0.281	0.281	0.279	0.274	0.267	0.257	0.244
Ischaemic stroke	I63-I66	0.150	0.155	0.159	0.160	0.160	0.159	0.156	0.151	0.145	0.137
Oesophageal varices	I85, I98.2	0.593	0.602	0.608	0.611	0.611	0.609	0.603	0.594	0.582	0.565
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.592	0.601	0.607	0.610	0.610	0.607	0.602	0.593	0.581	0.564
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.623	0.632	0.638	0.641	0.641	0.638	0.633	0.624	0.612	0.596
Portal hypertension	K76.6	0.593	0.602	0.608	0.611	0.611	0.609	0.603	0.594	0.582	0.565
Cholelithiasis	K80	-0.041	-0.043	-0.044	-0.045	-0.045	-0.044	-0.043	-0.041	-0.039	-0.037
Acute and other chronic pancreatitis	K85, K86.1	0.240	0.247	0.251	0.254	0.254	0.252	0.247	0.241	0.231	0.219
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.520	0.530	0.536	0.539	0.539	0.537	0.531	0.522	0.509	0.492
INJURIES											
Pedestrian traffic accidents	V01-V10	0.364	0.373	0.378	0.381	0.381	0.379	0.373	0.365	0.353	0.338
Road traffic accidents - non pedestrian	V11-V89	0.407	0.416	0.422	0.425	0.426	0.423	0.417	0.408	0.396	0.380
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.528	0.537	0.543	0.547	0.547	0.544	0.538	0.529	0.516	0.499

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.448	0.457	0.463	0.466	0.467	0.464	0.458	0.449	0.436	0.420
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.095	0.099	0.101	0.102	0.102	0.101	0.099	0.096	0.091	0.086
Assault	X85-Y09, Y87.1	0.050	0.052	0.053	0.054	0.054	0.053	0.052	0.050	0.048	0.045

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.1.5 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Poland – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.539	0.546	0.549	0.548	0.543	0.534	0.520	0.500	0.473	0.437
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.539	0.546	0.549	0.548	0.543	0.534	0.520	0.500	0.473	0.437
Oesophageal cancer	C15	0.349	0.355	0.358	0.357	0.353	0.344	0.332	0.314	0.291	0.262
Colorectal cancer	C18-C20	0.054	0.055	0.056	0.056	0.055	0.053	0.050	0.046	0.042	0.036
Cancer of the liver and intrahepatic bile ducts	C22	0.180	0.184	0.186	0.185	0.182	0.177	0.169	0.158	0.144	0.127
Laryngeal cancer	C32	0.371	0.378	0.381	0.380	0.375	0.366	0.353	0.335	0.312	0.282
Breast cancer	C50	0.241	0.246	0.249	0.248	0.244	0.238	0.227	0.214	0.196	0.174
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.381	0.388	0.391	0.390	0.385	0.376	0.363	0.345	0.321	0.290
Coronary heart disease	I20-25	-0.126	-0.130	-0.132	-0.131	-0.128	-0.123	-0.115	-0.106	-0.094	-0.080
Cardiac arrhythmias	I47, I48	0.348	0.354	0.357	0.356	0.352	0.343	0.331	0.313	0.291	0.262
Haemorrhagic stroke	I60-I62	0.332	0.339	0.341	0.340	0.336	0.328	0.315	0.298	0.276	0.248
Ischaemic stroke	I63-I66	0.191	0.196	0.198	0.197	0.194	0.188	0.180	0.169	0.154	0.136
Oesophageal varices	I85, I98.2	0.653	0.659	0.662	0.661	0.657	0.648	0.635	0.617	0.591	0.555
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.651	0.658	0.661	0.660	0.655	0.647	0.634	0.615	0.590	0.554
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.683	0.689	0.691	0.691	0.686	0.678	0.666	0.648	0.623	0.588
Cholelithiasis	K80	-0.055	-0.056	-0.057	-0.057	-0.056	-0.053	-0.050	-0.046	-0.041	-0.036

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Acute and other chronic pancreatitis	K85, K86.1	0.305	0.311	0.314	0.313	0.309	0.301	0.289	0.273	0.252	0.226
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.583	0.590	0.593	0.592	0.587	0.578	0.565	0.545	0.518	0.482
INJURIES											
Pedestrian traffic accidents	V01-V10	0.243	0.248	0.251	0.250	0.246	0.239	0.229	0.216	0.198	0.176
Road traffic accidents - non pedestrian	V11-V89	0.498	0.506	0.509	0.508	0.503	0.493	0.479	0.460	0.433	0.398
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.619	0.626	0.629	0.628	0.623	0.615	0.601	0.582	0.556	0.520
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.450	0.457	0.461	0.460	0.455	0.445	0.431	0.412	0.386	0.353
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.140	0.143	0.145	0.144	0.142	0.138	0.131	0.122	0.111	0.098
Assault	X85-Y09, Y87.1	0.087	0.090	0.091	0.090	0.089	0.086	0.081	0.076	0.068	0.060

Source: ALICE RAP, Del.6.1, p.179 (*Table 8.1.1.3*).

Table 4.1.6 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Poland – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.519	0.526	0.529	0.528	0.523	0.514	0.500	0.480	0.453	0.417
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.519	0.526	0.529	0.528	0.523	0.514	0.500	0.480	0.453	0.417
Oesophageal cancer	C15	0.331	0.337	0.340	0.339	0.334	0.326	0.314	0.297	0.275	0.247
Colorectal cancer	C18-C20	0.050	0.051	0.052	0.052	0.051	0.049	0.046	0.043	0.039	0.034
Cancer of the liver and intrahepatic bile ducts	C22	0.168	0.172	0.174	0.174	0.171	0.166	0.158	0.148	0.135	0.119
Laryngeal cancer	C32	0.352	0.359	0.362	0.361	0.356	0.348	0.335	0.318	0.295	0.266
Breast cancer	C50	0.227	0.232	0.234	0.234	0.230	0.223	0.214	0.201	0.184	0.163
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.362	0.369	0.371	0.371	0.366	0.357	0.344	0.327	0.304	0.274
Coronary heart disease	I20-25	-0.116	-0.120	-0.121	-0.121	-0.118	-0.113	-0.106	-0.098	-0.087	-0.074

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Cardiac arrhythmias	I47, I48	0.331	0.338	0.341	0.340	0.335	0.327	0.315	0.298	0.276	0.248
Haemorrhagic stroke	I60-I62	0.313	0.320	0.322	0.321	0.317	0.309	0.297	0.281	0.260	0.233
Ischaemic stroke	I63-I66	0.176	0.180	0.182	0.181	0.178	0.173	0.165	0.154	0.141	0.124
Oesophageal varices	I85, I98.2	0.638	0.645	0.647	0.647	0.642	0.633	0.620	0.601	0.575	0.539
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.637	0.643	0.646	0.645	0.641	0.632	0.619	0.600	0.574	0.538
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.667	0.674	0.676	0.676	0.671	0.663	0.650	0.632	0.607	0.571
Cholelithiasis	K80	-0.050	-0.052	-0.053	-0.052	-0.051	-0.049	-0.046	-0.043	-0.038	-0.033
Acute and other chronic pancreatitis	K85, K86.1	0.288	0.294	0.297	0.296	0.292	0.284	0.273	0.257	0.237	0.212
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.568	0.575	0.578	0.577	0.572	0.563	0.549	0.529	0.502	0.466
INJURIES											
Pedestrian traffic accidents	V01-V10	0.232	0.237	0.239	0.238	0.235	0.228	0.218	0.205	0.188	0.167
Road traffic accidents - non pedestrian	V11-V89	0.478	0.485	0.488	0.487	0.482	0.473	0.459	0.439	0.413	0.378
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.601	0.608	0.611	0.610	0.605	0.596	0.583	0.563	0.537	0.501
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.435	0.442	0.445	0.444	0.439	0.430	0.416	0.397	0.371	0.338
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.132	0.136	0.137	0.137	0.134	0.130	0.124	0.116	0.105	0.092
Assault	X85-Y09, Y87.1	0.082	0.084	0.085	0.085	0.084	0.081	0.077	0.071	0.064	0.056

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.1.7 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Poland – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.497	0.504	0.507	0.506	0.501	0.492	0.478	0.458	0.432	0.396
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.497	0.504	0.507	0.506	0.501	0.492	0.478	0.458	0.432	0.396

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Oesophageal cancer	C15	0.311	0.318	0.320	0.320	0.315	0.307	0.295	0.279	0.258	0.231
Colorectal cancer	C18-C20	0.046	0.047	0.048	0.048	0.047	0.045	0.043	0.040	0.036	0.031
Cancer of the liver and intrahepatic bile ducts	C22	0.157	0.161	0.162	0.162	0.159	0.154	0.147	0.137	0.125	0.110
Laryngeal cancer	C32	0.333	0.339	0.342	0.341	0.337	0.328	0.316	0.299	0.277	0.249
Breast cancer	C50	0.212	0.217	0.219	0.218	0.215	0.209	0.200	0.187	0.171	0.152
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.342	0.348	0.351	0.350	0.346	0.337	0.325	0.308	0.285	0.256
Coronary heart disease	I20-25	-0.106	-0.110	-0.111	-0.111	-0.108	-0.104	-0.098	-0.090	-0.080	-0.068
Cardiac arrhythmias	I47, I48	0.314	0.321	0.323	0.323	0.318	0.310	0.298	0.282	0.261	0.234
Haemorrhagic stroke	I60-I62	0.293	0.299	0.302	0.301	0.297	0.289	0.278	0.262	0.242	0.216
Ischaemic stroke	I63-I66	0.159	0.163	0.165	0.164	0.162	0.157	0.149	0.140	0.127	0.112
Oesophageal varices	I85, I98.2	0.622	0.629	0.631	0.631	0.626	0.617	0.604	0.585	0.558	0.522
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.620	0.627	0.630	0.629	0.625	0.616	0.602	0.583	0.557	0.521
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.650	0.657	0.660	0.659	0.654	0.646	0.633	0.614	0.588	0.553
Cholelithiasis	K80	-0.046	-0.047	-0.048	-0.048	-0.047	-0.045	-0.043	-0.039	-0.035	-0.030
Acute and other chronic pancreatitis	K85, K86.1	0.270	0.276	0.279	0.278	0.274	0.267	0.256	0.241	0.222	0.198
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.551	0.558	0.561	0.560	0.555	0.546	0.532	0.512	0.485	0.449
INJURIES											
Pedestrian traffic accidents	V01-V10	0.220	0.225	0.227	0.226	0.223	0.216	0.207	0.194	0.178	0.158
Road traffic accidents - non pedestrian	V11-V89	0.455	0.462	0.465	0.465	0.460	0.450	0.436	0.417	0.391	0.357
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.581	0.588	0.591	0.590	0.586	0.577	0.563	0.543	0.516	0.480
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.418	0.425	0.428	0.427	0.422	0.413	0.400	0.381	0.356	0.323
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.125	0.128	0.129	0.129	0.127	0.123	0.117	0.109	0.099	0.087

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Assault	X85-Y09, Y87.1	0.077	0.079	0.080	0.080	0.079	0.076	0.072	0.067	0.060	0.053

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.1.8 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Poland – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.419	0.426	0.429	0.428	0.423	0.414	0.400	0.381	0.356	0.324
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.419	0.426	0.429	0.428	0.423	0.414	0.400	0.381	0.356	0.324
Oesophageal cancer	C15	0.247	0.253	0.255	0.254	0.250	0.244	0.233	0.219	0.202	0.179
Colorectal cancer	C18-C20	0.034	0.035	0.036	0.035	0.035	0.034	0.032	0.029	0.026	0.023
Cancer of the liver and intrahepatic bile ducts	C22	0.120	0.124	0.125	0.124	0.122	0.118	0.113	0.105	0.095	0.083
Laryngeal cancer	C32	0.266	0.271	0.274	0.273	0.269	0.262	0.251	0.236	0.218	0.194
Breast cancer	C50	0.164	0.168	0.170	0.169	0.166	0.161	0.154	0.144	0.131	0.115
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.273	0.279	0.281	0.280	0.276	0.269	0.258	0.243	0.224	0.200
Coronary heart disease	I20-25	-0.078	-0.081	-0.082	-0.082	-0.080	-0.077	-0.072	-0.066	-0.059	-0.051
Cardiac arrhythmias	I47, I48	0.257	0.263	0.265	0.265	0.261	0.254	0.243	0.229	0.210	0.187
Haemorrhagic stroke	I60-I62	0.226	0.231	0.234	0.233	0.229	0.223	0.213	0.200	0.184	0.163
Ischaemic stroke	I63-I66	0.106	0.109	0.110	0.110	0.108	0.104	0.099	0.092	0.084	0.073
Oesophageal varices	I85, I98.2	0.563	0.570	0.573	0.573	0.568	0.558	0.544	0.525	0.498	0.462
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.562	0.569	0.572	0.571	0.566	0.557	0.543	0.523	0.497	0.460
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.588	0.595	0.598	0.597	0.592	0.583	0.569	0.549	0.523	0.486
Cholelithiasis	K80	-0.034	-0.035	-0.035	-0.035	-0.034	-0.033	-0.031	-0.029	-0.026	-0.022
Acute and other chronic pancreatitis	K85, K86.1	0.212	0.217	0.219	0.218	0.215	0.209	0.200	0.187	0.171	0.152
OTHER CHRONIC AND ACUTE CONDITIONS											
Epilepsy and Status epilepticus	G40-G41	0.492	0.499	0.502	0.501	0.496	0.487	0.473	0.453	0.427	0.392
INJURIES											
Pedestrian traffic accidents	V01-V10	0.182	0.186	0.188	0.188	0.184	0.179	0.171	0.160	0.146	0.129

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Road traffic accidents - non pedestrian	V11-V89	0.375	0.381	0.384	0.383	0.379	0.370	0.357	0.339	0.315	0.285
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.508	0.515	0.518	0.517	0.512	0.503	0.489	0.469	0.442	0.407
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.362	0.369	0.371	0.371	0.366	0.357	0.344	0.327	0.304	0.274
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.101	0.104	0.105	0.105	0.103	0.099	0.094	0.088	0.080	0.070
Assault	X85-Y09, Y87.1	0.062	0.064	0.064	0.064	0.063	0.061	0.058	0.054	0.048	0.042

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

4.1.2 Smoking

Table 4.1.9 Attributable fractions for causes of death partially attributable to smoking according to age, men, Poland – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.755	0.788	0.809	0.822	0.830	0.834	0.835	0.833	0.827	0.816
Esophagus	C15	0.691	0.723	0.744	0.758	0.767	0.772	0.773	0.770	0.763	0.752
Stomach	C16	0.259	0.292	0.316	0.333	0.345	0.351	0.352	0.349	0.340	0.325
Pancreas	C25	0.270	0.313	0.343	0.365	0.379	0.387	0.388	0.384	0.373	0.355
Larynx	C32	0.824	0.847	0.862	0.872	0.878	0.881	0.881	0.879	0.875	0.867
Trachea, lung, bronchus	C33, C34	0.881	0.898	0.909	0.916	0.920	0.922	0.923	0.921	0.918	0.913
Urinary bladder	C67	0.452	0.492	0.521	0.541	0.553	0.560	0.562	0.558	0.548	0.532
Kidney and renal pelvis	C64, C65	0.376	0.416	0.445	0.465	0.479	0.486	0.487	0.483	0.473	0.456
Acute myeloid leukemia	C92.0	0.227	0.259	0.282	0.300	0.311	0.317	0.318	0.315	0.306	0.292
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.268	0.299	0.323	0.340	0.351	0.357	0.359	0.355	0.346	0.332
Ischemic heart disease	I25	0.377	0.418	0.448	0.469	0.483	0.490	0.492	0.487	0.477	0.460
Other heart disease	I00-I52 excl.I10, I25	0.199	0.230	0.254	0.270	0.282	0.288	0.289	0.285	0.277	0.263
Cerebrovascular disease	I67	0.373	0.425	0.462	0.487	0.503	0.511	0.513	0.508	0.496	0.476
Atherosclerosis	I70	0.307	0.349	0.379	0.400	0.414	0.422	0.423	0.419	0.408	0.391
Aortic aneurysm	I71	0.642	0.680	0.706	0.723	0.733	0.739	0.740	0.737	0.729	0.715
Other arterial disease	I72-I79	0.218	0.258	0.287	0.308	0.322	0.329	0.331	0.326	0.316	0.299
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.214	0.242	0.264	0.280	0.290	0.296	0.297	0.294	0.286	0.273
Bronchitis, emphysema	J20, J43	0.880	0.893	0.902	0.908	0.911	0.913	0.914	0.913	0.910	0.905
Chronic airways obstruction	J44.9	0.789	0.813	0.829	0.839	0.846	0.849	0.850	0.848	0.843	0.835
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: ALICE RAP, Del.6.1, p.182 (table 8.1.1.6).

Table 4.1.10 Attributable fractions for causes of death partially attributable to smoking according to age, men, Poland – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.745	0.777	0.798	0.811	0.820	0.824	0.825	0.822	0.816	0.805
Esophagus	C15	0.690	0.719	0.739	0.752	0.761	0.765	0.766	0.763	0.757	0.746
Stomach	C16	0.256	0.285	0.308	0.324	0.334	0.340	0.341	0.338	0.330	0.317
Pancreas	C25	0.255	0.295	0.324	0.345	0.359	0.366	0.367	0.363	0.353	0.336
Larynx	C32	0.819	0.842	0.856	0.866	0.871	0.874	0.875	0.873	0.869	0.862
Trachea, lung, bronchus	C33, C34	0.877	0.894	0.905	0.911	0.915	0.918	0.918	0.917	0.914	0.908
Urinary bladder	C67	0.447	0.484	0.511	0.530	0.542	0.548	0.550	0.546	0.537	0.521
Kidney and renal pelvis	C64, C65	0.370	0.407	0.434	0.453	0.466	0.472	0.474	0.470	0.460	0.445
Acute myeloid leukemia	C92.0	0.222	0.251	0.273	0.288	0.299	0.305	0.306	0.303	0.294	0.281
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.266	0.295	0.316	0.332	0.342	0.348	0.349	0.346	0.338	0.325
Ischemic heart disease	I25	0.368	0.407	0.435	0.455	0.468	0.475	0.476	0.472	0.462	0.446
Other heart disease	I00-I52 excl.I10, I25	0.192	0.220	0.242	0.258	0.268	0.274	0.275	0.272	0.264	0.251
Cerebrovascular disease	I67	0.350	0.401	0.436	0.461	0.477	0.485	0.487	0.482	0.470	0.450
Atherosclerosis	I70	0.296	0.334	0.363	0.383	0.396	0.404	0.405	0.401	0.391	0.374
Aortic aneurysm	I71	0.636	0.672	0.696	0.712	0.722	0.728	0.729	0.726	0.718	0.705
Other arterial disease	I72-I79	0.201	0.238	0.266	0.286	0.299	0.307	0.308	0.304	0.294	0.277
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.211	0.237	0.257	0.271	0.281	0.286	0.287	0.284	0.277	0.265
Bronchitis, emphysema	J20, J43	0.883	0.894	0.902	0.907	0.910	0.912	0.913	0.912	0.909	0.905
Chronic airways obstruction	J44.9	0.788	0.810	0.825	0.835	0.841	0.845	0.845	0.843	0.839	0.831
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.1.11 Attributable fractions for causes of death partially attributable to smoking according to age, men, Poland – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.734	0.765	0.786	0.800	0.808	0.812	0.813	0.811	0.804	0.794
Esophagus	C15	0.689	0.715	0.734	0.746	0.754	0.758	0.759	0.756	0.751	0.741
Stomach	C16	0.253	0.279	0.299	0.314	0.324	0.329	0.330	0.327	0.320	0.307
Pancreas	C25	0.240	0.277	0.304	0.324	0.336	0.343	0.345	0.341	0.331	0.315
Larynx	C32	0.815	0.836	0.850	0.859	0.865	0.868	0.868	0.867	0.862	0.855
Trachea, lung, bronchus	C33, C34	0.873	0.889	0.900	0.906	0.910	0.912	0.913	0.912	0.909	0.903
Urinary bladder	C67	0.442	0.476	0.501	0.518	0.530	0.536	0.537	0.533	0.525	0.511
Kidney and renal pelvis	C64, C65	0.364	0.398	0.423	0.440	0.452	0.458	0.459	0.456	0.447	0.432
Acute myeloid leukemia	C92.0	0.216	0.242	0.262	0.277	0.287	0.292	0.293	0.290	0.282	0.270
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.264	0.290	0.309	0.324	0.333	0.338	0.339	0.336	0.329	0.317
Ischemic heart disease	I25	0.360	0.396	0.422	0.440	0.452	0.459	0.460	0.456	0.447	0.432
Other heart disease	I00-I52 excl.I10, I25	0.185	0.210	0.230	0.245	0.254	0.259	0.261	0.257	0.250	0.238
Cerebrovascular disease	I67	0.325	0.374	0.409	0.433	0.448	0.457	0.458	0.454	0.442	0.422
Atherosclerosis	I70	0.283	0.319	0.346	0.365	0.378	0.384	0.386	0.382	0.372	0.357
Aortic aneurysm	I71	0.629	0.662	0.685	0.701	0.711	0.716	0.717	0.714	0.706	0.694
Other arterial disease	I72-I79	0.183	0.218	0.244	0.263	0.276	0.283	0.284	0.280	0.270	0.255
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.208	0.231	0.249	0.262	0.271	0.276	0.277	0.274	0.267	0.256
Bronchitis, emphysema	J20, J43	0.885	0.895	0.902	0.906	0.909	0.911	0.911	0.910	0.908	0.904
Chronic airways obstruction	J44.9	0.787	0.808	0.821	0.830	0.836	0.839	0.840	0.838	0.834	0.826
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.1.12 Attributable fractions for causes of death partially attributable to smoking according to age, men, Poland – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.695	0.722	0.740	0.753	0.761	0.765	0.766	0.764	0.758	0.747
Esophagus	C15	0.686	0.703	0.716	0.725	0.731	0.734	0.735	0.733	0.728	0.721
Stomach	C16	0.242	0.260	0.273	0.283	0.290	0.293	0.294	0.292	0.287	0.279
Pancreas	C25	0.188	0.215	0.235	0.250	0.260	0.266	0.267	0.263	0.256	0.243
Larynx	C32	0.799	0.816	0.827	0.835	0.839	0.842	0.843	0.841	0.837	0.831
Trachea, lung, bronchus	C33, C34	0.859	0.872	0.881	0.887	0.890	0.892	0.893	0.892	0.889	0.884
Urinary bladder	C67										
Kidney and renal pelvis	C64, C65	0.428	0.451	0.468	0.480	0.489	0.493	0.494	0.491	0.485	0.475
Acute myeloid leukemia	C92.0	0.345	0.368	0.385	0.398	0.406	0.411	0.412	0.409	0.403	0.392
CARDIOVASCULAR DISEASES		0.199	0.216	0.230	0.240	0.247	0.250	0.251	0.249	0.244	0.235
Hypertension	I10										
Ischemic heart disease	I25	0.259	0.275	0.288	0.298	0.304	0.308	0.308	0.306	0.301	0.294
Other heart disease	I00-I52 excl.I10, I25	0.333	0.358	0.377	0.390	0.399	0.404	0.405	0.402	0.395	0.384
Cerebrovascular disease	I67	0.161	0.179	0.192	0.202	0.209	0.213	0.213	0.211	0.206	0.198
Atherosclerosis	I70	0.236	0.277	0.306	0.327	0.341	0.348	0.350	0.346	0.335	0.318
Aortic aneurysm	I71	0.244	0.270	0.289	0.303	0.313	0.318	0.319	0.316	0.309	0.297
Other arterial disease	I72-I79	0.606	0.630	0.648	0.660	0.668	0.673	0.673	0.671	0.665	0.655
RESPIRATORY DISEASES		0.125	0.150	0.170	0.184	0.194	0.199	0.200	0.197	0.189	0.178
Pneumonia, influenza	J10-J18										
Bronchitis, emphysema	J20, J43	0.198	0.213	0.225	0.234	0.240	0.243	0.244	0.242	0.237	0.230
Chronic airways obstruction	J44.9	0.891	0.897	0.901	0.904	0.906	0.907	0.908	0.907	0.905	0.903
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.1.13 Attributable fractions for causes of death partially attributable to smoking according to age, women, Poland – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.483	0.518	0.543	0.559	0.569	0.573	0.571	0.564	0.550	0.529
Esophagus	C15	0.601	0.635	0.658	0.673	0.682	0.686	0.684	0.677	0.665	0.646
Stomach	C16	0.096	0.106	0.114	0.119	0.123	0.124	0.123	0.121	0.116	0.109
Pancreas	C25	0.233	0.258	0.276	0.289	0.297	0.300	0.299	0.293	0.282	0.266
Larynx	C32	0.736	0.762	0.780	0.791	0.797	0.800	0.799	0.794	0.785	0.770
Trachea, lung, bronchus	C33, C34	0.726	0.754	0.772	0.783	0.790	0.793	0.792	0.787	0.777	0.762
Cervix uteri	C53	0.115	0.131	0.143	0.151	0.157	0.159	0.158	0.154	0.147	0.136
Urinary bladder	C67	0.058	0.067	0.074	0.079	0.082	0.083	0.083	0.080	0.076	0.070
Kidney and renal pelvis	C64, C65	0.252	0.275	0.292	0.304	0.311	0.314	0.313	0.307	0.297	0.282
Acute myeloid leukemia	C92.0	0.064	0.068	0.071	0.073	0.074	0.075	0.075	0.074	0.072	0.069
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.217	0.240	0.258	0.270	0.277	0.280	0.279	0.273	0.263	0.248
Ischemic heart disease	I25	0.304	0.338	0.362	0.378	0.388	0.392	0.391	0.383	0.369	0.349
Other heart disease	I00-I52 excl.I10, I25	0.099	0.113	0.123	0.131	0.136	0.137	0.137	0.133	0.127	0.118
Cerebrovascular disease	I67	0.380	0.418	0.444	0.462	0.473	0.477	0.475	0.467	0.453	0.430
Atherosclerosis	I70	0.138	0.159	0.175	0.186	0.193	0.196	0.194	0.189	0.180	0.166
Aortic aneurysm	I71	0.564	0.601	0.625	0.642	0.651	0.655	0.654	0.646	0.633	0.612
Other arterial disease	I72-I79	0.193	0.219	0.238	0.251	0.259	0.263	0.261	0.255	0.244	0.227
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.192	0.217	0.237	0.250	0.258	0.262	0.260	0.254	0.243	0.226
Bronchitis, emphysema	J20, J43	0.770	0.789	0.801	0.810	0.815	0.817	0.816	0.812	0.805	0.794
Chronic airways obstruction	J44.9	0.749	0.773	0.789	0.799	0.805	0.807	0.806	0.802	0.794	0.780
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: ALICE RAP, Del.6.1, p.183 (table 8.1.1.7).

Table 4.1.14 Attributable fractions for causes of death partially attributable to smoking according to age, women, Poland – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.470	0.504	0.528	0.543	0.553	0.557	0.555	0.548	0.535	0.515
Esophagus	C15	0.587	0.620	0.643	0.658	0.666	0.670	0.668	0.662	0.650	0.630
Stomach	C16	0.097	0.106	0.113	0.118	0.121	0.122	0.122	0.119	0.115	0.109
Pancreas	C25	0.227	0.250	0.267	0.279	0.286	0.289	0.288	0.282	0.272	0.257
Larynx	C32	0.727	0.753	0.770	0.781	0.787	0.789	0.788	0.784	0.775	0.760
Trachea, lung, bronchus	C33, C34	0.716	0.743	0.761	0.772	0.779	0.781	0.780	0.775	0.766	0.751
Cervix uteri	C53	0.109	0.123	0.134	0.142	0.147	0.149	0.148	0.144	0.138	0.128
Urinary bladder	C67	0.054	0.062	0.069	0.073	0.076	0.077	0.077	0.074	0.071	0.065
Kidney and renal pelvis	C64, C65	0.251	0.272	0.288	0.299	0.305	0.308	0.307	0.302	0.293	0.279
Acute myeloid leukemia	C92.0	0.070	0.074	0.076	0.078	0.080	0.080	0.080	0.079	0.077	0.075
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.212	0.234	0.249	0.261	0.268	0.270	0.269	0.264	0.255	0.241
Ischemic heart disease	I25	0.289	0.320	0.343	0.359	0.368	0.372	0.371	0.363	0.350	0.330
Other heart disease	I00-I52 excl.I10, I25	0.095	0.107	0.117	0.123	0.128	0.129	0.129	0.125	0.120	0.111
Cerebrovascular disease	I67	0.360	0.396	0.422	0.440	0.450	0.454	0.453	0.445	0.430	0.408
Atherosclerosis	I70	0.126	0.145	0.160	0.171	0.177	0.180	0.178	0.174	0.165	0.152
Aortic aneurysm	I71	0.546	0.582	0.607	0.623	0.633	0.636	0.635	0.628	0.614	0.593
Other arterial disease	I72-I79	0.180	0.204	0.222	0.235	0.242	0.245	0.244	0.238	0.228	0.212
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.178	0.202	0.220	0.233	0.241	0.244	0.242	0.237	0.226	0.210
Bronchitis, emphysema	J20, J43	0.774	0.790	0.801	0.809	0.813	0.815	0.814	0.811	0.805	0.795
Chronic airways obstruction	J44.9	0.744	0.766	0.782	0.791	0.797	0.800	0.799	0.794	0.786	0.773
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.1.15 Attributable fractions for causes of death partially attributable to smoking according to age, women, Poland – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.457	0.489	0.511	0.526	0.535	0.539	0.538	0.531	0.518	0.499
Esophagus	C15	0.572	0.604	0.626	0.641	0.649	0.653	0.651	0.645	0.633	0.614
Stomach	C16	0.098	0.106	0.112	0.117	0.120	0.121	0.120	0.118	0.114	0.109
Pancreas	C25	0.221	0.242	0.257	0.268	0.275	0.277	0.276	0.271	0.262	0.249
Larynx	C32	0.718	0.742	0.759	0.769	0.776	0.778	0.777	0.772	0.763	0.750
Trachea, lung, bronchus	C33, C34	0.705	0.731	0.748	0.759	0.766	0.769	0.768	0.763	0.753	0.739
Cervix uteri	C53	0.103	0.116	0.126	0.133	0.137	0.139	0.138	0.135	0.129	0.120
Urinary bladder	C67	0.050	0.058	0.063	0.067	0.070	0.071	0.070	0.068	0.065	0.060
Kidney and renal pelvis	C64, C65	0.251	0.270	0.284	0.294	0.300	0.302	0.301	0.297	0.288	0.276
Acute myeloid leukemia	C92.0	0.077	0.080	0.082	0.084	0.085	0.085	0.085	0.084	0.083	0.081
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.208	0.227	0.241	0.251	0.258	0.260	0.259	0.254	0.246	0.233
Ischemic heart disease	I25	0.272	0.302	0.323	0.338	0.347	0.351	0.349	0.342	0.330	0.311
Other heart disease	I00-I52 excl.I10, I25	0.090	0.101	0.110	0.116	0.120	0.121	0.121	0.118	0.112	0.105
Cerebrovascular disease	I67	0.339	0.374	0.398	0.415	0.425	0.429	0.428	0.420	0.406	0.385
Atherosclerosis	I70	0.114	0.131	0.145	0.155	0.160	0.163	0.162	0.157	0.149	0.137
Aortic aneurysm	I71	0.527	0.562	0.586	0.602	0.612	0.615	0.614	0.607	0.593	0.573
Other arterial disease	I72-I79	0.167	0.189	0.206	0.217	0.224	0.227	0.226	0.221	0.211	0.196
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.165	0.187	0.203	0.215	0.222	0.225	0.224	0.219	0.209	0.194
Bronchitis, emphysema	J20, J43	0.777	0.791	0.801	0.808	0.812	0.814	0.813	0.810	0.804	0.796
Chronic airways obstruction	J44.9	0.738	0.759	0.774	0.783	0.789	0.791	0.790	0.786	0.778	0.766
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.1.16 Attributable fractions for causes of death partially attributable to smoking according to age, women, Poland – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.415	0.438	0.455	0.467	0.474	0.477	0.476	0.470	0.460	0.446
Esophagus	C15	0.521	0.546	0.565	0.577	0.585	0.588	0.586	0.581	0.570	0.555
Stomach	C16	0.101	0.106	0.110	0.113	0.115	0.116	0.115	0.114	0.112	0.108
Pancreas	C25	0.203	0.217	0.227	0.234	0.239	0.241	0.240	0.236	0.230	0.221
Larynx	C32	0.685	0.704	0.718	0.727	0.733	0.735	0.734	0.730	0.722	0.711
Trachea, lung, bronchus	C33, C34	0.665	0.687	0.702	0.712	0.718	0.720	0.719	0.715	0.706	0.693
Cervix uteri	C53	0.083	0.092	0.099	0.103	0.106	0.108	0.107	0.105	0.101	0.095
Urinary bladder	C67	0.039	0.043	0.047	0.050	0.051	0.052	0.052	0.050	0.048	0.045
Kidney and renal pelvis	C64, C65	0.251	0.262	0.271	0.278	0.282	0.283	0.283	0.280	0.274	0.266
Acute myeloid leukemia	C92.0	0.095	0.097	0.098	0.099	0.100	0.100	0.100	0.100	0.099	0.098
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.193	0.206	0.215	0.222	0.226	0.228	0.227	0.224	0.218	0.210
Ischemic heart disease	I25	0.218	0.239	0.256	0.267	0.274	0.277	0.276	0.270	0.261	0.247
Other heart disease	I00-I52 excl.I10, I25	0.075	0.082	0.088	0.092	0.095	0.096	0.095	0.093	0.090	0.085
Cerebrovascular disease	I67	0.266	0.293	0.313	0.327	0.335	0.339	0.337	0.331	0.319	0.302
Atherosclerosis	I70	0.074	0.086	0.096	0.103	0.107	0.108	0.108	0.105	0.099	0.091
Aortic aneurysm	I71	0.458	0.488	0.509	0.523	0.531	0.535	0.533	0.527	0.515	0.497
Other arterial disease	I72-I79	0.124	0.140	0.151	0.160	0.165	0.167	0.166	0.162	0.155	0.145
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.121	0.136	0.148	0.156	0.162	0.164	0.163	0.159	0.152	0.141
Bronchitis, emphysema	J20, J43	0.787	0.795	0.801	0.806	0.808	0.809	0.809	0.807	0.803	0.798
Chronic airways obstruction	J44.9	0.720	0.736	0.747	0.754	0.759	0.761	0.760	0.756	0.750	0.741
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

4.1.3 Drugs

Table 4.1.17 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Poland – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis B	B17.1, B18.2, B16, B18.0	0.259	0.330	0.338	0.313	0.268	0.214	0.162	0.125	0.106	0.102
Hepatitis C	B18.1	0.266	0.338	0.346	0.321	0.275	0.220	0.167	0.129	0.110	0.106

Source: ALICE RAP, Del.6.1, p.49 (table 4.1.9).

Table 4.1.18 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Poland – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis B	B17.1, B18.2, B16, B18.0	0.239	0.307	0.315	0.291	0.248	0.197	0.149	0.114	0.097	0.093
Hepatitis C	B18.1	0.246	0.314	0.323	0.298	0.255	0.202	0.153	0.117	0.100	0.096

Source: author's own.

Table 4.1.19 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Poland – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis B	B17.1, B18.2, B16, B18.0	0.218	0.282	0.290	0.267	0.227	0.179	0.134	0.102	0.087	0.084
Hepatitis C	B18.1	0.225	0.290	0.297	0.274	0.233	0.184	0.139	0.106	0.090	0.086

Source: author's own.

Table 4.1.20 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Poland – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis B	B17.1, B18.2, B16, B18.0	0.149	0.197	0.203	0.186	0.155	0.120	0.088	0.067	0.056	0.054
Hepatitis C	B18.1	0.153	0.203	0.209	0.191	0.159	0.124	0.091	0.069	0.058	0.056

Source: author's own.

4.2 Portugal

4.2.1 Alcohol

Table 4.2.1 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Portugal – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.421	0.443	0.452	0.454	0.454	0.454	0.456	0.459	0.464	0.466
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.421	0.443	0.452	0.454	0.454	0.454	0.456	0.459	0.464	0.466
Oesophageal cancer	C15	0.248	0.265	0.272	0.273	0.273	0.273	0.275	0.278	0.281	0.283
Colorectal cancer	C18-C20	0.037	0.041	0.042	0.043	0.042	0.042	0.043	0.043	0.044	0.045
Cancer of the liver and intrahepatic bile ducts	C22	0.130	0.141	0.145	0.146	0.146	0.146	0.147	0.149	0.151	0.152
Laryngeal cancer	C32	0.266	0.284	0.291	0.293	0.293	0.293	0.294	0.297	0.301	0.303
Breast cancer	C50	0.169	0.182	0.187	0.189	0.189	0.189	0.190	0.192	0.195	0.197
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.269	0.287	0.294	0.296	0.296	0.296	0.297	0.301	0.304	0.307
Coronary heart disease	I20-25	-0.128	-0.142	-0.148	-0.149	-0.149	-0.149	-0.150	-0.153	-0.156	-0.158
Cardiac arrhythmias	I47, I48	0.287	0.306	0.313	0.315	0.315	0.315	0.316	0.320	0.324	0.326
Haemorrhagic stroke	I60-I62	0.184	0.198	0.203	0.205	0.204	0.204	0.206	0.208	0.211	0.213
Ischaemic stroke	I63-I66	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Oesophageal varices	I85, I98.2	0.499	0.522	0.530	0.533	0.532	0.532	0.534	0.538	0.542	0.545
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.497	0.519	0.528	0.530	0.530	0.530	0.531	0.535	0.540	0.542
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.511	0.533	0.542	0.544	0.544	0.544	0.546	0.549	0.554	0.557
Portal hypertension	K76.6	0.499	0.522	0.530	0.533	0.532	0.532	0.534	0.538	0.542	0.545
Cholelithiasis	K80	-0.020	-0.022	-0.023	-0.023	-0.023	-0.023	-0.024	-0.024	-0.024	-0.025
Acute and other chronic pancreatitis	K85, K86.1	0.208	0.224	0.230	0.231	0.231	0.231	0.232	0.235	0.238	0.240
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.274	0.292	0.300	0.301	0.301	0.301	0.303	0.306	0.310	0.312
Epilepsy and Status epilepticus	G40-G41	0.435	0.457	0.466	0.468	0.468	0.468	0.469	0.473	0.478	0.480
INJURIES											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Pedestrian traffic accidents	V01-V10	0.264	0.282	0.289	0.291	0.290	0.290	0.292	0.295	0.299	0.301
Road traffic accidents - non pedestrian	V11-V89	0.230	0.246	0.253	0.254	0.254	0.254	0.256	0.258	0.262	0.264
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.581	0.603	0.611	0.613	0.613	0.613	0.615	0.619	0.623	0.625
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.337	0.357	0.366	0.368	0.367	0.367	0.369	0.373	0.377	0.379
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.062	0.067	0.070	0.070	0.070	0.070	0.071	0.072	0.073	0.074
Assault	X85-Y09, Y87.1	0.032	0.035	0.036	0.036	0.036	0.036	0.037	0.037	0.038	0.038

Source: ALICE RAP, Del.6.1, p.186 (table 8.1.1.10).

Table 4.2.2 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Portugal – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.399	0.421	0.430	0.432	0.431	0.432	0.433	0.437	0.441	0.444
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.399	0.421	0.430	0.432	0.431	0.432	0.433	0.437	0.441	0.444
Oesophageal cancer	C15	0.231	0.248	0.254	0.256	0.256	0.256	0.257	0.260	0.263	0.266
Colorectal cancer	C18-C20	0.034	0.037	0.039	0.039	0.039	0.039	0.039	0.040	0.041	0.041
Cancer of the liver and intrahepatic bile ducts	C22	0.120	0.130	0.134	0.135	0.135	0.135	0.136	0.138	0.140	0.141
Laryngeal cancer	C32	0.249	0.266	0.273	0.275	0.274	0.274	0.276	0.279	0.283	0.285
Breast cancer	C50	0.157	0.169	0.174	0.175	0.175	0.175	0.176	0.179	0.181	0.183
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.252	0.269	0.276	0.278	0.277	0.278	0.279	0.282	0.286	0.288
Coronary heart disease	I20-25	-0.116	-0.128	-0.134	-0.135	-0.135	-0.135	-0.136	-0.138	-0.141	-0.143
Cardiac arrhythmias	I47, I48	0.269	0.287	0.294	0.296	0.296	0.296	0.298	0.301	0.304	0.307
Haemorrhagic stroke	I60-I62	0.170	0.183	0.189	0.190	0.190	0.190	0.191	0.193	0.196	0.198
Ischaemic stroke	I63-I66	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.007	0.007	0.007
Oesophageal varices	I85, I98.2	0.477	0.499	0.508	0.510	0.510	0.510	0.512	0.516	0.520	0.523
GASTROINTESTINAL, METABOLIC AND											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.474	0.496	0.505	0.507	0.507	0.507	0.509	0.513	0.517	0.520
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.488	0.510	0.519	0.521	0.521	0.521	0.523	0.527	0.531	0.534
Portal hypertension	K76.6	0.477	0.499	0.508	0.510	0.510	0.510	0.512	0.516	0.520	0.523
Cholelithiasis	K80	-0.019	-0.020	-0.021	-0.021	-0.021	-0.021	-0.021	-0.022	-0.022	-0.022
Acute and other chronic pancreatitis	K85, K86.1	0.194	0.208	0.214	0.216	0.215	0.216	0.217	0.219	0.222	0.224
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.257	0.274	0.281	0.283	0.283	0.283	0.284	0.288	0.291	0.294
Epilepsy and Status epilepticus	G40-G41	0.413	0.435	0.443	0.446	0.445	0.445	0.447	0.451	0.455	0.458
INJURIES											
Pedestrian traffic accidents	V01-V10	0.247	0.264	0.271	0.272	0.272	0.272	0.274	0.277	0.280	0.282
Road traffic accidents - non pedestrian	V11-V89	0.213	0.229	0.235	0.237	0.237	0.237	0.238	0.241	0.244	0.246
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.560	0.582	0.590	0.592	0.592	0.592	0.594	0.598	0.602	0.605
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.317	0.337	0.345	0.347	0.347	0.347	0.348	0.352	0.356	0.358
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.057	0.062	0.064	0.065	0.064	0.064	0.065	0.066	0.067	0.068
Assault	X85-Y09, Y87.1	0.029	0.032	0.033	0.033	0.033	0.033	0.034	0.034	0.035	0.035

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.2.3 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Portugal – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.376	0.397	0.406	0.408	0.407	0.408	0.409	0.413	0.417	0.420
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.376	0.397	0.406	0.408	0.407	0.408	0.409	0.413	0.417	0.420
Oesophageal cancer	C15	0.214	0.230	0.236	0.237	0.237	0.237	0.239	0.241	0.245	0.247
Colorectal cancer	C18-C20	0.031	0.034	0.035	0.036	0.035	0.035	0.036	0.036	0.037	0.037
Cancer of the liver and intrahepatic bile	C22	0.110	0.119	0.123	0.124	0.124	0.124	0.125	0.127	0.129	0.130

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
ducts											
Laryngeal cancer	C32	0.231	0.247	0.254	0.255	0.255	0.255	0.257	0.260	0.263	0.265
Breast cancer	C50	0.144	0.156	0.160	0.162	0.161	0.161	0.162	0.165	0.167	0.169
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.234	0.250	0.257	0.258	0.258	0.258	0.260	0.262	0.266	0.268
Coronary heart disease	I20-25	-0.104	-0.115	-0.120	-0.121	-0.121	-0.121	-0.122	-0.124	-0.126	-0.128
Cardiac arrhythmias	I47, I48	0.250	0.268	0.275	0.276	0.276	0.276	0.278	0.281	0.284	0.287
Haemorrhagic stroke	I60-I62	0.157	0.169	0.174	0.175	0.175	0.175	0.176	0.178	0.181	0.182
Ischaemic stroke	I63-I66	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Oesophageal varices	I85, I98.2	0.452	0.474	0.483	0.485	0.485	0.485	0.487	0.491	0.495	0.498
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.449	0.472	0.481	0.483	0.482	0.482	0.484	0.488	0.493	0.495
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.463	0.486	0.494	0.497	0.496	0.496	0.498	0.502	0.506	0.509
Portal hypertension	K76.6	0.452	0.474	0.483	0.485	0.485	0.485	0.487	0.491	0.495	0.498
Cholelithiasis	K80	-0.017	-0.018	-0.019	-0.019	-0.019	-0.019	-0.019	-0.020	-0.020	-0.020
Acute and other chronic pancreatitis	K85, K86.1	0.179	0.193	0.198	0.199	0.199	0.199	0.200	0.203	0.206	0.208
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.239	0.255	0.262	0.264	0.264	0.264	0.265	0.268	0.272	0.274
Epilepsy and Status epilepticus	G40-G41	0.389	0.411	0.419	0.421	0.421	0.421	0.423	0.427	0.431	0.434
INJURIES											
Pedestrian traffic accidents	V01-V10	0.229	0.245	0.251	0.253	0.253	0.253	0.254	0.257	0.261	0.263
Road traffic accidents - non pedestrian	V11-V89	0.196	0.211	0.217	0.218	0.218	0.218	0.220	0.222	0.225	0.227
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.536	0.558	0.567	0.569	0.568	0.569	0.570	0.574	0.578	0.581
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.296	0.315	0.323	0.325	0.324	0.324	0.326	0.329	0.333	0.336
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.052	0.056	0.058	0.059	0.059	0.059	0.059	0.060	0.061	0.062
Assault	X85-Y09, Y87.1	0.027	0.029	0.030	0.030	0.030	0.030	0.030	0.031	0.031	0.032

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.2.4 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Portugal – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.293	0.312	0.320	0.322	0.322	0.322	0.323	0.327	0.330	0.333
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.293	0.312	0.320	0.322	0.322	0.322	0.323	0.327	0.330	0.333
Oesophageal cancer	C15	0.158	0.170	0.175	0.177	0.176	0.177	0.178	0.180	0.182	0.184
Colorectal cancer	C18-C20	0.022	0.024	0.025	0.025	0.025	0.025	0.025	0.025	0.026	0.026
Cancer of the liver and intrahepatic bile ducts	C22	0.079	0.086	0.089	0.089	0.089	0.089	0.090	0.091	0.092	0.093
Laryngeal cancer	C32	0.171	0.184	0.190	0.191	0.191	0.191	0.192	0.194	0.197	0.199
Breast cancer	C50	0.104	0.113	0.116	0.117	0.117	0.117	0.118	0.120	0.121	0.123
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.173	0.187	0.192	0.193	0.193	0.193	0.194	0.197	0.200	0.201
Coronary heart disease	I20-25	-0.070	-0.078	-0.081	-0.081	-0.081	-0.081	-0.082	-0.083	-0.085	-0.086
Cardiac arrhythmias	I47, I48	0.188	0.202	0.208	0.209	0.209	0.209	0.210	0.213	0.216	0.218
Haemorrhagic stroke	I60-I62	0.112	0.121	0.125	0.126	0.126	0.126	0.127	0.129	0.131	0.132
Ischaemic stroke	I63-I66	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oesophageal varices	I85, I98.2	0.362	0.383	0.391	0.394	0.393	0.393	0.395	0.399	0.403	0.406
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.360	0.380	0.389	0.391	0.391	0.391	0.392	0.396	0.400	0.403
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.372	0.393	0.401	0.403	0.403	0.403	0.405	0.408	0.413	0.415
Portal hypertension	K76.6	0.362	0.383	0.391	0.394	0.393	0.393	0.395	0.399	0.403	0.406
Cholelithiasis	K80	-0.011	-0.012	-0.013	-0.013	-0.013	-0.013	-0.013	-0.013	-0.013	-0.014
Acute and other chronic pancreatitis	K85, K86.1	0.130	0.141	0.145	0.146	0.146	0.146	0.147	0.149	0.151	0.153
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.179	0.192	0.198	0.199	0.199	0.199	0.200	0.203	0.206	0.208
Epilepsy and Status epilepticus	G40-G41	0.305	0.324	0.332	0.334	0.334	0.334	0.335	0.339	0.343	0.345
INJURIES											
Pedestrian traffic accidents	V01-V10	0.169	0.182	0.187	0.189	0.188	0.188	0.190	0.192	0.195	0.197

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Road traffic accidents - non pedestrian	V11-V89	0.141	0.152	0.157	0.158	0.158	0.158	0.159	0.161	0.163	0.165
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.445	0.467	0.476	0.478	0.478	0.478	0.480	0.484	0.488	0.491
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.224	0.240	0.246	0.248	0.248	0.248	0.249	0.252	0.256	0.258
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.036	0.039	0.041	0.041	0.041	0.041	0.041	0.042	0.043	0.043
Assault	X85-Y09, Y87.1	0.018	0.020	0.021	0.021	0.021	0.021	0.021	0.021	0.022	0.022

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.2.5 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Portugal – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.366	0.361	0.364	0.369	0.373	0.372	0.366	0.353	0.334	0.311
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.366	0.361	0.364	0.369	0.373	0.372	0.366	0.353	0.334	0.311
Oesophageal cancer	C15	0.207	0.203	0.205	0.209	0.212	0.212	0.207	0.198	0.185	0.170
Colorectal cancer	C18-C20	0.030	0.029	0.030	0.030	0.031	0.031	0.030	0.028	0.026	0.023
Cancer of the liver and intrahepatic bile ducts	C22	0.106	0.104	0.105	0.107	0.109	0.109	0.106	0.101	0.093	0.085
Laryngeal cancer	C32	0.223	0.219	0.222	0.226	0.229	0.228	0.223	0.214	0.200	0.184
Breast cancer	C50	0.139	0.136	0.138	0.141	0.143	0.142	0.139	0.132	0.123	0.112
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.226	0.222	0.224	0.228	0.231	0.231	0.226	0.216	0.202	0.186
Coronary heart disease	I20-25	-0.098	-0.095	-0.097	-0.099	-0.101	-0.101	-0.098	-0.092	-0.084	-0.075
Cardiac arrhythmias	I47, I48	0.242	0.238	0.240	0.244	0.247	0.247	0.242	0.231	0.217	0.199
Haemorrhagic stroke	I60-I62	0.153	0.150	0.151	0.154	0.156	0.156	0.152	0.145	0.135	0.123
Ischaemic stroke	I63-I66	0.007	0.007	0.007	0.007	0.008	0.008	0.007	0.007	0.006	0.006
Oesophageal varices	I85, I98.2	0.447	0.441	0.444	0.450	0.454	0.453	0.446	0.433	0.412	0.387
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Mallory-Weiss syndrome	K22.6	0.444	0.438	0.441	0.447	0.451	0.451	0.444	0.430	0.410	0.384
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.458	0.452	0.456	0.461	0.465	0.465	0.458	0.444	0.423	0.398
Portal hypertension	K76.6	0.447	0.441	0.444	0.450	0.454	0.453	0.446	0.433	0.412	0.387
Cholelithiasis	K80	-0.017	-0.016	-0.016	-0.017	-0.017	-0.017	-0.017	-0.016	-0.014	-0.013
Acute and other chronic pancreatitis	K85, K86.1	0.173	0.170	0.171	0.175	0.177	0.177	0.173	0.165	0.154	0.140
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.229	0.225	0.227	0.232	0.234	0.234	0.229	0.219	0.205	0.189
Spontaneous abortion	O03	0.129	0.126	0.127	0.130	0.132	0.132	0.129	0.122	0.114	0.103
Epilepsy and Status epilepticus	G40-G41	0.384	0.378	0.381	0.387	0.391	0.390	0.383	0.370	0.351	0.327
INJURIES											
Pedestrian traffic accidents	V01-V10	0.114	0.112	0.113	0.115	0.117	0.117	0.114	0.108	0.101	0.091
Road traffic accidents - non pedestrian	V11-V89	0.218	0.214	0.216	0.220	0.223	0.223	0.218	0.208	0.195	0.179
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.522	0.517	0.520	0.526	0.530	0.529	0.522	0.508	0.487	0.461
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.247	0.243	0.245	0.250	0.253	0.252	0.247	0.237	0.222	0.204
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.061	0.060	0.061	0.062	0.063	0.063	0.061	0.058	0.054	0.048
Assault	X85-Y09, Y87.1	0.037	0.036	0.037	0.037	0.038	0.038	0.037	0.035	0.032	0.029

Source: ALICE RAP, Del.6.1, p.187 (table 8.1.1.11).

Table 4.2.6 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Portugal – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.345	0.340	0.343	0.348	0.352	0.352	0.345	0.333	0.314	0.292
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.345	0.340	0.343	0.348	0.352	0.352	0.345	0.333	0.314	0.292
Oesophageal cancer	C15	0.193	0.189	0.191	0.195	0.197	0.197	0.193	0.184	0.172	0.157
Colorectal cancer	C18-C20	0.027	0.027	0.027	0.028	0.028	0.028	0.027	0.026	0.024	0.022
Cancer of the liver and intrahepatic bile	C22	0.098	0.096	0.097	0.099	0.100	0.100	0.098	0.093	0.086	0.078

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
ducts											
Laryngeal cancer	C32	0.208	0.204	0.207	0.210	0.213	0.213	0.208	0.199	0.186	0.170
Breast cancer	C50	0.129	0.126	0.127	0.130	0.132	0.132	0.129	0.122	0.114	0.103
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.211	0.207	0.209	0.213	0.216	0.215	0.211	0.202	0.188	0.173
Coronary heart disease	I20-25	-0.089	-0.087	-0.088	-0.090	-0.092	-0.092	-0.089	-0.084	-0.076	-0.068
Cardiac arrhythmias	I47, I48	0.226	0.222	0.224	0.228	0.231	0.231	0.226	0.216	0.202	0.186
Haemorrhagic stroke	I60-I62	0.141	0.138	0.140	0.143	0.145	0.144	0.141	0.134	0.125	0.114
Ischaemic stroke	I63-I66	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.005
Oesophageal varices	I85, I98.2	0.425	0.419	0.422	0.428	0.432	0.431	0.424	0.411	0.391	0.366
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.422	0.416	0.419	0.425	0.429	0.429	0.422	0.408	0.388	0.363
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.436	0.430	0.433	0.439	0.443	0.442	0.436	0.422	0.401	0.376
Portal hypertension	K76.6	0.425	0.419	0.422	0.428	0.432	0.431	0.424	0.411	0.391	0.366
Cholelithiasis	K80	-0.015	-0.015	-0.015	-0.015	-0.016	-0.015	-0.015	-0.014	-0.013	-0.012
Acute and other chronic pancreatitis	K85, K86.1	0.161	0.157	0.159	0.162	0.165	0.164	0.160	0.153	0.142	0.130
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.214	0.210	0.212	0.216	0.219	0.219	0.214	0.205	0.191	0.176
Spontaneous abortion	O03	0.119	0.117	0.118	0.120	0.122	0.122	0.119	0.113	0.105	0.095
Epilepsy and Status epilepticus	G40-G41	0.363	0.357	0.360	0.366	0.369	0.369	0.362	0.350	0.331	0.308
INJURIES											
Pedestrian traffic accidents	V01-V10	0.105	0.103	0.104	0.106	0.108	0.108	0.105	0.100	0.093	0.084
Road traffic accidents - non pedestrian	V11-V89	0.202	0.199	0.201	0.204	0.207	0.207	0.202	0.193	0.180	0.165
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.500	0.495	0.498	0.504	0.508	0.507	0.500	0.486	0.465	0.439
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.231	0.227	0.229	0.233	0.236	0.236	0.231	0.221	0.207	0.190
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.056	0.055	0.056	0.057	0.058	0.058	0.056	0.053	0.049	0.044

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Assault	X85-Y09, Y87.1	0.034	0.033	0.033	0.034	0.035	0.035	0.034	0.032	0.029	0.027

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.2.7 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Portugal – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.324	0.319	0.321	0.327	0.330	0.330	0.324	0.311	0.294	0.272
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.324	0.319	0.321	0.327	0.330	0.330	0.324	0.311	0.294	0.272
Oesophageal cancer	C15	0.178	0.175	0.176	0.180	0.182	0.182	0.178	0.170	0.158	0.145
Colorectal cancer	C18-C20	0.025	0.024	0.025	0.025	0.026	0.026	0.025	0.024	0.022	0.020
Cancer of the liver and intrahepatic bile ducts	C22	0.090	0.088	0.089	0.091	0.092	0.092	0.090	0.085	0.079	0.071
Laryngeal cancer	C32	0.193	0.189	0.191	0.195	0.197	0.197	0.192	0.184	0.172	0.157
Breast cancer	C50	0.118	0.116	0.117	0.119	0.121	0.121	0.118	0.112	0.104	0.095
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.195	0.191	0.193	0.197	0.200	0.199	0.195	0.186	0.174	0.159
Coronary heart disease	I20-25	-0.080	-0.078	-0.079	-0.081	-0.083	-0.083	-0.080	-0.075	-0.069	-0.062
Cardiac arrhythmias	I47, I48	0.209	0.206	0.208	0.212	0.214	0.214	0.209	0.200	0.187	0.171
Haemorrhagic stroke	I60-I62	0.129	0.127	0.128	0.131	0.133	0.132	0.129	0.123	0.114	0.104
Ischaemic stroke	I63-I66	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004
Oesophageal varices	I85, I98.2	0.401	0.395	0.398	0.404	0.408	0.407	0.400	0.387	0.367	0.343
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.398	0.392	0.395	0.401	0.405	0.405	0.398	0.384	0.365	0.341
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.411	0.406	0.409	0.415	0.418	0.418	0.411	0.398	0.378	0.353
Portal hypertension	K76.6	0.401	0.395	0.398	0.404	0.408	0.407	0.400	0.387	0.367	0.343
Cholelithiasis	K80	-0.014	-0.013	-0.013	-0.014	-0.014	-0.014	-0.014	-0.013	-0.012	-0.011
Acute and other chronic pancreatitis	K85, K86.1	0.148	0.145	0.146	0.149	0.151	0.151	0.148	0.141	0.131	0.119
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.198	0.195	0.197	0.200	0.203	0.203	0.198	0.189	0.177	0.162

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Spontaneous abortion	O03	0.109	0.107	0.108	0.110	0.112	0.112	0.109	0.104	0.096	0.087
Epilepsy and Status epilepticus	G40-G41	0.340	0.335	0.338	0.343	0.347	0.346	0.340	0.327	0.309	0.287
INJURIES											
Pedestrian traffic accidents	V01-V10	0.096	0.094	0.095	0.097	0.099	0.099	0.096	0.091	0.085	0.077
Road traffic accidents - non pedestrian	V11-V89	0.186	0.183	0.185	0.188	0.191	0.190	0.186	0.178	0.166	0.152
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.476	0.471	0.474	0.480	0.484	0.483	0.476	0.462	0.441	0.416
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.214	0.210	0.212	0.216	0.219	0.218	0.213	0.204	0.191	0.175
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.051	0.050	0.051	0.052	0.053	0.052	0.051	0.048	0.045	0.040
Assault	X85-Y09, Y87.1	0.031	0.030	0.030	0.031	0.032	0.032	0.031	0.029	0.027	0.024

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.2.8 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Portugal – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.248	0.244	0.246	0.251	0.254	0.254	0.248	0.238	0.223	0.205
Cancer of the oral cavity and pharynx	C01-C06, C09-10, C12-14	0.248	0.244	0.246	0.251	0.254	0.254	0.248	0.238	0.223	0.205
Oesophageal cancer	C15	0.130	0.127	0.129	0.132	0.133	0.133	0.130	0.124	0.115	0.105
Colorectal cancer	C18-C20	0.017	0.017	0.017	0.018	0.018	0.018	0.017	0.016	0.015	0.014
Cancer of the liver and intrahepatic bile ducts	C22	0.064	0.062	0.063	0.065	0.066	0.065	0.064	0.060	0.056	0.051
Laryngeal cancer	C32	0.141	0.139	0.140	0.143	0.145	0.145	0.141	0.135	0.125	0.114
Breast cancer	C50	0.085	0.083	0.084	0.086	0.087	0.087	0.085	0.080	0.074	0.067
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.143	0.140	0.142	0.145	0.147	0.146	0.143	0.136	0.127	0.115
Coronary heart disease	I20-25	-0.055	-0.054	-0.054	-0.056	-0.057	-0.056	-0.055	-0.052	-0.047	-0.042
Cardiac arrhythmias	I47, I48	0.155	0.152	0.154	0.157	0.159	0.159	0.155	0.148	0.138	0.126

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Haemorrhagic stroke	I60-I62	0.092	0.090	0.091	0.093	0.094	0.094	0.092	0.087	0.081	0.073
Ischaemic stroke	I63-I66	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Oesophageal varices	I85, I98.2	0.315	0.310	0.313	0.318	0.321	0.321	0.315	0.303	0.285	0.264
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.313	0.308	0.310	0.315	0.319	0.319	0.313	0.301	0.283	0.262
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.324	0.319	0.322	0.327	0.330	0.330	0.324	0.312	0.294	0.272
Portal hypertension	K76.6	0.315	0.310	0.313	0.318	0.321	0.321	0.315	0.303	0.285	0.264
Cholelithiasis	K80	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	-0.009	-0.008	-0.007
Acute and other chronic pancreatitis	K85, K86.1	0.107	0.105	0.106	0.108	0.110	0.109	0.107	0.101	0.094	0.085
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.147	0.144	0.146	0.149	0.151	0.151	0.147	0.140	0.130	0.119
Spontaneous abortion	O03	0.078	0.077	0.078	0.079	0.081	0.080	0.078	0.074	0.069	0.062
Epilepsy and Status epilepticus	G40-G41	0.262	0.258	0.260	0.265	0.268	0.267	0.262	0.251	0.236	0.217
INJURIES											
Pedestrian traffic accidents	V01-V10	0.068	0.067	0.067	0.069	0.070	0.070	0.068	0.065	0.060	0.054
Road traffic accidents - non pedestrian	V11-V89	0.133	0.131	0.132	0.135	0.137	0.136	0.133	0.127	0.118	0.107
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94 W00-W19 W24-W31, W45	0.388	0.383	0.386	0.391	0.395	0.395	0.388	0.375	0.355	0.331
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.157	0.154	0.156	0.159	0.161	0.161	0.157	0.150	0.139	0.127
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.036	0.035	0.035	0.036	0.037	0.037	0.036	0.034	0.031	0.028
Assault	X85-Y09, Y87.1	0.021	0.021	0.021	0.022	0.022	0.022	0.021	0.020	0.019	0.017

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

4.2.2 Smoking

Table 4.2.9 Attributable fractions for causes of death partially attributable to smoking according to age, men, Portugal – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.753	0.789	0.804	0.808	0.804	0.793	0.774	0.749	0.718	0.682
Esophagus	C15	0.690	0.724	0.740	0.743	0.739	0.728	0.710	0.686	0.659	0.629
Stomach	C16	0.258	0.293	0.310	0.315	0.310	0.297	0.278	0.255	0.230	0.206
Pancreas	C25	0.269	0.315	0.337	0.343	0.336	0.320	0.295	0.265	0.231	0.198
Larynx	C32	0.823	0.848	0.859	0.862	0.859	0.851	0.838	0.820	0.798	0.772
Trachea, lung, bronchus	C33, C34	0.881	0.899	0.907	0.909	0.907	0.901	0.892	0.879	0.862	0.842
Urinary bladder	C67	0.450	0.494	0.514	0.520	0.514	0.498	0.475	0.446	0.412	0.378
Kidney and renal pelvis	C64, C65	0.375	0.418	0.439	0.444	0.438	0.423	0.399	0.370	0.338	0.306
Acute myeloid leukemia	C92.0	0.226	0.260	0.277	0.282	0.277	0.264	0.245	0.223	0.198	0.175
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.266	0.300	0.318	0.322	0.317	0.304	0.286	0.263	0.239	0.215
Ischemic heart disease	I25	0.375	0.420	0.442	0.448	0.441	0.425	0.401	0.371	0.336	0.303
Other heart disease	I00-I52 excl.I10, I25	0.198	0.232	0.248	0.253	0.248	0.235	0.217	0.195	0.172	0.149
Cerebrovascular disease	I67	0.371	0.428	0.454	0.461	0.453	0.434	0.404	0.365	0.321	0.276
Atherosclerosis	I70	0.306	0.351	0.373	0.378	0.372	0.356	0.331	0.301	0.268	0.235
Aortic aneurysm	I71	0.641	0.682	0.700	0.705	0.700	0.686	0.665	0.636	0.602	0.566
Other arterial disease	I72-I79	0.216	0.260	0.281	0.286	0.280	0.264	0.241	0.212	0.181	0.151
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.213	0.244	0.259	0.263	0.259	0.247	0.230	0.210	0.188	0.167
Bronchitis, emphysema	J20, J43	0.879	0.894	0.900	0.902	0.900	0.895	0.888	0.878	0.866	0.853
Chronic airways obstruction	J44.9	0.788	0.814	0.826	0.828	0.825	0.817	0.803	0.785	0.763	0.739
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: ALICE RAP, Del.6.1, p.189 (table 8.1.1.13).

Table 4.2.10 Attributable fractions for causes of death partially attributable to smoking according to age, men, Portugal – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.733	0.771	0.787	0.791	0.787	0.775	0.756	0.729	0.696	0.659
Esophagus	C15	0.667	0.703	0.719	0.723	0.718	0.706	0.688	0.663	0.634	0.604
Stomach	C16	0.238	0.272	0.288	0.293	0.288	0.275	0.257	0.235	0.212	0.189
Pancreas	C25	0.249	0.292	0.314	0.319	0.313	0.297	0.274	0.245	0.213	0.182
Larynx	C32	0.807	0.834	0.846	0.849	0.845	0.837	0.823	0.804	0.780	0.753
Trachea, lung, bronchus	C33, C34	0.869	0.889	0.898	0.900	0.897	0.891	0.881	0.867	0.849	0.827
Urinary bladder	C67	0.424	0.467	0.488	0.494	0.487	0.472	0.449	0.420	0.387	0.354
Kidney and renal pelvis	C64, C65	0.350	0.393	0.413	0.418	0.412	0.397	0.374	0.346	0.315	0.284
Acute myeloid leukemia	C92.0	0.208	0.240	0.257	0.261	0.256	0.244	0.226	0.205	0.182	0.161
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.246	0.279	0.295	0.299	0.295	0.282	0.265	0.243	0.220	0.198
Ischemic heart disease	I25	0.351	0.395	0.416	0.422	0.415	0.400	0.376	0.346	0.313	0.281
Other heart disease	I00-I52 excl.I10, I25	0.182	0.213	0.229	0.234	0.229	0.217	0.200	0.179	0.157	0.137
Cerebrovascular disease	I67	0.347	0.402	0.428	0.435	0.427	0.408	0.379	0.341	0.299	0.255
Atherosclerosis	I70	0.284	0.327	0.348	0.354	0.348	0.332	0.309	0.280	0.248	0.217
Aortic aneurysm	I71	0.616	0.659	0.678	0.683	0.677	0.663	0.641	0.612	0.577	0.540
Other arterial disease	I72-I79	0.199	0.240	0.260	0.265	0.259	0.244	0.222	0.195	0.166	0.138
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.196	0.225	0.240	0.244	0.239	0.228	0.212	0.193	0.172	0.153
Bronchitis, emphysema	J20, J43	0.868	0.883	0.890	0.892	0.890	0.885	0.877	0.866	0.853	0.840
Chronic airways obstruction	J44.9	0.770	0.798	0.810	0.813	0.809	0.800	0.786	0.767	0.743	0.718
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.2.11 Attributable fractions for causes of death partially attributable to smoking according to age, men, Portugal – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.710	0.749	0.767	0.771	0.766	0.753	0.733	0.705	0.671	0.632
Esophagus	C15	0.640	0.677	0.694	0.699	0.694	0.681	0.662	0.637	0.607	0.576
Stomach	C16	0.218	0.249	0.265	0.269	0.264	0.252	0.235	0.215	0.193	0.172
Pancreas	C25	0.227	0.269	0.289	0.294	0.288	0.273	0.251	0.224	0.194	0.165
Larynx	C32	0.788	0.817	0.830	0.833	0.829	0.820	0.805	0.785	0.759	0.731
Trachea, lung, bronchus	C33, C34	0.855	0.877	0.886	0.889	0.886	0.879	0.868	0.853	0.833	0.810
Urinary bladder	C67	0.395	0.438	0.459	0.464	0.458	0.443	0.420	0.391	0.359	0.328
Kidney and renal pelvis	C64, C65	0.324	0.365	0.385	0.390	0.384	0.369	0.347	0.320	0.290	0.261
Acute myeloid leukemia	C92.0	0.189	0.219	0.235	0.239	0.234	0.223	0.206	0.186	0.165	0.145
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.225	0.256	0.271	0.275	0.271	0.259	0.242	0.222	0.201	0.180
Ischemic heart disease	I25	0.324	0.367	0.388	0.393	0.387	0.372	0.349	0.320	0.289	0.258
Other heart disease	I00-I52 excl.I10, I25	0.165	0.194	0.209	0.213	0.209	0.198	0.182	0.163	0.142	0.123
Cerebrovascular disease	I67	0.321	0.374	0.400	0.406	0.399	0.380	0.352	0.315	0.275	0.234
Atherosclerosis	I70	0.261	0.302	0.322	0.327	0.321	0.306	0.284	0.257	0.227	0.198
Aortic aneurysm	I71	0.588	0.632	0.652	0.657	0.651	0.636	0.613	0.583	0.548	0.511
Other arterial disease	I72-I79	0.181	0.219	0.238	0.243	0.237	0.223	0.203	0.177	0.150	0.125
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.178	0.205	0.219	0.223	0.218	0.208	0.193	0.175	0.156	0.139
Bronchitis, emphysema	J20, J43	0.854	0.871	0.878	0.880	0.878	0.872	0.864	0.852	0.838	0.823
Chronic airways obstruction	J44.9	0.748	0.778	0.791	0.794	0.791	0.781	0.765	0.745	0.720	0.694
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.2.12 Attributable fractions for causes of death partially attributable to smoking according to age, men, Portugal – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.604	0.652	0.673	0.678	0.672	0.656	0.632	0.599	0.560	0.517
Esophagus	C15	0.527	0.568	0.587	0.592	0.586	0.572	0.550	0.523	0.491	0.459
Stomach	C16	0.148	0.172	0.184	0.187	0.183	0.174	0.161	0.146	0.130	0.115
Pancreas	C25	0.155	0.187	0.202	0.207	0.202	0.190	0.173	0.153	0.131	0.110
Larynx	C32	0.699	0.736	0.753	0.757	0.752	0.740	0.721	0.695	0.663	0.629
Trachea, lung, bronchus	C33, C34	0.787	0.817	0.830	0.833	0.829	0.820	0.804	0.783	0.757	0.727
Urinary bladder	C67	0.290	0.328	0.346	0.351	0.346	0.332	0.312	0.287	0.259	0.233
Kidney and renal pelvis	C64, C65	0.230	0.264	0.281	0.286	0.281	0.268	0.250	0.227	0.203	0.181
Acute myeloid leukemia	C92.0	0.127	0.149	0.161	0.164	0.161	0.152	0.140	0.125	0.110	0.096
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.154	0.177	0.189	0.192	0.188	0.179	0.167	0.151	0.136	0.121
Ischemic heart disease	I25	0.231	0.266	0.284	0.288	0.283	0.270	0.251	0.227	0.202	0.178
Other heart disease	I00-I52 excl.I10, I25	0.110	0.131	0.142	0.145	0.141	0.133	0.122	0.108	0.094	0.081
Cerebrovascular disease	I67	0.228	0.272	0.294	0.300	0.293	0.277	0.253	0.224	0.191	0.160
Atherosclerosis	I70	0.180	0.213	0.229	0.233	0.228	0.216	0.199	0.177	0.155	0.133
Aortic aneurysm	I71	0.471	0.517	0.539	0.545	0.538	0.522	0.498	0.467	0.431	0.395
Other arterial disease	I72-I79	0.121	0.149	0.163	0.167	0.163	0.152	0.137	0.119	0.100	0.082
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.119	0.139	0.149	0.152	0.149	0.141	0.130	0.117	0.104	0.091
Bronchitis, emphysema	J20, J43	0.785	0.808	0.818	0.821	0.818	0.810	0.798	0.783	0.764	0.744
Chronic airways obstruction	J44.9	0.650	0.686	0.703	0.707	0.702	0.690	0.671	0.646	0.617	0.586
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.2.13 Attributable fractions for causes of death partially attributable to smoking according to age, women, Portugal – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.385	0.419	0.433	0.431	0.418	0.394	0.361	0.320	0.272	0.223
Esophagus	C15	0.502	0.538	0.552	0.551	0.537	0.512	0.476	0.428	0.371	0.308
Stomach	C16	0.068	0.075	0.078	0.078	0.075	0.069	0.063	0.055	0.048	0.041
Pancreas	C25	0.170	0.190	0.198	0.197	0.189	0.175	0.157	0.136	0.113	0.091
Larynx	C32	0.652	0.683	0.695	0.694	0.682	0.661	0.629	0.586	0.531	0.466
Trachea, lung, bronchus	C33, C34	0.640	0.672	0.685	0.684	0.672	0.649	0.616	0.572	0.514	0.447
Cervix uteri	C53	0.080	0.091	0.096	0.096	0.091	0.083	0.072	0.060	0.048	0.036
Urinary bladder	C67	0.186	0.205	0.213	0.212	0.204	0.191	0.174	0.154	0.133	0.113
Kidney and renal pelvis	C64, C65	0.039	0.046	0.048	0.048	0.045	0.041	0.035	0.029	0.023	0.017
Acute myeloid leukemia	C92.0	0.046	0.049	0.050	0.050	0.049	0.047	0.044	0.041	0.039	0.036
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.158	0.176	0.184	0.183	0.175	0.163	0.146	0.126	0.106	0.086
Ischemic heart disease	I25	0.225	0.253	0.265	0.264	0.253	0.233	0.207	0.175	0.140	0.106
Other heart disease	I00-I52 excl.I10, I25	0.069	0.079	0.083	0.082	0.078	0.071	0.063	0.052	0.042	0.032
Cerebrovascular disease	I67	0.289	0.323	0.336	0.335	0.322	0.298	0.266	0.226	0.181	0.135
Atherosclerosis	I70	0.095	0.111	0.118	0.117	0.111	0.100	0.085	0.069	0.052	0.035
Aortic aneurysm	I71	0.462	0.501	0.515	0.514	0.500	0.473	0.435	0.386	0.327	0.262
Other arterial disease	I72-I79	0.137	0.157	0.165	0.164	0.156	0.142	0.124	0.102	0.080	0.058
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.136	0.156	0.164	0.163	0.155	0.141	0.123	0.101	0.078	0.056
Bronchitis, emphysema	J20, J43	0.697	0.719	0.727	0.727	0.718	0.703	0.681	0.653	0.618	0.580
Chronic airways obstruction	J44.9	0.668	0.697	0.708	0.707	0.696	0.677	0.648	0.609	0.560	0.503
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: ALICE RAP, Del.6.1, p.190 (table 8.1.1.14).

Table 4.2.14 Attributable fractions for causes of death partially attributable to smoking according to age, women, Portugal – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.360	0.394	0.407	0.406	0.393	0.370	0.337	0.297	0.252	0.205
Esophagus	C15	0.475	0.512	0.526	0.525	0.511	0.486	0.450	0.403	0.347	0.286
Stomach	C16	0.061	0.068	0.071	0.070	0.068	0.063	0.057	0.050	0.043	0.037
Pancreas	C25	0.156	0.174	0.182	0.181	0.173	0.161	0.144	0.124	0.103	0.083
Larynx	C32	0.628	0.660	0.672	0.671	0.659	0.637	0.604	0.560	0.505	0.440
Trachea, lung, bronchus	C33, C34	0.616	0.649	0.661	0.660	0.648	0.625	0.591	0.546	0.488	0.421
Cervix uteri	C53	0.072	0.083	0.087	0.087	0.083	0.075	0.066	0.055	0.043	0.033
Urinary bladder	C67	0.171	0.188	0.195	0.195	0.188	0.176	0.160	0.141	0.122	0.103
Kidney and renal pelvis	C64, C65	0.036	0.041	0.044	0.043	0.041	0.037	0.032	0.026	0.020	0.015
Acute myeloid leukemia	C92.0	0.042	0.044	0.045	0.045	0.044	0.042	0.040	0.037	0.035	0.033
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.144	0.161	0.168	0.168	0.161	0.149	0.133	0.115	0.096	0.078
Ischemic heart disease	I25	0.208	0.234	0.245	0.244	0.233	0.215	0.190	0.160	0.128	0.096
Other heart disease	I00-I52 excl.I10, I25	0.062	0.071	0.075	0.075	0.071	0.065	0.057	0.047	0.038	0.029
Cerebrovascular disease	I67	0.268	0.300	0.313	0.312	0.299	0.277	0.246	0.208	0.166	0.124
Atherosclerosis	I70	0.087	0.101	0.107	0.107	0.101	0.091	0.077	0.062	0.047	0.032
Aortic aneurysm	I71	0.436	0.474	0.489	0.488	0.473	0.447	0.410	0.362	0.304	0.242
Other arterial disease	I72-I79	0.125	0.143	0.151	0.150	0.143	0.130	0.113	0.093	0.072	0.052
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.124	0.142	0.150	0.149	0.142	0.129	0.112	0.092	0.071	0.051
Bronchitis, emphysema	J20, J43	0.674	0.697	0.706	0.705	0.697	0.681	0.658	0.628	0.593	0.554
Chronic airways obstruction	J44.9	0.645	0.674	0.685	0.684	0.673	0.653	0.623	0.583	0.534	0.477
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.2.15 Attributable fractions for causes of death partially attributable to smoking according to age, women, Portugal – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.334	0.366	0.379	0.378	0.365	0.343	0.312	0.273	0.231	0.186
Esophagus	C15	0.446	0.482	0.497	0.495	0.481	0.456	0.421	0.375	0.321	0.263
Stomach	C16	0.055	0.061	0.063	0.063	0.061	0.056	0.051	0.045	0.039	0.033
Pancreas	C25	0.141	0.158	0.165	0.164	0.157	0.145	0.130	0.112	0.093	0.075
Larynx	C32	0.600	0.633	0.646	0.644	0.632	0.609	0.576	0.531	0.475	0.412
Trachea, lung, bronchus	C33, C34	0.587	0.621	0.635	0.633	0.621	0.597	0.563	0.516	0.459	0.392
Cervix uteri	C53	0.065	0.074	0.078	0.078	0.074	0.067	0.059	0.049	0.039	0.029
Urinary bladder	C67	0.155	0.171	0.178	0.177	0.170	0.159	0.145	0.127	0.110	0.093
Kidney and renal pelvis	C64, C65	0.032	0.037	0.039	0.039	0.037	0.033	0.029	0.023	0.018	0.013
Acute myeloid leukemia	C92.0	0.037	0.039	0.040	0.040	0.039	0.038	0.036	0.033	0.031	0.029
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.130	0.146	0.152	0.152	0.145	0.135	0.120	0.104	0.086	0.070
Ischemic heart disease	I25	0.189	0.214	0.224	0.223	0.213	0.196	0.172	0.145	0.115	0.086
Other heart disease	I00-I52 excl.I10, I25	0.056	0.064	0.067	0.067	0.064	0.058	0.051	0.042	0.034	0.026
Cerebrovascular disease	I67	0.245	0.276	0.288	0.287	0.275	0.254	0.225	0.189	0.150	0.111
Atherosclerosis	I70	0.078	0.091	0.096	0.096	0.090	0.081	0.069	0.056	0.042	0.028
Aortic aneurysm	I71	0.408	0.445	0.460	0.458	0.444	0.418	0.382	0.335	0.280	0.221
Other arterial disease	I72-I79	0.113	0.130	0.137	0.136	0.129	0.117	0.102	0.084	0.065	0.047
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.112	0.129	0.136	0.135	0.128	0.116	0.101	0.083	0.064	0.046
Bronchitis, emphysema	J20, J43	0.648	0.672	0.681	0.680	0.671	0.655	0.631	0.601	0.564	0.525
Chronic airways obstruction	J44.9	0.617	0.648	0.659	0.658	0.647	0.626	0.595	0.555	0.504	0.447
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.2.16 Attributable fractions for causes of death partially attributable to smoking according to age, women, Portugal – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip, oral cavity, pharynx	C00, C01-C06, C09-C10, C12-C14	0.238	0.265	0.276	0.275	0.264	0.246	0.221	0.190	0.158	0.125
Esophagus	C15	0.335	0.368	0.381	0.380	0.367	0.344	0.312	0.273	0.228	0.182
Stomach	C16	0.035	0.039	0.041	0.040	0.039	0.036	0.032	0.029	0.024	0.021
Pancreas	C25	0.093	0.105	0.110	0.109	0.104	0.096	0.085	0.073	0.060	0.048
Larynx	C32	0.484	0.519	0.532	0.531	0.518	0.494	0.459	0.415	0.362	0.304
Trachea, lung, bronchus	C33, C34	0.471	0.506	0.520	0.519	0.506	0.481	0.446	0.400	0.346	0.288
Cervix uteri	C53	0.042	0.048	0.051	0.050	0.048	0.043	0.038	0.031	0.025	0.018
Urinary bladder	C67	0.103	0.114	0.119	0.118	0.114	0.106	0.095	0.084	0.071	0.060
Kidney and renal pelvis	C64, C65	0.020	0.023	0.025	0.025	0.023	0.021	0.018	0.015	0.011	0.008
Acute myeloid leukemia	C92.0	0.024	0.025	0.026	0.026	0.025	0.024	0.023	0.021	0.020	0.018
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.086	0.096	0.101	0.101	0.096	0.089	0.079	0.067	0.056	0.045
Ischemic heart disease	I25	0.127	0.145	0.153	0.152	0.145	0.132	0.115	0.096	0.075	0.056
Other heart disease	I00-I52 excl.I10, I25	0.036	0.041	0.043	0.043	0.041	0.037	0.032	0.027	0.021	0.016
Cerebrovascular disease	I67	0.169	0.192	0.202	0.201	0.192	0.175	0.153	0.127	0.100	0.073
Atherosclerosis	I70	0.050	0.059	0.062	0.062	0.059	0.052	0.045	0.036	0.026	0.018
Aortic aneurysm	I71	0.301	0.334	0.347	0.346	0.333	0.310	0.278	0.239	0.196	0.151
Other arterial disease	I72-I79	0.074	0.085	0.090	0.090	0.085	0.077	0.066	0.054	0.041	0.030
RESPIRATORY DISEASES											
Pneumonia, influenza	J10-J18	0.073	0.084	0.089	0.089	0.084	0.076	0.065	0.053	0.041	0.029
Bronchitis, emphysema	J20, J43	0.535	0.561	0.572	0.571	0.561	0.542	0.517	0.484	0.447	0.409
Chronic airways obstruction	J44.9	0.502	0.535	0.548	0.546	0.534	0.511	0.479	0.438	0.389	0.336
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005]. List of causes of deaths and ICD 10 codes after [Assessment …2011].

4.2.3 Drugs

Table 4.2.17 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Portugal – 0% reduction of exposure[7]

CAUSES OF DEATH	ICD10 CODES	GENDER	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis	B17.1, B18.2, B16, B18.0	MEN	0.803	0.814	0.808	0.783	0.722	0.633	0.513	0.372	0.254	0.228
		WOMEN	0.724	0.644	0.541	0.419	0.306	0.253	0.291	0.397	0.000	0.000

Source: author's own.

Table 4.2.18 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Portugal – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	GENDER	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis	B17.1, B18.2, B16, B18.0	MEN	0.786	0.798	0.792	0.764	0.701	0.608	0.487	0.348	0.235	0.210
		WOMEN	0.702	0.620	0.515	0.394	0.285	0.233	0.270	0.372	0.000	0.000

Source: author's own.

Table 4.2.19 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Portugal – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	GENDER	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis	B17.1, B18.2, B16, B18.0	MEN	0.765	0.778	0.771	0.742	0.675	0.580	0.458	0.322	0.214	0.191
		WOMEN	0.677	0.591	0.485	0.366	0.261	0.213	0.247	0.345	0.000	0.000

Source: author's own.

Table 4.2.20 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Portugal – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	GENDER	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hepatitis	B17.1, B18.2, B16, B18.0	MEN	0.671	0.686	0.678	0.643	0.565	0.463	0.345	0.229	0.146	0.129
		WOMEN	0.567	0.475	0.371	0.265	0.181	0.145	0.170	0.248	0.000	0.000

Source: author's own.

[7]Calculated as an average for Hepatitis B and C.

4.3 Catalonia (Spain)

4.3.1 Alcohol

Table 4.3.1 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Catalonia – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.564	0.585	0.560	0.540	0.529	0.529	0.542	0.543	0.530	0.521
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.564	0.585	0.560	0.540	0.529	0.529	0.542	0.543	0.530	0.521
Oesophageal cancer	C15	0.373	0.393	0.369	0.351	0.341	0.340	0.352	0.352	0.341	0.333
Colorectal cancer	C18-C20	0.058	0.064	0.059	0.056	0.055	0.055	0.057	0.057	0.055	0.053
Cancer of the liver and intrahepatic bile ducts	C22	0.193	0.209	0.195	0.186	0.181	0.181	0.189	0.189	0.183	0.178
Laryngeal cancer	C32	0.396	0.416	0.391	0.373	0.363	0.362	0.374	0.374	0.363	0.355
Breast cancer	C50	0.259	0.277	0.259	0.246	0.239	0.238	0.248	0.248	0.239	0.233
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.407	0.426	0.401	0.381	0.371	0.370	0.381	0.382	0.370	0.361
Coronary heart disease	I20-25	-0.121	-0.154	-0.167	-0.174	-0.177	-0.180	-0.185	-0.182	-0.180	-0.178
Cardiac arrhythmias	I47, I48	0.364	0.390	0.371	0.356	0.349	0.352	0.369	0.367	0.359	0.352
Haemorrhagic stroke	I60-I62	0.367	0.377	0.340	0.312	0.297	0.294	0.304	0.307	0.292	0.280
Ischaemic stroke	I63-I66	0.235	0.227	0.182	0.149	0.130	0.121	0.120	0.127	0.110	0.097
Oesophageal varices	I85, I98.2	0.690	0.693	0.621	0.554	0.516	0.525	0.585	0.586	0.564	0.543
GASTROINTESTINAL, METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.689	0.692	0.618	0.550	0.512	0.521	0.582	0.583	0.561	0.540
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.719	0.722	0.657	0.598	0.563	0.568	0.617	0.619	0.597	0.577
Portal hypertension	K76.6	0.690	0.693	0.621	0.554	0.516	0.525	0.585	0.586	0.564	0.543
Cholelithiasis	K80	-0.067	-0.067	-0.049	-0.038	-0.032	-0.032	-0.038	-0.039	-0.035	-0.032
Acute and other chronic pancreatitis	K85, K86.1	0.329	0.346	0.321	0.303	0.293	0.292	0.304	0.304	0.293	0.285
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.313	0.347	0.349	0.347	0.347	0.348	0.356	0.354	0.348	0.345
Epilepsy and Status epilepticus	G40-G41	0.622	0.627	0.549	0.480	0.443	0.453	0.515	0.515	0.493	0.473
INJURIES											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Pedestrian traffic accidents	V01-V10	0.466	0.466	0.377	0.302	0.264	0.272	0.335	0.336	0.313	0.292
Road traffic accidents - non pedestrian	V11-V89	0.526	0.526	0.462	0.409	0.378	0.373	0.397	0.403	0.377	0.357
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.625	0.661	0.663	0.662	0.662	0.663	0.670	0.668	0.663	0.659
Firearm injuries, Drowning, Inhalation and ingestion of food causing obstruction of respiratory tract, Fire injuries, Accidental excessive cold, Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.554	0.554	0.462	0.381	0.337	0.347	0.416	0.418	0.393	0.370
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.139	0.139	0.100	0.074	0.062	0.065	0.085	0.085	0.077	0.071
Assault	X85-Y09, Y87.1	0.075	0.075	0.053	0.038	0.032	0.033	0.044	0.045	0.040	0.037

Source: ALICE RAP, Del.6.1, p.192 (table 8.1.1.16).

Table 4.3.2 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Catalonia – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.566	0.566	0.539	0.518	0.507	0.507	0.521	0.521	0.508	0.499
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.566	0.566	0.539	0.518	0.507	0.507	0.521	0.521	0.508	0.499
Oesophageal cancer	C15	0.374	0.374	0.349	0.331	0.321	0.320	0.332	0.332	0.321	0.313
Colorectal cancer	C18-C20	0.059	0.059	0.055	0.052	0.050	0.050	0.053	0.053	0.051	0.049
Cancer of the liver and intrahepatic bile ducts	C22	0.196	0.196	0.183	0.173	0.168	0.168	0.176	0.176	0.170	0.165
Laryngeal cancer	C32	0.397	0.397	0.371	0.353	0.343	0.342	0.354	0.354	0.343	0.334
Breast cancer	C50	0.262	0.262	0.243	0.230	0.223	0.223	0.232	0.232	0.223	0.217
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.407	0.407	0.380	0.361	0.350	0.349	0.361	0.361	0.349	0.341
Coronary heart disease	I20-25	-0.141	-0.141	-0.151	-0.156	-0.159	-0.161	-0.167	-0.164	-0.162	-0.160
Cardiac arrhythmias	I47, I48	0.373	0.373	0.353	0.337	0.330	0.333	0.349	0.348	0.339	0.333
Haemorrhagic stroke	I60-I62	0.357	0.357	0.320	0.294	0.278	0.275	0.286	0.288	0.273	0.263
Ischaemic stroke	I63-I66	0.209	0.209	0.167	0.137	0.119	0.110	0.110	0.116	0.100	0.089
Oesophageal varices	I85, I98.2	0.679	0.679	0.607	0.541	0.504	0.512	0.569	0.570	0.548	0.527
GASTROINTESTINAL. METABOLIC AND ENDOCRINE CONDITIONS											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Mallory-Weiss syndrome	K22.6	0.678	0.678	0.605	0.538	0.500	0.508	0.566	0.568	0.545	0.524
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.707	0.707	0.642	0.583	0.549	0.553	0.600	0.603	0.580	0.560
Portal hypertension	K76.6	0.679	0.679	0.607	0.541	0.504	0.512	0.569	0.570	0.548	0.527
Cholelithiasis	K80	-0.062	-0.062	-0.045	-0.035	-0.030	-0.030	-0.035	-0.036	-0.032	-0.029
Acute and other chronic pancreatitis	K85, K86.1	0.328	0.328	0.303	0.285	0.275	0.274	0.286	0.286	0.275	0.268
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.330	0.330	0.330	0.327	0.326	0.328	0.336	0.334	0.328	0.324
Epilepsy and Status epilepticus	G40-G41	0.612	0.612	0.535	0.468	0.431	0.440	0.499	0.500	0.477	0.457
INJURIES											
Pedestrian traffic accidents	V01-V10	0.451	0.451	0.364	0.294	0.257	0.264	0.321	0.323	0.300	0.281
Road traffic accidents - non pedestrian	V11-V89	0.505	0.505	0.441	0.390	0.359	0.354	0.377	0.383	0.358	0.338
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.644	0.644	0.644	0.642	0.640	0.642	0.650	0.648	0.642	0.639
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.538	0.538	0.448	0.371	0.329	0.337	0.402	0.404	0.379	0.356
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.131	0.131	0.095	0.071	0.060	0.062	0.080	0.081	0.073	0.067
Assault	X85-Y09, Y87.1	0.070	0.070	0.050	0.037	0.031	0.032	0.042	0.042	0.038	0.035

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.3.3 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Catalonia – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.544	0.544	0.516	0.495	0.483	0.482	0.497	0.497	0.484	0.475
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.544	0.544	0.516	0.495	0.483	0.482	0.497	0.497	0.484	0.475
Oesophageal cancer	C15	0.354	0.354	0.328	0.310	0.300	0.299	0.311	0.311	0.300	0.292
Colorectal cancer	C18-C20	0.055	0.055	0.050	0.047	0.046	0.046	0.048	0.048	0.046	0.045
Cancer of the liver and intrahepatic bile ducts	C22	0.183	0.183	0.170	0.160	0.155	0.155	0.163	0.163	0.157	0.152
Laryngeal cancer	C32	0.376	0.376	0.350	0.331	0.321	0.320	0.332	0.333	0.321	0.313
Breast cancer	C50	0.245	0.245	0.227	0.213	0.206	0.206	0.215	0.215	0.207	0.201
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.386	0.386	0.359	0.339	0.328	0.327	0.339	0.339	0.328	0.319
Coronary heart disease	I20-25	-0.129	-0.129	-0.136	-0.139	-0.141	-0.143	-0.149	-0.146	-0.144	-0.143
Cardiac arrhythmias	I47, I48	0.355	0.355	0.333	0.318	0.310	0.312	0.329	0.328	0.319	0.312
Haemorrhagic stroke	I60-I62	0.336	0.336	0.300	0.274	0.259	0.256	0.266	0.268	0.254	0.244
Ischaemic stroke	I63-I66	0.190	0.190	0.152	0.124	0.108	0.100	0.099	0.104	0.090	0.080
Oesophageal varices	I85, I98.2	0.664	0.664	0.592	0.527	0.491	0.497	0.552	0.554	0.531	0.510
GASTROINTESTINAL. METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.663	0.663	0.590	0.525	0.488	0.494	0.549	0.551	0.528	0.507
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.692	0.692	0.626	0.568	0.533	0.537	0.582	0.585	0.562	0.542
Portal hypertension	K76.6	0.664	0.664	0.592	0.527	0.491	0.497	0.552	0.554	0.531	0.510
Cholelithiasis	K80	-0.056	-0.056	-0.042	-0.032	-0.028	-0.028	-0.032	-0.033	-0.030	-0.027
Acute and other chronic pancreatitis	K85, K86.1	0.310	0.310	0.284	0.266	0.256	0.255	0.267	0.267	0.257	0.249
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.313	0.313	0.309	0.306	0.304	0.305	0.314	0.312	0.307	0.303
Epilepsy and Status epilepticus	G40-G41	0.596	0.596	0.520	0.455	0.419	0.426	0.482	0.483	0.460	0.441
INJURIES											
Pedestrian traffic accidents	V01-V10	0.434	0.434	0.351	0.285	0.250	0.255	0.308	0.310	0.288	0.268
Road traffic accidents - non pedestrian	V11-V89	0.482	0.482	0.419	0.369	0.339	0.334	0.356	0.361	0.337	0.318
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.625	0.625	0.622	0.618	0.616	0.618	0.627	0.625	0.619	0.615

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.521	0.521	0.434	0.361	0.321	0.327	0.387	0.389	0.364	0.342
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.124	0.124	0.091	0.068	0.058	0.059	0.076	0.076	0.069	0.063
Assault	X85-Y09, Y87.1	0.066	0.066	0.048	0.035	0.030	0.031	0.039	0.040	0.036	0.033

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.3.4 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, men, Catalonia – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.465	0.465	0.431	0.406	0.392	0.392	0.408	0.409	0.395	0.385
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.465	0.465	0.431	0.406	0.392	0.392	0.408	0.409	0.395	0.385
Oesophageal cancer	C15	0.284	0.284	0.257	0.238	0.228	0.228	0.239	0.240	0.230	0.222
Colorectal cancer	C18-C20	0.041	0.041	0.036	0.033	0.032	0.032	0.034	0.034	0.033	0.031
Cancer of the liver and intrahepatic bile ducts	C22	0.142	0.142	0.127	0.117	0.112	0.113	0.120	0.120	0.115	0.111
Laryngeal cancer	C32	0.304	0.304	0.276	0.256	0.246	0.245	0.257	0.258	0.247	0.239
Breast cancer	C50	0.191	0.191	0.172	0.159	0.152	0.152	0.160	0.161	0.153	0.148
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.312	0.312	0.283	0.263	0.251	0.251	0.263	0.264	0.252	0.244
Coronary heart disease	I20-25	-0.095	-0.095	-0.093	-0.091	-0.090	-0.092	-0.099	-0.097	-0.095	-0.093
Cardiac arrhythmias	I47, I48	0.294	0.294	0.268	0.250	0.241	0.243	0.259	0.258	0.249	0.242
Haemorrhagic stroke	I60-I62	0.262	0.262	0.230	0.207	0.194	0.191	0.200	0.202	0.190	0.182
Ischaemic stroke	I63-I66	0.129	0.129	0.102	0.084	0.073	0.067	0.065	0.069	0.059	0.052
Oesophageal varices	I85, I98.2	0.609	0.609	0.540	0.482	0.449	0.450	0.491	0.494	0.471	0.450
GASTROINTESTINAL. METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.608	0.608	0.539	0.480	0.446	0.447	0.489	0.492	0.468	0.448
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.633	0.633	0.568	0.513	0.481	0.480	0.516	0.520	0.496	0.476
Portal hypertension	K76.6	0.609	0.609	0.540	0.482	0.449	0.450	0.491	0.494	0.471	0.450

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Cholelithiasis	K80	-0.041	-0.041	-0.031	-0.025	-0.022	-0.021	-0.024	-0.024	-0.022	-0.020
Acute and other chronic pancreatitis	K85, K86.1	0.246	0.246	0.220	0.202	0.192	0.192	0.202	0.203	0.194	0.187
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.253	0.253	0.241	0.232	0.228	0.230	0.241	0.240	0.233	0.229
Epilepsy and Status epilepticus	G40-G41	0.539	0.539	0.469	0.411	0.380	0.382	0.422	0.425	0.402	0.383
INJURIES											
Pedestrian traffic accidents	V01-V10	0.379	0.379	0.309	0.256	0.228	0.228	0.263	0.266	0.246	0.229
Road traffic accidents - non pedestrian	V11-V89	0.398	0.398	0.341	0.297	0.272	0.266	0.282	0.287	0.266	0.250
Water transport injuries Fall injuries Occupational work/machine injuries	V90-V94, W00-W19, W24-W31, W45	0.553	0.553	0.538	0.526	0.520	0.523	0.538	0.537	0.528	0.522
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.464	0.464	0.388	0.328	0.295	0.296	0.336	0.339	0.316	0.297
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0, Y87.2	0.101	0.101	0.076	0.060	0.052	0.052	0.062	0.063	0.057	0.052
Assault	X85-Y09, Y87.1	0.053	0.053	0.040	0.031	0.026	0.027	0.032	0.032	0.029	0.027

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.3.5 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Catalonia – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.569	0.578	0.522	0.476	0.451	0.453	0.486	0.484	0.476	0.461
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.569	0.578	0.522	0.476	0.451	0.453	0.486	0.484	0.476	0.461
Oesophageal cancer	C15	0.377	0.386	0.332	0.292	0.270	0.272	0.300	0.298	0.291	0.280
Colorectal cancer	C18-C20	0.060	0.063	0.054	0.047	0.044	0.045	0.049	0.049	0.047	0.044
Cancer of the liver and intrahepatic bile ducts	C22	0.199	0.206	0.179	0.160	0.150	0.152	0.165	0.164	0.159	0.152
Laryngeal cancer	C32	0.400	0.409	0.354	0.312	0.290	0.292	0.321	0.319	0.312	0.299
Breast cancer	C50	0.265	0.273	0.233	0.204	0.190	0.191	0.211	0.209	0.204	0.195
CARDIOVASCULAR DISEASES											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Hypertensive diseases	I10-I15	0.410	0.419	0.360	0.315	0.291	0.292	0.323	0.322	0.314	0.302
Coronary heart disease	I20-25	-0.150	-0.166	-0.177	-0.186	-0.192	-0.194	-0.194	-0.189	-0.180	-0.168
Cardiac arrhythmias	I47, I48	0.378	0.389	0.357	0.335	0.325	0.328	0.346	0.344	0.336	0.324
Haemorrhagic stroke	I60-I62	0.357	0.361	0.278	0.210	0.170	0.170	0.215	0.215	0.211	0.201
Ischaemic stroke	I63-I66	0.204	0.200	0.087	-0.010	-0.070	-0.075	-0.018	-0.012	-0.009	-0.010
Oesophageal varices	I85, I98.2	0.675	0.676	0.578	0.473	0.403	0.412	0.504	0.509	0.506	0.499
GASTROINTESTINAL. METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.673	0.675	0.575	0.468	0.397	0.406	0.500	0.506	0.502	0.495
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.703	0.705	0.604	0.488	0.405	0.413	0.516	0.522	0.518	0.510
Portal hypertension	K76.6	0.675	0.676	0.578	0.473	0.403	0.412	0.504	0.509	0.506	0.499
Cholelithiasis	K80	-0.060	-0.060	-0.034	-0.018	-0.010	-0.010	-0.020	-0.020	-0.020	-0.019
Acute and other chronic pancreatitis	K85, K86.1	0.331	0.339	0.286	0.246	0.225	0.226	0.253	0.252	0.246	0.236
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.339	0.354	0.343	0.337	0.335	0.337	0.345	0.341	0.332	0.319
Spontaneous abortion	G40-G41	0.231	0.238	0.204	0.180	0.169	0.172	0.190	0.189	0.184	0.176
Epilepsy and Status epilepticus		0.607	0.609	0.509	0.411	0.350	0.359	0.442	0.447	0.443	0.436
INJURIES	V01-V10										
Pedestrian traffic accidents	V11-V89	0.260	0.260	0.178	0.113	0.079	0.083	0.130	0.133	0.133	0.130
Road traffic accidents - non pedestrian	V90-V94, W00-W19, W24-W31, W45	0.522	0.522	0.384	0.237	0.134	0.134	0.249	0.257	0.256	0.247
Water transport injuries Fall injuries Occupational work/machine injuries	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.653	0.667	0.658	0.652	0.650	0.653	0.660	0.656	0.647	0.634
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	X60-X84, Y10-Y34, Y87.0, Y87.2	0.473	0.473	0.356	0.246	0.179	0.187	0.275	0.282	0.281	0.277
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0. Y87.2	0.151	0.151	0.099	0.061	0.042	0.044	0.070	0.072	0.072	0.071
Assault	X85-Y09, Y87.1	0.095	0.095	0.061	0.037	0.025	0.026	0.042	0.044	0.044	0.043

Source: ALICE RAP, Del.6.1, p.193 (table 8.1.1.17).

Table 4.3.6 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Catalonia – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.558	0.558	0.500	0.452	0.426	0.428	0.463	0.461	0.452	0.439
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.558	0.558	0.500	0.452	0.426	0.428	0.463	0.461	0.452	0.439
Oesophageal cancer	C15	0.367	0.367	0.313	0.273	0.251	0.253	0.281	0.279	0.272	0.261
Colorectal cancer	C18-C20	0.059	0.059	0.049	0.043	0.040	0.041	0.045	0.044	0.043	0.041
Cancer of the liver and intrahepatic bile ducts	C22	0.193	0.193	0.166	0.147	0.138	0.139	0.153	0.151	0.147	0.140
Laryngeal cancer	C32	0.389	0.389	0.334	0.292	0.270	0.272	0.301	0.299	0.292	0.280
Breast cancer	C50	0.257	0.257	0.218	0.190	0.175	0.177	0.196	0.194	0.189	0.180
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.399	0.399	0.340	0.295	0.271	0.272	0.303	0.302	0.295	0.283
Coronary heart disease	I20-25	-0.151	-0.151	-0.160	-0.166	-0.171	-0.173	-0.174	-0.170	-0.162	-0.151
Cardiac arrhythmias	I47, I48	0.372	0.372	0.338	0.314	0.304	0.307	0.326	0.323	0.316	0.304
Haemorrhagic stroke	I60-I62	0.342	0.342	0.261	0.194	0.157	0.156	0.199	0.200	0.196	0.187
Ischaemic stroke	I63-I66	0.184	0.184	0.079	-0.010	-0.063	-0.067	-0.016	-0.011	-0.009	-0.010
Oesophageal varices	I85, I98.2	0.662	0.662	0.560	0.451	0.379	0.387	0.481	0.487	0.484	0.476
GASTROINTESTINAL. METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.660	0.660	0.557	0.447	0.373	0.382	0.477	0.483	0.480	0.473
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.690	0.690	0.585	0.467	0.381	0.388	0.493	0.499	0.496	0.487
Portal hypertension	K76.6	0.662	0.662	0.560	0.451	0.379	0.387	0.481	0.487	0.484	0.476
Cholelithiasis	K80	-0.056	-0.056	-0.032	-0.016	-0.009	-0.009	-0.018	-0.019	-0.018	-0.018
Acute and other chronic pancreatitis	K85, K86.1	0.321	0.321	0.268	0.229	0.208	0.209	0.236	0.235	0.229	0.219
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.336	0.336	0.324	0.316	0.313	0.316	0.324	0.320	0.312	0.300
Spontaneous abortion	G40-G41	0.225	0.225	0.191	0.167	0.156	0.158	0.176	0.175	0.170	0.164
Epilepsy and Status epilepticus		0.594	0.594	0.491	0.390	0.328	0.336	0.420	0.425	0.421	0.414
INJURIES	V01-V10										
Pedestrian traffic accidents	V11-V89	0.248	0.248	0.168	0.105	0.072	0.075	0.120	0.124	0.123	0.120
Road traffic accidents - non pedestrian	V90-V94, W00-W19, W24-	0.501	0.501	0.364	0.221	0.122	0.122	0.232	0.240	0.238	0.230

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
	W31, W45										
Water transport injuries Fall injuries Occupational work/machine injuries	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.650	0.650	0.638	0.630	0.627	0.630	0.639	0.635	0.626	0.612
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	X60-X84, Y10-Y34, Y87.0, Y87.2	0.457	0.457	0.340	0.231	0.165	0.172	0.258	0.265	0.263	0.259
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0. Y87.2	0.143	0.143	0.093	0.056	0.038	0.040	0.065	0.067	0.066	0.065
Assault	X85-Y09, Y87.1	0.090	0.090	0.057	0.034	0.023	0.024	0.039	0.040	0.040	0.039

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.3.7 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Catalonia – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.536	0.536	0.476	0.427	0.400	0.402	0.437	0.435	0.427	0.414
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.536	0.536	0.476	0.427	0.400	0.402	0.437	0.435	0.427	0.414
Oesophageal cancer	C15	0.346	0.346	0.293	0.252	0.231	0.233	0.260	0.259	0.253	0.242
Colorectal cancer	C18-C20	0.054	0.054	0.045	0.039	0.036	0.037	0.041	0.040	0.039	0.037
Cancer of the liver and intrahepatic bile ducts	C22	0.180	0.180	0.153	0.135	0.126	0.127	0.140	0.139	0.135	0.128
Laryngeal cancer	C32	0.368	0.368	0.313	0.271	0.249	0.251	0.279	0.278	0.271	0.260
Breast cancer	C50	0.240	0.240	0.202	0.174	0.160	0.161	0.180	0.179	0.174	0.166
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.377	0.377	0.319	0.274	0.250	0.251	0.282	0.280	0.274	0.263
Coronary heart disease	I20-25	-0.138	-0.138	-0.143	-0.147	-0.150	-0.153	-0.154	-0.150	-0.144	-0.135
Cardiac arrhythmias	I47, I48	0.353	0.353	0.317	0.293	0.281	0.284	0.303	0.301	0.294	0.283
Haemorrhagic stroke	I60-I62	0.321	0.321	0.242	0.178	0.143	0.142	0.183	0.184	0.180	0.171
Ischaemic stroke	I63-I66	0.167	0.167	0.070	-0.009	-0.056	-0.060	-0.015	-0.011	-0.009	-0.010
Oesophageal varices	I85, I98.2	0.646	0.646	0.540	0.428	0.353	0.361	0.457	0.463	0.459	0.452
GASTROINTESTINAL. METABOLIC AND											

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.645	0.645	0.538	0.424	0.347	0.355	0.453	0.459	0.456	0.448
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.674	0.674	0.565	0.443	0.355	0.362	0.469	0.475	0.471	0.463
Portal hypertension	K76.6	0.646	0.646	0.540	0.428	0.353	0.361	0.457	0.463	0.459	0.452
Cholelithiasis	K80	-0.051	-0.051	-0.029	-0.015	-0.008	-0.008	-0.016	-0.017	-0.017	-0.016
Acute and other chronic pancreatitis	K85, K86.1	0.302	0.302	0.250	0.211	0.191	0.192	0.218	0.217	0.212	0.202
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.317	0.317	0.303	0.294	0.290	0.293	0.302	0.299	0.291	0.279
Spontaneous abortion	G40-G41	0.211	0.211	0.177	0.153	0.142	0.144	0.161	0.161	0.157	0.150
Epilepsy and Status epilepticus		0.577	0.577	0.472	0.368	0.304	0.311	0.396	0.401	0.397	0.390
INJURIES	V01-V10										
Pedestrian traffic accidents	V11-V89	0.236	0.236	0.158	0.097	0.065	0.068	0.110	0.114	0.113	0.110
Road traffic accidents - non pedestrian	V90-V94, W00-W19, W24-W31, W45	0.479	0.479	0.343	0.205	0.111	0.110	0.215	0.222	0.220	0.212
Water transport injuries Fall injuries Occupational work/machine injuries	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.630	0.630	0.615	0.605	0.602	0.604	0.615	0.611	0.601	0.587
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	X60-X84, Y10-Y34, Y87.0, Y87.2	0.441	0.441	0.323	0.215	0.150	0.156	0.240	0.246	0.245	0.241
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0. Y87.2	0.135	0.135	0.087	0.052	0.034	0.035	0.059	0.061	0.060	0.059
Assault	X85-Y09, Y87.1	0.084	0.084	0.053	0.031	0.020	0.021	0.035	0.037	0.036	0.036

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

Table 4.3.8 Attributable fractions for causes of death partially attributable to alcohol consumption according to age, women, Catalonia – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Cancer of the lip	C00	0.455	0.455	0.388	0.333	0.303	0.305	0.343	0.342	0.335	0.323
Cancer of the oral cavity and pharynx	C01-C06, C09-C10, C12-C14	0.455	0.455	0.388	0.333	0.303	0.305	0.343	0.342	0.335	0.323
Oesophageal cancer	C15	0.276	0.276	0.223	0.185	0.164	0.165	0.191	0.191	0.186	0.178
Colorectal cancer	C18-C20	0.040	0.040	0.032	0.026	0.024	0.024	0.028	0.028	0.027	0.025
Cancer of the liver and intrahepatic bile ducts	C22	0.138	0.138	0.112	0.094	0.086	0.087	0.099	0.098	0.095	0.091
Laryngeal cancer	C32	0.295	0.295	0.241	0.200	0.178	0.179	0.207	0.206	0.201	0.192
Breast cancer	C50	0.186	0.186	0.149	0.124	0.111	0.112	0.129	0.128	0.125	0.119
CARDIOVASCULAR DISEASES											
Hypertensive diseases	I10-I15	0.303	0.303	0.245	0.202	0.179	0.180	0.209	0.208	0.203	0.194
Coronary heart disease	I20-25	-0.098	-0.098	-0.095	-0.094	-0.094	-0.095	-0.099	-0.097	-0.093	-0.088
Cardiac arrhythmias	I47, I48	0.289	0.289	0.248	0.218	0.203	0.206	0.227	0.226	0.221	0.212
Haemorrhagic stroke	I60-I62	0.249	0.249	0.180	0.127	0.098	0.098	0.131	0.131	0.129	0.122
Ischaemic stroke	I63-I66	0.112	0.112	0.045	-0.007	-0.036	-0.039	-0.012	-0.009	-0.007	-0.008
Oesophageal varices	I85, I98.2	0.588	0.588	0.470	0.346	0.261	0.265	0.367	0.373	0.370	0.361
GASTROINTESTINAL. METABOLIC AND ENDOCRINE CONDITIONS											
Mallory-Weiss syndrome	K22.6	0.587	0.587	0.468	0.342	0.256	0.260	0.364	0.370	0.367	0.358
Unspecified liver disease	K73, K74.0-2, K76.0, K76.9	0.612	0.612	0.491	0.358	0.263	0.266	0.377	0.383	0.380	0.371
Portal hypertension	K76.6	0.588	0.588	0.470	0.346	0.261	0.265	0.367	0.373	0.370	0.361
Cholelithiasis	K80	-0.037	-0.037	-0.021	-0.010	-0.005	-0.005	-0.011	-0.011	-0.011	-0.011
Acute and other chronic pancreatitis	K85, K86.1	0.237	0.237	0.188	0.152	0.133	0.134	0.158	0.158	0.154	0.147
OTHER CHRONIC AND ACUTE CONDITIONS											
Psoriasis	L40 excl.L40.5	0.253	0.253	0.232	0.217	0.211	0.213	0.226	0.223	0.217	0.208
Spontaneous abortion	G40-G41	0.168	0.168	0.134	0.109	0.097	0.099	0.115	0.115	0.112	0.107
Epilepsy and Status epilepticus		0.518	0.518	0.403	0.291	0.220	0.224	0.311	0.316	0.313	0.305
INJURIES	V01-V10										
Pedestrian traffic accidents	V11-V89	0.196	0.196	0.126	0.072	0.043	0.044	0.079	0.082	0.081	0.079
Road traffic accidents - non pedestrian	V90-V94, W00-W19, W24-	0.397	0.397	0.270	0.151	0.074	0.073	0.156	0.162	0.161	0.154

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
	W31, W45										
Water transport injuries Fall injuries Occupational work/machine injuries	W32-W34, W65-W74, W78-W79, X00-X09, X31 X40-X49 excl. X45	0.554	0.554	0.526	0.506	0.497	0.500	0.518	0.514	0.505	0.491
Firearm injuries. Drowning. Inhalation and ingestion of food causing obstruction of respiratory tract. Fire injuries. Accidental excessive cold. Accidental poisoning by and exposure to noxious substances	X60-X84, Y10-Y34, Y87.0, Y87.2	0.384	0.384	0.268	0.164	0.102	0.104	0.180	0.185	0.184	0.179
Intentional self-harm\Event of undetermined intent	X60-X84, Y10-Y34, Y87.0. Y87.2	0.110	0.110	0.068	0.038	0.022	0.023	0.042	0.043	0.043	0.042
Assault	X85-Y09, Y87.1	0.068	0.068	0.041	0.022	0.013	0.013	0.025	0.026	0.026	0.025

Source: author's own calculation on the basis of: [English 1995], [Corrao et al. 2004], [Rehm et al. 2004], [Gujahr et al. 2001], [Shield et al. 2012], [Zeisser et al. 2013]. List of causes of deaths and ICD 10 codes after [Grant, Springbett, Graham 2009, p.4].

4.3.2 Smoking

Table 4.3.9 Attributable fractions for causes of death partially attributable to smoking according to age, men, Catalonia – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.780	0.784	0.788	0.791	0.794	0.797	0.799	0.801	0.771	0.722
Esophagus	C15	0.681	0.697	0.710	0.722	0.731	0.739	0.746	0.752	0.731	0.699
Stomach	C16	0.261	0.272	0.283	0.292	0.300	0.308	0.314	0.320	0.293	0.257
Pancreas	C25	0.317	0.318	0.320	0.321	0.321	0.322	0.322	0.322	0.278	0.218
Larynx	C32	0.832	0.838	0.844	0.848	0.852	0.856	0.859	0.861	0.843	0.814
Trachea. lung. bronchus	C33, C34	0.890	0.894	0.897	0.900	0.902	0.904	0.906	0.908	0.894	0.871
Urinary bladder	C67	0.454	0.469	0.481	0.493	0.502	0.511	0.518	0.525	0.493	0.447
Kidney and renal pelvis	C64, C65	0.386	0.398	0.408	0.418	0.426	0.434	0.440	0.446	0.412	0.365
Acute myeloid leukemia	C92.0	0.238	0.246	0.254	0.261	0.267	0.272	0.277	0.281	0.252	0.215
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.262	0.276	0.288	0.298	0.308	0.316	0.324	0.330	0.305	0.272
Ischemic heart disease	I25	0.395	0.405	0.414	0.421	0.428	0.434	0.440	0.444	0.408	0.356
Other heart disease	I00-I52 excl.I10. I25	0.219	0.225	0.229	0.234	0.238	0.241	0.244	0.247	0.217	0.178
Cerebrovascular disease	I67	0.443	0.441	0.439	0.437	0.435	0.433	0.431	0.429	0.370	0.284
Atherosclerosis	I70	0.340	0.345	0.350	0.354	0.358	0.361	0.364	0.366	0.326	0.271
Aortic aneurysm	I71	0.655	0.665	0.674	0.682	0.689	0.695	0.700	0.705	0.674	0.628
Other arterial disease	I72-I79	0.273	0.271	0.269	0.267	0.265	0.263	0.262	0.260	0.215	0.155
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.216	0.226	0.235	0.243	0.250	0.257	0.262	0.267	0.243	0.211
Bronchitis. emphysema	J20, J43	0.860	0.873	0.883	0.891	0.897	0.902	0.907	0.910	0.904	0.894
Chronic airways obstruction	J44.9	0.781	0.793	0.803	0.812	0.819	0.825	0.831	0.835	0.819	0.795
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: ALICE RAP, Del.6.1, p.195 (table 8.1.1.19).

Table 4.3.10 Attributable fractions for causes of death partially attributable to smoking according to age, men, Catalonia – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.767	0.772	0.776	0.780	0.783	0.786	0.789	0.791	0.761	0.712
Esophagus	C15	0.673	0.690	0.704	0.715	0.725	0.734	0.741	0.747	0.727	0.696
Stomach	C16	0.251	0.263	0.274	0.283	0.292	0.300	0.306	0.312	0.287	0.252
Pancreas	C25	0.297	0.299	0.301	0.302	0.303	0.304	0.304	0.305	0.263	0.206
Larynx	C32	0.823	0.830	0.836	0.842	0.846	0.850	0.853	0.856	0.838	0.809
Trachea. lung. bronchus	C33, C34	0.883	0.887	0.891	0.894	0.897	0.900	0.902	0.903	0.890	0.867
Urinary bladder	C67	0.442	0.457	0.470	0.482	0.492	0.501	0.509	0.516	0.485	0.441
Kidney and renal pelvis	C64, C65	0.372	0.385	0.396	0.406	0.415	0.423	0.430	0.436	0.403	0.358
Acute myeloid leukemia	C92.0	0.227	0.236	0.244	0.251	0.257	0.263	0.267	0.272	0.245	0.209
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.254	0.268	0.280	0.291	0.301	0.310	0.317	0.324	0.300	0.268
Ischemic heart disease	I25	0.380	0.390	0.400	0.408	0.415	0.422	0.428	0.432	0.397	0.348
Other heart disease	I00-I52 excl.I10. I25	0.207	0.213	0.218	0.222	0.227	0.230	0.233	0.236	0.208	0.172
Cerebrovascular disease	I67	0.418	0.416	0.414	0.412	0.410	0.408	0.406	0.404	0.347	0.264
Atherosclerosis	I70	0.323	0.329	0.334	0.338	0.342	0.346	0.349	0.352	0.313	0.261
Aortic aneurysm	I71	0.641	0.653	0.663	0.671	0.679	0.685	0.691	0.696	0.666	0.620
Other arterial disease	I72-I79	0.252	0.251	0.249	0.247	0.246	0.244	0.242	0.240	0.198	0.142
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.207	0.218	0.227	0.235	0.243	0.249	0.255	0.260	0.237	0.207
Bronchitis. emphysema	J20, J43	0.859	0.872	0.882	0.890	0.897	0.902	0.906	0.910	0.904	0.894
Chronic airways obstruction	J44.9	0.774	0.787	0.798	0.807	0.815	0.822	0.827	0.832	0.816	0.792
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005], List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.3.11 Attributable fractions for causes of death partially attributable to smoking according to age, men, Catalonia – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.751	0.757	0.762	0.767	0.771	0.774	0.777	0.779	0.750	0.701
Esophagus	C15	0.664	0.682	0.696	0.709	0.719	0.728	0.736	0.743	0.722	0.692
Stomach	C16	0.241	0.254	0.265	0.275	0.284	0.292	0.298	0.305	0.280	0.248
Pancreas	C25	0.277	0.279	0.281	0.282	0.284	0.285	0.285	0.286	0.246	0.193
Larynx	C32	0.814	0.822	0.829	0.834	0.839	0.844	0.847	0.850	0.832	0.804
Trachea. lung. bronchus	C33, C34	0.876	0.881	0.885	0.889	0.892	0.894	0.897	0.899	0.885	0.862
Urinary bladder	C67	0.429	0.445	0.459	0.471	0.482	0.491	0.500	0.507	0.477	0.435
Kidney and renal pelvis	C64, C65	0.358	0.372	0.384	0.394	0.404	0.412	0.419	0.425	0.394	0.351
Acute myeloid leukemia	C92.0	0.216	0.225	0.233	0.240	0.247	0.253	0.258	0.262	0.237	0.204
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.246	0.260	0.273	0.284	0.294	0.303	0.311	0.318	0.295	0.264
Ischemic heart disease	I25	0.364	0.375	0.385	0.394	0.402	0.409	0.415	0.420	0.386	0.340
Other heart disease	I00-I52 excl.I10. I25	0.195	0.201	0.206	0.211	0.215	0.219	0.222	0.225	0.199	0.166
Cerebrovascular disease	I67	0.390	0.388	0.387	0.385	0.383	0.381	0.379	0.377	0.322	0.244
Atherosclerosis	I70	0.305	0.311	0.316	0.322	0.326	0.330	0.333	0.336	0.300	0.250
Aortic aneurysm	I71	0.626	0.639	0.650	0.659	0.668	0.675	0.681	0.686	0.657	0.613
Other arterial disease	I72-I79	0.231	0.230	0.228	0.226	0.225	0.223	0.222	0.220	0.180	0.129
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.199	0.209	0.219	0.227	0.235	0.242	0.248	0.253	0.231	0.203
Bronchitis. emphysema	J20, J43	0.858	0.871	0.882	0.890	0.896	0.902	0.906	0.910	0.903	0.894
Chronic airways obstruction	J44.9	0.767	0.781	0.793	0.802	0.811	0.817	0.823	0.828	0.813	0.790
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005], List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.3.12 Attributable fractions for causes of death partially attributable to smoking according to age, men, Catalonia – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.691	0.701	0.709	0.716	0.723	0.728	0.733	0.737	0.708	0.664
Esophagus	C15	0.635	0.656	0.673	0.688	0.700	0.710	0.719	0.727	0.708	0.681
Stomach	C16	0.211	0.224	0.237	0.248	0.257	0.266	0.274	0.281	0.260	0.233
Pancreas	C25	0.207	0.210	0.213	0.216	0.218	0.220	0.222	0.223	0.193	0.154
Larynx	C32	0.778	0.790	0.799	0.808	0.815	0.820	0.825	0.830	0.813	0.786
Trachea. lung. bronchus	C33, C34	0.847	0.854	0.861	0.867	0.871	0.875	0.879	0.882	0.868	0.847
Urinary bladder	C67	0.385	0.404	0.421	0.435	0.448	0.459	0.469	0.477	0.451	0.415
Kidney and renal pelvis	C64, C65	0.313	0.328	0.342	0.355	0.366	0.376	0.384	0.391	0.365	0.330
Acute myeloid leukemia	C92.0	0.180	0.190	0.200	0.208	0.215	0.222	0.228	0.233	0.213	0.186
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.220	0.235	0.249	0.261	0.272	0.282	0.291	0.298	0.279	0.252
Ischemic heart disease	I25	0.310	0.324	0.336	0.347	0.357	0.365	0.373	0.379	0.351	0.313
Other heart disease	I00-I52 excl.I10. I25	0.155	0.162	0.168	0.174	0.179	0.183	0.188	0.191	0.171	0.145
Cerebrovascular disease	I67	0.289	0.287	0.286	0.285	0.284	0.283	0.281	0.280	0.234	0.173
Atherosclerosis	I70	0.243	0.251	0.259	0.265	0.271	0.276	0.281	0.285	0.256	0.217
Aortic aneurysm	I71	0.574	0.591	0.605	0.618	0.629	0.638	0.646	0.652	0.626	0.587
Other arterial disease	I72-I79	0.159	0.158	0.157	0.156	0.155	0.154	0.153	0.152	0.123	0.086
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.172	0.183	0.194	0.203	0.211	0.219	0.226	0.231	0.214	0.190
Bronchitis. emphysema	J20, J43	0.855	0.869	0.879	0.888	0.895	0.900	0.905	0.908	0.902	0.893
Chronic airways obstruction	J44.9	0.743	0.761	0.775	0.786	0.796	0.804	0.811	0.816	0.802	0.781
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005], List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.3.13 Attributable fractions for causes of death partially attributable to smoking according to age, women, Catalonia – 0% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.501	0.555	0.599	0.616	0.589	0.574	0.588	0.532	0.475	0.409
Esophagus	C15	0.621	0.670	0.706	0.719	0.699	0.685	0.692	0.644	0.590	0.523
Stomach	C16	0.094	0.116	0.148	0.164	0.137	0.132	0.161	0.127	0.103	0.081
Pancreas	C25	0.241	0.285	0.329	0.347	0.317	0.305	0.327	0.277	0.232	0.188
Larynx	C32	0.749	0.788	0.818	0.828	0.811	0.801	0.812	0.774	0.731	0.676
Trachea. lung. bronchus	C33, C34	0.741	0.781	0.810	0.820	0.803	0.793	0.801	0.763	0.719	0.662
Cervix uteri	C53	0.124	0.150	0.171	0.180	0.167	0.158	0.161	0.134	0.109	0.086
Urinary bladder	C67	0.251	0.298	0.355	0.380	0.337	0.327	0.371	0.311	0.262	0.214
Kidney and renal pelvis	C64, C65	0.064	0.078	0.089	0.093	0.087	0.082	0.081	0.067	0.054	0.042
Acute myeloid leukemia	C92.0	0.053	0.069	0.104	0.123	0.091	0.089	0.134	0.100	0.079	0.062
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.224	0.266	0.310	0.328	0.297	0.286	0.311	0.261	0.218	0.176
Ischemic heart disease	I25	0.328	0.376	0.410	0.422	0.404	0.388	0.382	0.336	0.288	0.235
Other heart disease	I00-I52 excl.I10. I25	0.107	0.129	0.150	0.159	0.145	0.138	0.143	0.118	0.096	0.075
Cerebrovascular disease	I67	0.409	0.461	0.492	0.502	0.488	0.470	0.456	0.410	0.357	0.297
Atherosclerosis	I70	0.156	0.186	0.201	0.205	0.200	0.188	0.170	0.148	0.123	0.096
Aortic aneurysm	I71	0.589	0.639	0.672	0.684	0.667	0.651	0.649	0.601	0.546	0.478
Other arterial disease	I72-I79	0.213	0.250	0.274	0.283	0.271	0.257	0.247	0.213	0.178	0.142
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.212	0.249	0.272	0.280	0.269	0.255	0.244	0.211	0.176	0.140
Bronchitis. emphysema	J20, J43	0.764	0.804	0.847	0.862	0.834	0.829	0.861	0.824	0.786	0.739
Chronic airways obstruction	J44.9	0.757	0.796	0.828	0.840	0.820	0.812	0.829	0.792	0.750	0.697
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: ALICE RAP, Del.6.1, p.196 (table 8.1.1.20).

Table 4.3.14 Attributable fractions for causes of death partially attributable to smoking according to age, women, Catalonia – 10% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.485	0.540	0.585	0.603	0.575	0.560	0.576	0.519	0.461	0.396
Esophagus	C15	0.604	0.655	0.693	0.707	0.684	0.671	0.680	0.630	0.575	0.508
Stomach	C16	0.093	0.115	0.147	0.163	0.137	0.131	0.161	0.126	0.102	0.081
Pancreas	C25	0.232	0.275	0.319	0.338	0.307	0.295	0.319	0.269	0.225	0.182
Larynx	C32	0.737	0.778	0.809	0.821	0.802	0.792	0.805	0.766	0.721	0.665
Trachea. lung. bronchus	C33, C34	0.728	0.770	0.800	0.811	0.793	0.783	0.793	0.753	0.708	0.650
Cervix uteri	C53	0.116	0.141	0.162	0.171	0.157	0.149	0.153	0.127	0.103	0.081
Urinary bladder	C67	0.247	0.293	0.351	0.376	0.333	0.323	0.367	0.307	0.259	0.212
Kidney and renal pelvis	C64, C65	0.059	0.072	0.083	0.087	0.081	0.076	0.076	0.063	0.051	0.039
Acute myeloid leukemia	C92.0	0.058	0.075	0.111	0.129	0.097	0.095	0.139	0.104	0.082	0.065
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.216	0.257	0.301	0.320	0.289	0.278	0.304	0.254	0.212	0.171
Ischemic heart disease	I25	0.309	0.357	0.390	0.403	0.384	0.369	0.365	0.319	0.272	0.222
Other heart disease	I00-I52 excl.I10. I25	0.100	0.122	0.142	0.151	0.137	0.130	0.136	0.112	0.091	0.071
Cerebrovascular disease	I67	0.387	0.438	0.470	0.481	0.465	0.448	0.436	0.389	0.338	0.280
Atherosclerosis	I70	0.143	0.170	0.184	0.188	0.184	0.173	0.156	0.135	0.112	0.087
Aortic aneurysm	I71	0.569	0.621	0.655	0.668	0.649	0.634	0.633	0.584	0.528	0.460
Other arterial disease	I72-I79	0.198	0.233	0.257	0.266	0.254	0.241	0.232	0.200	0.166	0.132
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.197	0.232	0.255	0.262	0.252	0.238	0.228	0.197	0.164	0.130
Bronchitis. emphysema	J20, J43	0.763	0.804	0.847	0.862	0.834	0.828	0.861	0.824	0.786	0.738
Chronic airways obstruction	J44.9	0.748	0.788	0.823	0.835	0.814	0.805	0.824	0.786	0.744	0.690
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005], List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.3.15 Attributable fractions for causes of death partially attributable to smoking according to age, women, Catalonia – 20% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.468	0.523	0.570	0.589	0.559	0.544	0.563	0.505	0.447	0.383
Esophagus	C15	0.586	0.638	0.678	0.693	0.669	0.655	0.667	0.615	0.560	0.493
Stomach	C16	0.092	0.114	0.146	0.162	0.136	0.131	0.160	0.126	0.102	0.080
Pancreas	C25	0.223	0.265	0.309	0.328	0.297	0.285	0.311	0.261	0.218	0.176
Larynx	C32	0.724	0.767	0.800	0.812	0.792	0.782	0.797	0.756	0.711	0.653
Trachea. lung. bronchus	C33, C34	0.714	0.757	0.790	0.802	0.782	0.772	0.784	0.742	0.696	0.636
Cervix uteri	C53	0.108	0.131	0.152	0.161	0.147	0.140	0.144	0.119	0.097	0.076
Urinary bladder	C67	0.243	0.289	0.346	0.372	0.329	0.318	0.364	0.304	0.256	0.209
Kidney and renal pelvis	C64, C65	0.054	0.067	0.077	0.081	0.075	0.070	0.071	0.058	0.047	0.036
Acute myeloid leukemia	C92.0	0.063	0.081	0.116	0.135	0.103	0.101	0.143	0.108	0.086	0.068
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.208	0.248	0.293	0.312	0.280	0.269	0.297	0.247	0.206	0.166
Ischemic heart disease	I25	0.290	0.336	0.370	0.383	0.364	0.348	0.347	0.302	0.256	0.208
Other heart disease	I00-I52 excl.I10. I25	0.094	0.115	0.135	0.143	0.130	0.123	0.130	0.106	0.086	0.067
Cerebrovascular disease	I67	0.363	0.414	0.446	0.457	0.441	0.424	0.414	0.368	0.317	0.261
Atherosclerosis	I70	0.129	0.154	0.167	0.171	0.167	0.156	0.141	0.122	0.101	0.078
Aortic aneurysm	I71	0.547	0.600	0.636	0.649	0.629	0.614	0.615	0.565	0.508	0.441
Other arterial disease	I72-I79	0.182	0.216	0.239	0.248	0.236	0.223	0.217	0.185	0.154	0.122
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.181	0.214	0.236	0.244	0.233	0.221	0.212	0.182	0.151	0.119
Bronchitis. emphysema	J20, J43	0.763	0.804	0.846	0.862	0.834	0.828	0.861	0.823	0.785	0.738
Chronic airways obstruction	J44.9	0.739	0.780	0.816	0.830	0.807	0.798	0.820	0.779	0.736	0.682
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005], List of causes of deaths and ICD 10 codes after [Assessment …2011].

Table 4.3.16 Attributable fractions for causes of death partially attributable to smoking according to age, women, Catalonia – 50% reduction of exposure

CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
NEOPLASMS											
Lip. oral cavity. pharynx	C00, C01-C06, C09-C10, C12-C14	0.409	0.464	0.518	0.539	0.504	0.490	0.519	0.458	0.401	0.339
Esophagus	C15	0.519	0.575	0.623	0.642	0.611	0.597	0.620	0.563	0.505	0.439
Stomach	C16	0.090	0.112	0.144	0.159	0.133	0.128	0.158	0.124	0.100	0.079
Pancreas	C25	0.194	0.232	0.277	0.297	0.264	0.254	0.286	0.236	0.196	0.158
Larynx	C32	0.678	0.725	0.767	0.783	0.756	0.746	0.770	0.723	0.673	0.613
Trachea. lung. bronchus	C33, C34	0.661	0.710	0.751	0.767	0.741	0.730	0.751	0.703	0.652	0.590
Cervix uteri	C53	0.084	0.103	0.122	0.130	0.117	0.111	0.119	0.097	0.078	0.061
Urinary bladder	C67	0.230	0.275	0.333	0.359	0.315	0.305	0.354	0.294	0.246	0.201
Kidney and renal pelvis	C64, C65	0.040	0.049	0.058	0.062	0.056	0.053	0.055	0.044	0.036	0.028
Acute myeloid leukemia	C92.0	0.077	0.098	0.134	0.152	0.121	0.117	0.157	0.120	0.096	0.076
CARDIOVASCULAR DISEASES											
Hypertension	I10	0.183	0.220	0.265	0.285	0.251	0.242	0.275	0.226	0.187	0.150
Ischemic heart disease	I25	0.225	0.266	0.300	0.313	0.292	0.279	0.286	0.243	0.204	0.163
Other heart disease	I00-I52 excl.I10. I25	0.074	0.091	0.110	0.118	0.105	0.100	0.110	0.088	0.071	0.055
Cerebrovascular disease	I67	0.281	0.326	0.359	0.371	0.353	0.338	0.336	0.291	0.247	0.200
Atherosclerosis	I70	0.085	0.102	0.111	0.114	0.111	0.104	0.093	0.080	0.065	0.050
Aortic aneurysm	I71	0.466	0.521	0.565	0.581	0.555	0.539	0.551	0.496	0.438	0.374
Other arterial disease	I72-I79	0.132	0.159	0.180	0.188	0.176	0.166	0.166	0.139	0.114	0.089
RESPIRATORY DISEASES											
Pneumonia. influenza	J10-J18	0.130	0.156	0.175	0.182	0.172	0.162	0.159	0.134	0.110	0.086
Bronchitis. emphysema	J20, J43	0.762	0.803	0.846	0.861	0.833	0.827	0.861	0.823	0.785	0.737
Chronic airways obstruction	J44.9	0.706	0.752	0.795	0.811	0.783	0.774	0.803	0.758	0.712	0.655
FIRE DEATHS	X00-X01	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230

Source: author's own calculation on the basis of: [SAMMEC 2001], [Ezzati et al.2005], List of causes of deaths and ICD 10 codes after [Assessment …2011].

4.3.3 Drugs

Table 4.3.17 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Catalonia – 0% reduction of exposure

GENDER	CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
MEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.945	0.943	0.937	0.926	0.907	0.872	0.802	0.649	0.326	0.220
	Hepatitis C	B18.1	0.947	0.945	0.939	0.929	0.910	0.876	0.808	0.657	0.334	0.226
WOMEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.934	0.907	0.868	0.816	0.756	0.699	0.654	0.613	0.542	0.323
	Hepatitis C	B18.1	0.936	0.910	0.872	0.822	0.763	0.706	0.662	0.621	0.551	0.331

Source: ALICE RAP, Del.6.1, p.69 (table 4.3.7).

Table 4.3.18 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Catalonia – 10% reduction of exposure

GENDER	CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
MEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.939	0.937	0.931	0.919	0.898	0.860	0.785	0.625	0.303	0.202
	Hepatitis C	B18.1	0.941	0.939	0.933	0.921	0.901	0.864	0.791	0.633	0.311	0.208
WOMEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.927	0.897	0.855	0.800	0.736	0.676	0.629	0.587	0.516	0.300
	Hepatitis C	B18.1	0.929	0.900	0.860	0.806	0.743	0.684	0.638	0.596	0.525	0.308

Source: author's own.

Table 4.3.19 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Catalonia – 20% reduction of exposure

GENDER	CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
MEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.932	0.930	0.923	0.910	0.886	0.845	0.765	0.597	0.279	0.184
	Hepatitis C	B18.1	0.934	0.932	0.925	0.912	0.890	0.849	0.771	0.605	0.286	0.189
WOMEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.918	0.886	0.840	0.781	0.713	0.650	0.602	0.558	0.486	0.276
	Hepatitis C	B18.1	0.921	0.889	0.845	0.787	0.720	0.658	0.610	0.567	0.495	0.283

Source: author's own.

Table 4.3.20 Attributable fractions for causes of death partially attributable to illicit drugs use according to age, Catalonia – 50% reduction of exposure

GENDER	CAUSES OF DEATH	ICD10 CODES	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
MEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.896	0.892	0.882	0.863	0.830	0.773	0.670	0.481	0.195	0.123
	Hepatitis C	B18.1	0.899	0.896	0.886	0.867	0.835	0.779	0.678	0.489	0.200	0.127
WOMEN	Hepatitis B	B17.1, B18.2, B16, B18.0	0.875	0.829	0.767	0.690	0.608	0.537	0.486	0.442	0.372	0.193
	Hepatitis C	B18.1	0.879	0.834	0.773	0.697	0.616	0.546	0.495	0.450	0.380	0.198

Source: author's own.

PART II

Minimum pricing of alcohol versus social and economic costs in Poland

Artur Bartoszewicz
Katarzyna Okulicz-Kozaryn
Krzysztof Brzózka
Marta Zin-Sędek

1 Introduction

The purpose of this analysis is to identify the scale of changes in the values of various socio-economic costs resulting from alcohol drinking in Poland, as a result of applying alcohol minimum unit pricing.

The short-term and long-term price and income elasticities of demand for alcohol were obtained from the research by Laboratory of Applied Mathematics in Economics at the Faculty of Management, University of Science and Technology in Krakow, based on error correction almost ideal demand system (*EC-AIDS*). For the purpose of the mentioned research, the GUS annual data for the period of 1961-2008 were used in the process of estimation.

This study is based on the results of the Deliverable 6.1 report *Social costs: a report specifying the costs of addiction to societies* of the ALICE RAP project, and the socio-economic costs of consumption of alcoholic beverages in Poland, identified in it.

The analysis was performed with the use of the data for the year 2010, and in the event of absence of the possibility of obtaining the relevant data, data for the period of 2009-2012 were used, assuming that the changes in individual values in such a short period of time will not significantly influence the final results of the study.

This part of D6.2 presents the overall situation in the market of alcoholic beverages in Poland, with particular emphasis on consumer attitudes towards this type of consumer goods. Subsequently, the methodological basis related to the estimation of the price elasticity of demand were identified and, on the basis of the results of the above cited research, specific values of price elasticity of demand were adopted, which served for further analysis and the final inference. Part II of D6.2 then presents assumptions and mechanisms of the impact of a minimum price of alcohol. Later, as a result of identification of social and economic costs of alcohol consumption, the impact of the minimum price of alcohol on the scale of selected costs reduction was analysed. Finally, the study presents conclusions and recommendations with regard to the use of a minimum pricing of alcohol in Poland.

In the study, the minimum price in the range of 1.50 PLN to 3.00 PLN was adopted; however, the final analysis has been presented for the minimum price of 2.00 PLN per 10 grams of pure alcohol.

A significant assumption made is that there will be no compensation for the loss of demand for higher-priced products from official sources by replacing it with an increased demand for goods from illegal sources. This might be possible if an extra supply of smuggled or illegally manufactured products at low prices appeared on the market. Therefore, the introduction of the proposed solutions must be combined with improved protective measures taken at the border and increased intensity of actions limiting the illegal manufacture of alcoholic beverages, particularly vodka.

This study should be perceived as the first attempt to estimate the impact resulting from the application of this solution on the changing of consumer behaviour and the reduction of socio-economic costs of alcohol consumption in Poland. Both the very issue, as well as the real impact of the proposed solution requires further study and improvement of assessment tools, and, above all, supplementation of information in the sphere of assumptions, adopted at this stage.

2. Alcoholic beverages market and consumer behaviour

According to the data provided by GUS (Poland's Central Statistical Office) and analyses of the Institute of Agricultural and Food Economics at the National Research Institute, the size of demand for alcoholic beverages in Poland in the period 1998-2012 is as follows. According to the global accounts, in the period of 1998-2012, nominal private consumption of alcoholic beverages increased by over 80%, but in constant prices, the increase amounted to 24%. **Throughout the 15 years' period, individual consumption of alcoholic beverages was increasing at a rate of approx. 4.1% per year, while in constant prices - approx. 1.4% per year.** The greatest rate of increase in spending on alcoholic beverages (in comparable prices) occurred in the period of 2003-2007. It amounted to 4% per year in that period, while it had been negative in the years 1998-2002 in spending on alcoholic beverages (a decrease by 1.3% per year). The share of consumption of alcoholic beverages in individual households was declining steadily. It decreased from 7% in 1997 to 3.9% in 2012. In the years 1998-2012, individual consumption of alcoholic beverages and tobacco products increased by nearly 15%, while their sales - by 2%. The GUS estimates show that in the analysed period, the consumption of wine and mead was systematically decreasing, while consumption of beer increased. In the years 1997-2012, wine consumption has decreased by more than half (from 12.8 litres to 5.9 litres). **Beer consumption increased by 83% and its fastest growth was recorded in the years 1998-2002 (7.3% per year), and over the next five-year period - by 5.7% per year.** In turn, changes in the consumption of spirits, liqueurs and other spirituous beverages varied. In 1997-2002, the consumption of these drinks coming from legal source decreased by 2/5. In the following six years, it had an upward trend and in 2008, it reached 3.4 l 100º/person, with a growing share of the shadow economy. In the period of 2009-2012, a decline in consumption (12%, to 3 litres) was registered again. In 2012, it was approx. 1/4 larger than in 1998. In the years 1998-2012, domestic demand for beer grew steadily (with the exception of the year 2009) at a rate of 4.6% per year. On the other hand, trends in demand for grape wine varied, but throughout the entire analysed period, it decreased by more than half. The consumption of fermented beverages (from approx. 400 million litres in 1999 to 120 million litres in 2012) systematically decreased, while that of wines increased, but in 2012, it was still slightly lower than in 1999. The consumption of spirits declined in the first analysed five-year period, and, following an easing in the excise tax policy, it significantly increased, exceeding the level marked in 1997 (by 15%)[8].

The producer and consumer prices of spirits in Poland, according to GUS data and analyses by the Institute of Agricultural and Food Economics at the National Research Institute, for the period of 1998-2012 are as follows. The drink prices at the producer level varied similarly to food, because their growth rate was similar in the periods studied, and a greater difference between the two (by 1.1 percentage points) occurred only in the last five years. Changes in consumer prices for alcoholic beverages were the highest in the period of 1998-2002 and only by 0.9 percentage points lower than inflation. In the following five years, the retail prices of alcoholic beverages decreased, but then they began to increase again at a rate of 2.5% per annum. In the period of 2003-2007, the retail prices of wine and beer were practically stable, while those of spirits fell at a rate of 3% per year. **In the last five years, differences in the rate of growth in consumer prices of individual alcoholic beverages were insignificant, and in the entire analysed period, the price of all types of those drinks relatively decreased.** In the analysed period, there were no major differences in the growth rates of all beverage producer prices by 49.2% and retail prices of alcoholic beverages by 47.1%, including spirits by 30.8%, 56.1% wine and beer by 57, 6%.[9]

[8] Based on GUS Statistical Yearbooks for the years 1997-2012, GUS Concise Statistical Yearbook 2013 and the Internal Market in 2012. More information: *Procesy dostosowawcze polskiego przemysłu spożywczego do zmieniającego się otoczenia rynkowego (3*) [The adjustment processes of Polish food industry to the changing market environment (3)], collective work, academic editing by R. Mroczek, Ph.D., Eng., Institute of Agriculture and Food Economics at the National Research Institute, Warsaw 2013, p. 164 et seq.

[9] Based on GUS Statistical Yearbooks for the years 1997-2012, GUS Concise Statistical Yearbook 2013 and the Internal Market in 2012. More information: Ibidem, p. 171 et seq.

The scale of consumption of unregistered alcohol is illustrated by the data given below. It should be emphasised, citing the report *State budget losses due to errors of the Ministry of Finance*, produced by the Association of Entrepreneurs and Employers, that the estimates of the scale of this phenomenon are extremely divergent.[10] According to the calculations made within the AMPHORA project[11], consumption of unregistered alcohol in Poland amounts to 3.7 litres of 100% alcohol per capita (for people aged 15 years and older). **In practice, unregistered alcohol includes mainly illegal spirits, while the production of beers and wines is negligible: it does not exceed 1/6 of the total production of alcoholic beverages**. People aged 15 years and older account for 85% of the Polish population, which is 32.760 million citizens[12]. This would mean that the unregistered spirits market in Poland is more than 120 million litres, while liquors constitute more than 100 million litres. The report of the European Commission and the World Health Organisation quotes other data, which suggest that the unregistered alcohol consumption is 3 litres per capita (among people over 15 years of age)[13]. This gives a total of approx. 98 million litres of alcoholic beverages, including approx. 82 million spirits in the grey and black economy. The KPMG report, in turn, states that on the basis of modular supply analysis, the volumes of unregistered liquors use was estimated at 11.5 million litres of 100% alcohol, while on the basis of overall demand analysis – at 11.7 million litres of 100% alcohol.[14]

Social perception of changes in the prices of alcoholic beverages was as follows. **According to the CBOS (Public Opinion Research Center) research, the only category of products perceived more frequently as decreasing than increasing in price were alcoholic beverages; also, types of alcoholic beverages were rarely changed to their cheaper equivalents.** Merely over a quarter of respondents did not purchase alcoholic beverages. About 30% of consumers have reduced the volume or changed the quality of purchased alcoholic beverages (this information should be approached with caution, as one can assume that it is a result of the 'correctness' of response, intended by respondents). **The noted price movement did not bring about the substitution of alcoholic beverages, which recently have been often perceived as decreasing in price.** Also, the perception of changes in consumer prices had no significant effect on the amount of consumed alcohol and stimulants. **Per capita family income most strongly influenced, among others, the amount of purchased alcohol**.[15]

Another CBOS report presents social attitudes towards alcohol. It shows that **alcohol is not avoided by more than three-quarters of adult Poles (76%), with two-thirds (65%) claiming to drink occasionally, and every ninth person (11%) - frequently.** More than one-fifth of the respondents (22%) declared abstinence. Over the past thirteen years, the group of abstainers has increased (by 6 percentage points), while the percentage of those who drink alcohol occasionally, has decreased (by 4 points). The use of alcohol is strongly influenced by the sex of respondents: it is consumed by an overwhelming majority of men (84%), while among women, almost a third (30%) are abstainers. People's age also plays an important role in this matter. The youngest respondents constitute the relatively largest group of drinkers (89%). Among respondents under 55 years of age, at least eight out of ten drink alcohol occasionally. This percentage is lower in the group of people aged 55-64 (72%) and the lowest - among the oldest respondents (49%). **The most commonly consumed alcohol is beer (52% of indications among those who declare alcohol use).** In the past three years, its popularity has increased even more. It is also worth noting that while wine, which

[10] The report *Straty budżetu państwa z powodu błędów Ministerstwa Finansów* [State Budget Losses Due to Errors of the Ministry of Finance]. Association of Entrepreneurs and Employers, Warsaw 2014, p. 25 et seq.

[11] For more information see: Quality of illegally and informally produced alcohol in Europe: Results from the AMPHORA project, p. 135

[12] For more information see: Podstawowe informacje o rozwoju demograficznym Polski do 2012 r. [Information on basic demographic development in Poland until 2012], p. 14, GUS

[13] For more information see: Word Health Organisation, *Alcohol in European Union*, p. 138

[14] For more information see: KPMG Report, Szara strefa wyrobów spirytusowych w Polsce [The gray zone of spirits in Poland].

[15] For more information see: *Postrzegane zmiany cen i ich konsekwencje dla konsumpcji* [Perceived changes in prices and their implications for consumption], Survey report, BS/121/2004, CBOS, Warsaw, July 2004.

belongs to the relatively frequently consumed alcohol (21%), was, in fact, indicated by the same number of respondents as three years before, the popularity of vodka has significantly decreased over this period (from 24% to 17%). A group of people reaching for high-quality alcohols has not changed (6%).

Preferences in the choice of alcohol depend on the sex and age of respondents. Beer, as most frequently consumed, was indicated by the majority of men who declare drinking alcohol (70%) and less than a third of women (30%). Conversely, wine is much more popular among women (38%) than men (6%). In addition, the popularity of beer decreases with growing age of respondents. The oldest people opt for vodka and other spirits, such as brandy or whiskey, much more frequently than representatives of younger generations. Beer is the most popular alcoholic beverage in all generations of men, while for women – it is only in the group of younger respondents (up to 34 years of age) that these indications prevail over those that point to wine. As declared by respondents, beer is the most frequently consumed alcoholic beverage. **More than one third of those who declare alcohol use (36%), drinks beer at least once a week, while one in twenty (5%) - daily.** Almost every third person (32%) reaches for the drink one to three times a month, and about one in five (19%) even less often. Relatively few are those who drink alcohol but never reach for a beer (12%). At least once a month, every fourth respondent (27%) drinks wine, while one in three (32%) – vodka. Wines are not consumed by a quarter (24%) of respondents, and spirits – by an even smaller group (15%). The least frequently consumed are other spirits such as brandy or whiskey. Most people (26%) state that they drink once a year, and 40% - shun the two types of beverage completely. One of these alcohols is consumed at least every other day by 15% of respondents, while more than a quarter (27%) reaches for alcohol 1-2 times a week, one-fifth (21%) - 2-3 times a month, and one in seven (15%) - no more than once a month. The remaining part of respondents (23%) consumes alcohol even less frequently. Drinking frequency depends heavily on the sex of respondents. At least once a week, alcohol is consumed by more than three-fifths of men (62%) and every fifth woman (20%). Dependence on age is less clearly marked, although - generally speaking - the older the respondents, the less frequently they consume alcohol.

Average monthly expenditures on alcohol are less than 50 PLN.[16] The amount of money that one-third of drinkers (34%) spends on alcohol is less than 25 PLN, while one quarter (23%) – 26 PLN to 50 PLN. One-tenth (10%) declared spending 51 PLN to 100 PLN, and every fourteenth (7%) - even higher amounts of money. Roughly one in eight respondents who use alcohol (12%) does not spend money for this purpose. On average, men spend almost twice as much money on alcohol as do women (61.68 PLN as compared to 33.61 PLN). People aged 25 to 44 spend relatively more money on alcohol than other age groups, while older respondents spend less. Expenditures of the youngest respondents do not differ from the average for the entire group of respondents. Those most educated and residents of the largest cities spend more than average on alcohol (65.17 PLN and 71.78 PLN, respectively). Interestingly, people who evaluate their financial situation as bad spend more money on alcohol per month than affluent people (60.19 PLN as compared to 53.67 PLN), while those who assess their financial status as medium, spend the smallest amount (42.95 PLN).

Nearly all respondents who consume alcohol estimate that they drink very little (49%) or within the limits (47%). Only a few admit that they drink too much (2%). Men usually state that they use alcohol within the limits (56%), while women often declare that they consume very little alcohol (61%). Most drinkers (62%) state that they don't ever get drunk. One in twelve (8%) admits that he/she gets drunk at least once a month, with half of them - more than once a month. Nearly one third of drinkers (31%) declares that they become intoxicated once a year or even less frequently. 48% of men and 12% women who use alcohol, get drunk at least once a year. An important role is also played by the age - the older the respondents are, the less frequently they happen to be under the influence of alcohol. **Most Poles (63%) personally know someone who - in their opinion - abuses alcohol.** Three-fifths of respondents (59%) know no more than five persons abusing alcohol, with more than two-fifths (42%) - from three to five, while the rest (17%) –

[16] an average = 49.95, median = 30.

fewer. More than one-fifth of adults (22%) have six to ten alcohol abusers in their environment. Every tenth knows even more abusive drinkers.[17]

3. Methodological assumptions

For the purpose of this study, a research of the Laboratory of Application of Mathematics in Economics at the Faculty of Management of the University of Science and Technology in Krakow, was used. [18] The research was based on the AIDS (almost ideal demand system) model. It has already been successfully used, among others, for the data concerning the meat market and tourism. As a result, its modifications have become the most popular tool for analysing the demand for alcohol.[19] For these needs, the error correction model (EC-AIDS) is also used.[20] **The numbers indicated below were determined using the EC-AIDS model,** which is a tool that takes into account non-stationarity of the data under consideration and the effect of the formation of habits.

In the estimation process, **annual data from the period of 1961 to 2008 were used**, as they were based on publications of the Central Statistical Office (ie. statistical yearbooks and prices in the national economy). In order to determine the amount of alcohol consumed, the authors used the data on the consumption of properly registered spirits, beer, wine and mead. **The original data was converted in such a manner so that they would express the consumption in litres of pure alcohol per person aged 15 years and older.** For this purpose, it was assumed that beer has 4%, and wine - 12.5% of pure alcohol content. As for the data regarding prices, prices of appropriate representatives were applied. They have been converted in such a manner so that they would express constant prices in the year 2008.[21] In the process of analysis, the following long-term and short-term assessment of the elasticity of demand for alcohol has been obtained (see table 3.1 and table 3.2).

Table 3.1. Long-term price and income elasticity of demand for alcohol

Type of alcoholic beverage	Price elasticities of Marshall demand			Price elasticities of Hicks demand			Income elasticities
	Spirit	Beer	Wine	Spirit	Beer	Wine	
Spirit	-0,63	-0,34	-0,03	0,11	-0,07	0,26	1,29
Beer	-0,48	-0,26	-0,54	-0,14	-0,03	-0,06	0,50
Wine	0,26	-0,55	-0,43	0,67	-0,40	-0,27	0,72

Source: Wolak J., Pociejewski G., *Analiza popytu na alkohol w Polsce z zastosowaniem modelu korekty błędem AIDS*, [The analysis of the demand for alcohol in Poland using error correction model of AIDS], Managerial Economics 2011, No. 10, p. 168, on the basis of the GUS data from 1961 to 2008

As interpreted by the authors of the study, the results indicate that **on the Polish market, all three types of alcohol are characterised by inelastic demand.** Spirits show the greatest sensitivity to price changes. In their case, in response to a one-percent increase in price, the expected decline in uncompensated demand is 0.74% for short-term elasticity, and 0.63% for long-term elasticity. Consumer income growth by 1%, in turn, will result in more than proportional increase in demand, which means that this type of alcohol

[17] For more information see: *Postawy wobec alkoholu* [Attitudes towards alcohol], Survey report, BS/116/2010, CBOS, Warsaw, August 2010.

[18] For more information see: Wolak J., Pociejewski G., *Analiza popytu na alkohol w Polsce z zastosowaniem modelu korekty błędem AIDS*, [The analysis of the demand for alcohol in Poland using error correction model of AIDS], Managerial Economics 2011, No. 10, pp. 161-172.

[19] For more information see: Andrikopulos A.A, Loizides J., *The demand for home-produced and imported alcoholic beverages in Cyprus: the AIDS approach*, "Applied Economics" 2000, 32, pp. 1111–1119. Blake D., Nied A., *The demand on alcohol in the United Kingdom*, "Applied Economics" 1997, 29, pp. 1655–1672.
Chang C., Griffith G., Bettington N., *The Demand for Wine in Australia Using a Systems Approach: Industry Implications*, "Agribusiness Review" 2002, 10, pap. 9.

[20] For more information see: Eakins J.M., Gallagher L.A., *Dynamic almost ideal demand systems: an empirical analysis of alcohol expenditure in Ireland*, "Applied Econo-mics" 2003, 35 (9), pp. 1025–1036.

[21] For further information on estimation please refer to: Wolak J., Pociejewski G., *Analiza popytu na alkohol w Polsce…*, [The analysis of the demand for alcohol in Poland…], pp. 165-169.

(spirit) can be classified as luxury goods. In the short term, the demand for spirits rises by 1.22%, while in the long-term - by 1.29%.

According to the authors of the study, **the values of price and income elasticities of demand for beer and wine are much lower.** Consequently, these two types of alcohol can be considered as basic goods with inelastic demand. In the case of beer, price elasticities of Marshall demand are respectively -0.32% in the short-term and -0.26 in the long-term period. When it comes to changes in demand in response to higher incomes, they are also insignificant. On the other hand, one-percent increase in consumer income results in an increase of the demand for beer by 0.49% in the short term and by 0.5% in the longer term. Slightly higher estimates were obtained in the case of wine. They amount to -0.29 and -0.43 for the price elasticity of Marshall demand for these goods for the short and long term, respectively. Also, the response of demand to a one-percent increase in consumer income is less than proportional. It amounts to 0.9% in the short-term and 0.72% in the long-term period.

Table 3.2. Short-term price and income elasticity of demand for alcohol

Type of alcoholic beverage	Price elasticities of Marshall demand			Price elasticities of Hicks demand			Income elasticities
	Spirit	Beer	Wine	Spirit	Beer	Wine	
Spirits	-0,74	-0,21	-0,27	-0,04	0,04	0,00	1,22
Beer	-0,17	-0,32	-0,01	-0,04	-0,03	0,00	0,49
Wine	-0,51	-0,09	-0,29	0,02	0,10	-0,08	0,90

Source: Wolak J., Pociejewski G., *Analiza popytu na alkohol w Polsce z zastosowaniem modelu korekty błędem AIDS*, [The analysis of the demand for alcohol in Poland using error correction model of AIDS], Managerial Economics 2011, No. 10, p. 169, on the basis of the GUS data from 1961 to 2008

The evaluation of elasticities of Hicks demand, adopted in the study, is relatively small and, apart from the long-term price elasticity of demand for spirits, it has the correct sign, while wine features **the biggest substitution change in demand**. According to the authors of the quoted study, **in the case of spirits,** obtained estimates are slightly **distorted** due to a high value of the income elasticity of demand. **Having been determined on the basis of data on registered demand, the value does not take into account the consumption of alcohol from illegal sources**. A negative sign of the long-term mixed price elasticities of uncompensated demand that occurs in nearly all examined cases, indicates that **the types of alcohol considered in the study constitute complementary goods.**

This relationship **exists not only in the case of wine and spirits**, for which the signs are different (Marshall demand) or even positive (Hicks demand), which suggests the existence of **substitution compounds**. **Short-term** relationships tend to be much lower in values and point to a rather **complementary nature**.[22]

It is worth noting that these results are consistent in their direction with the analyses of C.A. Gallet, who carried out a meta-analysis of **132 studies** and stated the average price elasticity for all types of alcoholic beverages at the level of -0.52 in a short-time period and -0.82 in the long-term period.[23] In domestic studies, short-term values are higher than their long-term equivalents, but it may be due to the specific nature of consumption of alcoholic beverages and the level of prosperity.

4. Minimum reference price for alcohol

The concept of a minimum reference price per alcohol serving assumes the introduction of a minimum retail price for a standard serving of alcohol. Here, the reference portion of 10 g of 100% alcohol has been adopted. It is assumed that the same reference rate for all types of alcohol is used.

[22] Ibidem, s. 169-170.

[23] Gallet C.A., The demand for alcohol: a meta-analysis of elasticities. The Australian Journal of Agricultural and Resource Economics 2007, 51, pp. 121–135.

The introduction of the rate is aimed at reducing the consumption of alcoholic beverages containing higher portions of pure alcohol, especially in groups of beverages such as beer and wine with high alcohol content, whose availability is relatively high due to low consumer price, as shown by the studies. In particular, the study assumes a restricted access of social groups who consume alcohol, but have limited income (youth aged 15-24).

The proposed solution was introduced in Canada.[24] In numerous countries, such as Australia, Ireland, Wales, Scotland, or New Zealand the most extensive research in this area is being conducted.[25]

The value of a minimum price has already been adopted in some countries, while in other countries it is only being tested. For example, in Canada, the analysis is carried out for 1.5 CAD, which is approx. 4.60 PLN. Taking into account values of salaries in both countries, including the PPP (Purchasing Power Parity), the relationship is as follows: Canada - 2.724 USD, while Poland - 1.536 USD, and so, salary in Poland constitutes 0.56% of the salary in Canada.[26] Having this in mind, it can be estimated that, in fact, the minimum price subject to testing is 2.56 PLN. Additionally, if one considers that in Canada it is referred to the so-called *standard drink*, or 13.45g of pure alcohol (17.05 ml of ethanol), then the minimum price in relation to 10 g would amount to 1.92 PLN. On the other hand, in Scotland, Ireland and Wales, the values have been set at approx. 0.45-0.50 GBP, i.e. approx. 2.92 PLN. The minimum price is calculated with the use of the following formula: MCJ x A% x V/L x 100. (The minimum unit price x percentage of alcohol x capacity in litres x 100). Taking into account the values of salaries in both countries, including the PPP (Purchasing Power Parity), the relationship is as follows: Great Britain - approx. 3.065 USD, while Poland – 1.536 USD, i.e. salary in Poland is 0.50% of salary in Great Britain.[27] Having this in mind, it can be estimated that, in fact, the minimum price subject to testing is 1.46 PLN.

It is estimated, for example, that the decision of the Canadian province of Saskatchewan to establish minimum prices for alcohol was very effective in reducing harmful consumption of alcohol. During its implementation, more than 10 years ago, the decision was very unpopular politically. However, it was calculated that a 10% increase in the minimum price for all drinks was associated with a decrease of 8.4% of the total consumption. The Centre for Addictions Research of British Columbia (BC) assessed the implementation of minimum prices for alcohol in BC and reported that 10% of the increase in the minimum price of alcohol reduces consumption of spirit by 6.8%, wine – by 8.9%, coolers and cider - by 13.9% , beer by 1.5%, and all alcoholic beverages - by a total of 3.4%.[28]

For the purposes of this study, the authors adopted the values of the minimum price in the range of 1.50 PLN - 3.00 PLN, i.e. minimum price values used in other countries, with their calculation based on PPP. Using the seven price levels: 1.5; 1.75; 2.00; 2.25; 2.50; 2.75 and 3.00 PLN, the minimum consumer price of a given type of alcoholic beverage has been identified. The analysis was performed for 10 types of beer with alcohol content in the range of 0,5-9,5 and different capacities of 330 ml and 500 ml (see Table 4.1).

[24] Model-based appraisal of alcohol minimum pricing in Ontario and British Columbia. A Canadian adaptation of the Sheffield Alcohol Policy Model version 2, ScHARR, University of Sheffield, December 2012.
[25] For more information see: *The Effectiveness of Alcohol Pricing Policies. Reducing harmful alcohol consumption and alcohol-related harm*, Ministry of Justice, Wellington 2014; The Cost of Alcohol: A Minimum Price per Unit of Alcohol, Report 2009; Independent Review of The Effects of Alcohol Pricing And Promotion: Part B Modelling the Potential Impact of Pricing and Promotion Policies for Alcohol in England: Results from the Sheffield Alcohol Policy Model Version 2008(1-1).
[26] On the basis of the statistics prepared by the International Labour Organisation, BBC gathered data on the average wage in 72 countries around the world and compared their actual purchasing power (2012). Source: Forsal.pl
[27] On the basis of the statistics prepared by the International Labour Organisation, BBC gathered data on the average wage in 72 countries around the world and compared their actual purchasing power (2012). Source: Forsal.pl
[28] Model-based appraisal of alcohol minimum pricing in Ontario and British Columbia…, p. 8.

For calculations, the following formula was adopted:

WPA = V*A*D
WPA – weight of alcohol serving (g)
V – volume (ml)
A – alcohol content (%)
D = 0,8 – ethanol density ratio (g/ml), for weight and volume concentration equals 100%.
KMCP = WPA*RSPA/10
KMCP – consumer minimum price of the product
RSPA – reference rate for alcohol serving PLN/10 g

Table 4.1. The estimated values of the minimum price (KMCP) of individual alcoholic beverages depending on the assumed rate per alcohol serving (from 1.50 to 3.00 PLN).

Assumption: reference portion of alcohol determined as 10 g of pure alcohol						The ratio of minimum price for alcohol serving (PLN) and the final minimum price of the product (PLN)						
Alcoholic beverage	Volume in ml	Alcohol content in %	Alcohol volume in ml	Weight ratio	Weight of alcohol serving in grams	1,50	1,75	2,00	2,25	2,50	2,75	3,00
Beer	330	0,5	1,7	0,8	1,32	0,20	0,23	0,26	0,30	0,33	0,36	0,40
	500	1,1	5,5	0,8	4,40	0,66	0,77	0,88	0,99	1,10	1,21	1,32
	330	2,5	8,3	0,8	6,60	0,99	1,16	1,32	1,49	1,65	1,82	1,98
	330	3,5	11,6	0,8	9,24	1,39	1,62	1,85	2,08	2,31	2,54	2,77
	500	4,5	22,5	0,8	18,00	2,70	3,15	3,60	4,05	4,50	4,95	5,40
	500	5,6	28,0	0,8	22,40	3,36	3,92	4,48	5,04	5,60	6,16	6,72
	500	6,0	30,0	0,8	24,00	3,60	4,20	4,80	5,40	6,00	6,60	7,20
	500	6,5	32,5	0,8	26,00	3,90	4,55	5,20	5,85	6,50	7,15	7,80
	500	7,8	39,0	0,8	31,20	4,68	5,46	6,24	7,02	7,80	8,58	9,36
	500	9,5	47,5	0,8	38,00	5,70	6,65	7,60	8,55	9,50	10,45	11,40
Wine	750	10,0	75,0	0,8	60,00	9,00	10,50	12,00	13,50	15,00	16,50	18,00
	750	13,0	97,5	0,8	78,00	11,70	13,65	15,60	17,55	19,50	21,45	23,40
	750	19,0	142,5	0,8	114,00	17,10	19,95	22,80	25,65	28,50	31,35	34,20
Liqueur	500	21,0	105,0	0,8	84,00	12,60	14,70	16,80	18,90	21,00	23,10	25,20
Vodka	100	32,0	32,0	0,8	25,60	3,84	4,48	5,12	5,76	6,40	7,04	7,68
	100	40,0	40,0	0,8	32,00	4,80	5,60	6,40	7,20	8,00	8,80	9,60
	500	38,0	190,0	0,8	152,00	22,80	26,60	30,40	34,20	38,00	41,80	45,60
	500	40,0	200,0	0,8	160,00	24,00	28,00	32,00	36,00	40,00	44,00	48,00

Source: Own calculations based on the PARPA data.

The prices of individual products, taken for analysis, have the characteristics of average prices, and may differ significantly from those perceived by individual consumers. At this stage of designing of public decision, it is not important to determine in detail, the scale of impact of the proposed solutions on each available alcoholic beverage consumed by individuals (purchased in shops, restaurants, bars, etc.). It is

important to identify trends and directions of potential changes in pricing policies with regard to alcoholic beverages.

Should the minimum price for the reference serving of alcohol be assumed at the amount of 1.50 PLN, a can of beer with a capacity of 0.5 litres and 4.5% alcohol content would have to cost at least 2.70 PLN, but were we to set the minimum reference price at 2.00 PLN, its price for the consumer would attain the value of 3.60 PLN. A bottle of wine with a capacity of 750 ml and alcohol content of 19% at the minimum reference price of 1.75 PLN would have to cost 19.95 PLN, while at the minimum reference price of 3.00 PLN – as much as 34.20 PLN.

The table below presents the differences in current retail prices and the prices arising from the introduction of a reference price of a minimum alcohol serving. The listed negative values (marked in red) indicate that today's retail price is higher than the proposed minimum price (in this case, the introduction of the proposed solutions for these products would not cause any changes, as one cannot expect that manufacturers and retailers would reduce their margins for this reason), while positive values indicate the value by which the price of a selected type of alcoholic beverage would have to increase (this would affect the retail price, and the benefits of this increase would be shared between manufacturers, dealers and retailers). For example, a bottle of beer with a capacity of 330 ml and 2.5% alcohol content does not receive an order for a price increase in any of the proposed reference price levels; however, in the case of beer with alcohol content of 5,6-9,5%, in each case, the need will arise to increase the retail price from PLN 0.45 for a separate product to up to PLN 7.90 of additional amount to the current retail price paid by the final consumer (see table 4.2).

Table 4.2. The estimated prices of alcoholic beverages and the difference in retail price following the introduction of a minimum price for alcohol (from 1.50 to 3.00 PLN)

Alcoholic beverage	Volume in ml	Alcohol content in %	Average price in PLN	**1,50**	**1,75**	**2,00**	**2,25**	**2,50**	**2,75**	**3,00**
Beer	330	0,5	**3,00**	-2,80	-2,77	-2,74	-2,70	-2,67	-2,64	-2,60
	500	1,1	**3,27**	-2,61	-2,50	-2,39	-2,28	-2,17	-2,06	-1,95
	330	2,5	**3,00**	-2,01	-1,85	-1,68	-1,52	-1,35	-1,19	-1,02
	330	3,5	**3,00**	-1,61	-1,38	-1,15	-0,92	-0,69	-0,46	-0,23
	500	4,5	**3,12**	-0,42	0,03	0,48	0,93	1,38	1,83	2,28
	500	5,6	**2,91**	0,45	1,01	1,57	2,13	2,69	3,25	3,81
	500	6,0	**3,12**	0,48	1,08	1,68	2,28	2,88	3,48	4,08
	500	6,5	**3,50**	0,40	1,05	1,70	2,35	3,00	3,65	4,30
	500	7,8	**3,50**	1,18	1,96	2,74	3,52	4,30	5,08	5,86
	500	9,5	**3,50**	2,20	3,15	4,10	5,05	6,00	6,95	7,90
Wine	750	10,0	**17,29**	-8,29	-6,79	-5,29	-3,79	-2,29	-0,79	0,71
	750	13,0	**17,80**	-6,10	-4,15	-2,20	-0,25	1,70	3,65	5,60
	750	19,0	**21,28**	-4,18	-1,33	1,52	4,37	7,22	10,07	12,92
Liqueur	500	20,0	**52,99**	-40,39	-38,29	-36,19	-34,09	-31,99	-29,89	-27,79

Vodka	100	32,0	**4,74**	-0,90	-0,26	0,38	1,02	1,66	2,30	2,94
	100	40,0	**4,78**	0,02	0,82	1,62	2,42	3,22	4,02	4,82
	500	38,0	**21,11**	1,69	5,49	9,29	13,09	16,89	20,69	24,49
	500	40,0	**19,59**	4,41	8,41	12,41	16,41	20,41	24,41	28,41

Source: Own calculations based on the PARPA data.

Analyses allow to determine an estimated increase in prices of alcoholic beverages following the introduction of particular levels of minimum reference prices (see table 4.3). A zero value growth indicates that the proposed value of the minimum reference price of alcohol does not influence any particular type of product at any assumed level and will not affect the final price. The specified percentage values determine the value of percentage points by which its value will ultimately have to increase in relation to the current price paid by the consumer.

Table 4.3 The estimated increase in prices of alcoholic beverages after the introduction of a minimum price for alcohol (from 1,50 to 3,00 PLN)

Alcoholic beverage	Volume in ml	Alcohol content in %	Average price in PLN	**1,50**	**1,75**	**2,00**	**2,25**	**2,50**	**2,75**	**3,00**
Beer	330	0,5	**3,00**	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
	500	1,1	**3,27**	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
	330	2,5	**3,00**	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
	330	3,5	**3,00**	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
	500	4,5	**3,12**	0,00%	0,96%	15,38%	29,81%	44,23%	58,65%	73,08%
	500	5,6	**2,91**	15,46%	34,71%	53,95%	73,20%	92,44%	111,68%	130,93%
	500	6,0	**3,12**	15,38%	34,62%	53,85%	73,08%	92,31%	111,54%	130,77%
	500	6,5	**3,50**	11,43%	30,00%	48,57%	67,14%	85,71%	104,29%	122,86%
	500	7,8	**3,50**	33,71%	56,00%	78,29%	100,57%	122,86%	145,14%	167,43%
	500	9,5	**3,50**	62,86%	90,00%	117,14%	144,29%	171,43%	198,57%	225,71%
Wine	750	10,0	**17,29**	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	4,11%
	750	13,0	**17,80**	0,00%	0,00%	0,00%	0,00%	9,55%	20,51%	31,46%
	750	19,0	**21,28**	0,00%	0,00%	7,14%	20,54%	33,93%	47,32%	60,71%
Liqueur	500	20,0	**52,99**	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Vodka	100	32,0	**4,74**	0,00%	0,00%	8,02%	21,52%	35,02%	48,52%	62,03%
	100	40,0	**4,78**	0,42%	17,15%	33,89%	50,63%	67,36%	84,10%	100,84%
	500	38,0	**21,11**	8,01%	26,01%	44,01%	62,01%	80,01%	98,01%	116,01%
	500	40,0	**19,59**	22,51%	42,93%	63,35%	83,77%	104,19%	124,60%	145,02%

Source: Own calculations based on the PARPA data.

The analysis shows that the introduction of minimum reference prices for alcohol servings significantly affects the final prices of alcoholic beverages with a high alcohol content; thus, it is consistent with the logic of the consumers' 'movement' towards the consumption of alcoholic beverages with a lower percentage of

alcohol content. This is particularly apparent in the group of alcoholic beverages such as beer and wine. Due to a high price of liqueurs, the proposed solution will not affect their final prices, while in the case of vodka, each of the proposed levels of minimum reference prices of alcohol increases the final price paid by the consumer from 8.01% to as much as 145.02%.

The association of percentage changes in prices of alcoholic beverages (resulting from the introduction of minimum reference prices for alcohol serving) with the presented long-term and short-term price elasticity of demand for different types of alcohol allows for the estimation of changes of demand in relation to changes in prices in the short term period (see table 4.4). For further analysis, the reference value of 2.00 PLN was adopted, as it corresponds (by PPP) to the values used in other countries which have implemented the proposed solution.

Table 4.4 The estimated change in the size of demand in relation to changes in the retail price with the use of the alcohol minimum price of 2,00 PLN per 10 g of pure alcohol (reference serving), taking into account the price elasticity of Marshall demand in the short-term and long-term period.

Alcoholic beverage	Volume in ml	Alcohol content in %	Percentage change in the retail price using the minimum price of alcohol	The change in the size of demand in relation to changes in prices in the short-term period	The change in the size of demand in relation to changes in price in the long-term period
Beer	330	0,5	0,00%	0,00%	0,00%
	500	1,1	0,00%	0,00%	0,00%
	330	2,5	0,00%	0,00%	0,00%
	330	3,5	0,00%	0,00%	0,00%
	500	4,5	15,38%	-4,92%	-4,00%
	500	5,6	53,95%	-17,26%	-14,03%
	500	6,0	53,85%	-17,23%	-14,00%
	500	6,5	48,57%	-15,54%	-12,63%
	500	7,8	78,29%	-25,05%	-20,35%
	500	9,5	117,14%	-37,49%	-30,46%
Wine	750	10,0	0,00%	0,00%	0,00%
	750	13,0	0,00%	0,00%	0,00%
	750	19,0	7,14%	-2,07%	-3,07%
Liqueur	500	20,0	0,00%	0,00%	0,00%
Vodka	100	32	8,02%	-5,93%	-5,05%
	100	40	33,89%	-25,08%	-21,35%
	500	38	44,01%	-32,57%	-27,72%
	500	40,0	63,35%	-46,88%	-39,91%

Source: Own calculations based on the PARPA data.

In the case of beer with alcohol content of 3.5%, we observe no change in the volume of consumption as a result of introduction of the proposed amount of the minimum reference price per alcohol serving. Beers with alcohol content of 4.5% and above become clearly less commercially attractive, and in the short-term period, the demand for them falls from 4.92% to as little as 37.49%, while in the long term, as a result of stabilisation and return of a part of consumers despite the increased price, a decline in demand is estimated at a value of 4.00% for 4.5% percent alcohol beers to as much as 30.46% for beers with alcohol content of 9.5%.

This situation should lead, due to the triggering of a substitution mechanism, to consumers' movement from the consumption of beers with high alcohol content to the consumption of low alcohol beers. Also, due to high minimum retail prices for beers with high content of alcohol, beer producers will also pursue the policy of marketing brand and product equivalents with lower alcohol content.

However, one should take notice of the existing mechanism of complementarity, i.e. joint consumption of beer and vodka. For this reason, the change in the prices of alcoholic beverages in the group of vodkas is so crucial. The analysis shows that, assuming the introduction of a minimum reference price for alcohol

serving at a level of 2.00 PLN simultaneously with a decrease in demand for beer would bring about a drop in demand for vodka in a short-term period by 5,93-46,88%, and in the long-term – by 5,05 - 39.91%, depending on the type of the analysed vodka.

The simultaneous decline in demand for strong beers and vodkas leads to a search for substitutes in the form of low-alcohol beers and low-alcohol vodkas. Here, an assumption has been made that there will be no compensation for the loss of demand for higher-priced products from official sources by replacing it with an increased demand for goods from illegal sources. It might be possible, if an extra supply of smuggled or illegally manufactured products at low prices does not appear on the market. Therefore, the introduction of the proposed solutions must be combined with improved protective measures taken at the border and increased intensity of actions limiting the illegal manufacture of alcoholic beverages, particularly vodka.

It is worth noting that the proposed solution in the analysed form does not change the size of the demand for wine, apart from a 2-3% drop in demand for wines with high alcohol content (19%). In addition, the changes in demand for liqueurs, whose current market price is so high that it includes in itself the proposed value of the minimum reference price per alcohol serving, have not been subjected to identification.

5. Socio-economic costs of alcohol consumption

The socio-economic costs, identified in Deliverable 6.1 *Social costs: a report specifying the costs of addiction to societie*s of the ALICE RAP project, which may significantly affect the introduction of a minimum price of alcohol, ultimately changing the price paid by the consumer, include the following:

- the lost value of tax revenue due to a shorter period of economic activity resulting from the years of life lost due to alcohol consumption;
- the costs of administration of justice (the uniformed services, probation officers, the judiciary and prosecutor's offices, but also the border guard and the customs service) in criminal cases resulting from alcohol consumption;
- the costs of the healthcare system;
- lost values of the GDP;
- the cost of the welfare system;
- the direct provision of social assistance;
- expenses incurred by sobering-up centres;
- the costs of the national rescue and fire fighting system;
- public expenditure on the prevention and resolution of alcohol problems.

Additionally, this analysis estimated the following aggregated socio-economic costs in the form of the costs of increased mortality attributable to the use of alcohol.

In 2010, a total of 13,306 people died in Poland as a result of alcohol consumption.[29] Alcohol consumption also has a direct impact on decreased longevity. The number of years of life lost due to alcohol consumption is 314,989.2 years annually for men and 90.285.9 years annually for women. Particularly important is the number of years of lost economic activity, which reached 290,691.2 for men and 72,664.6 for women. [30]

[29] ALICE RAP D6.1, p. 78. (http://www.alicerap.eu/resources/documents/doc_download/219-deliverable-06-1-social-costs-of-addiction.html)
[30] ALICE RAP D6.1, p. 82.

The period of professional activity directly affects benefits in the form of income tax revenues, as it increases or decreases the national budget revenues. According to the information reported by the Polish Ministry of Finance for the year 2010, the total number of taxed taxpayers in accordance with the tax scale was 24,907,974 people, and they generated the income of 575,514,314,000.00 PLN; hence, a statistical taxpayer reached the annual income of 23,105.63 PLN. Taxpayers have paid a total of 43,806,349,000.00 PLN of the income tax, i.e. statistically 1,758.73 PLN of the tax amount per year.[31]

The costs of individual road accidents for 2010, (a projection made) on the basis of the HEATCO report presented in the JASPERS studies, were as follows: fatalities - 1,606,790.00 PLN, the injured - 230,310.00 PLN, and material losses - 17,295.00 PLN. For comparison, in 2014, the values reached 2,248,775.00 PLN, 332,795.00 PLN and 25,836.00 PLN, respectively.[32] Taking into account the fact that not all cases of deaths of people who consume alcohol are associated with road events, further analysis will, nevertheless, use the aforementioned values for the purpose of evaluating the costs of the loss of human life, as this is the only official valuation used in public cost-benefit analyses.

If we combine these values, it can be assumed that with the number of 13,306 of deceased persons, social costs amounted to 21,379,947,740.00 PLN (1,606,790.00PLN*13,306 persons), while, for comparison, the lost value of tax revenue due to the total number of lost years of professional activities amounted to 639,044,746.13 PLN (290,691.2 years + 72,664.6 years*1,758.73 PLN of the tax amount for the given year), according to data for 2010.

In terms of the costs of administration of justice, Deliverable 6.1 of the ALICE RAP project assumed that the average number of cases and the time devoted to them by the police during six months of handling offences resulting from alcohol consumption was 21.4 cases, while the estimated time for one case was 0.55h.[33] Average salaries of police officers and civilian employees of the police in 2009, included in the annual analysis of the implementation of the annual budget of the police, were as follows: the average salary of police officers (without annual bonuses) was 3,740.52 PLN, the average annual bonus of police officers was 3,477.53 PLN, the average salary of civilian employees (without bonuses) amounted to 2,336.83 PLN, while the average additional annual salary of employees reached 2,054.47 PLN. [34] Given the above information, it can be concluded that the average social cost of handling one case is: 12,55 PLN (3,740.52 PLN * 12 + 3,477.53 PLN /53 weeks * 40 hours of work * 0.55 h). If we assume that there are 42.8 such cases annually, the total value of the costs per one police officer is 537.14 PLN.). As of 31 December, 2009, 98,955 police officers served in the police force, and the police employed 24,893 civil servants (23,660.53 FTE) – the assumed stability of employment in 2010. And so, the total social cost of handling alcohol-related offences by the police is estimated at 53,152,688.70 PLN (537,14 PLN * 98,955 police officers).

[31] Data based on: *Informacja dotycząca rozliczenia podatku dochodowego od osób fizycznych za 2010 rok*, *[Information concerning the settlement of income tax from individuals for 2010],* Ministry of Finance, Income Tax Department, Warsaw, August 2011

[32] *Blue Book. Road Infrastructure.* JASPERS, Warsaw, December 2008, p. 65. . For comparison, the individual cost of a fatality for 2013 according to Pandora 2014 amounted to 1,977,576.00 PLN. For more information see: *Wycena kosztów wypadków i kolizji drogowych na sieci dróg w Polsce na koniec 2013 z wyodrębnieniem średnich kosztów społeczno-ekonomicznych wypadków na transeuropejskiej sieci transportowej.* [Valuation of costs of road accidents and collisions on the road network in Poland at the end of 2013 with the average cost of separation of socioeconomic accidents in the trans-European transport network.] The National Road Safety Council, Ministry of Infrastructure and Development, Warsaw, November 2014.

[33] ALICE RAP D6.1, p. 115.

[34] The response of the Secretary of State in the Ministry of Internal Affairs and Administration - by the authority of the Minister – to the interpellation No. 14643 on the state of employment and salaries in the Ministry of Internal Affairs and Administration and subordinate units in 2009.

Based on the data presented in ALICE RAP Deliverable 6.1, social costs of prosecutors' work on the cases relating to alcohol abuse are estimated on the basis of the data given below. Approximately 17.5% of all cases handled by prosecutors have their source in excessive consumption of alcohol.[35] The starting salary of a district prosecutor in 2011 amounted to approx. 6,550.00 PLN (gross amount) per month. In turn, at grade V, their salaries were as high as approx. 8,000.00 PLN. Even higher salaries were paid to people employed in the district prosecutor's office, with the basic salary of more than 7,500.00 PLN, and the highest salary of approx. 9,300.00 PLN. The General Prosecutor's earnings averaged 13,200.00 PLN.[36] In 2010, 10,322 judges, 13,617 prosecutors, 42,000 judicial officers and 29,500 prison employees, i.e. a total of nearly 100,000 people worked in Poland. Given the above information and referring it to the rate of the basic salary of a district prosecutor, it can be assumed that the annual social cost of handling of incidents was at least 187,301,835.00 PLN (17.5% * 6,550.00PLN * 12 months * 13,617 prosecutors), excluding the costs of judges, judicial officers and penitentiary staff.

The judicial costs presented in ALICE RAP Deliverable 6.1 relate to juvenile justice, where, as assumed, 8.7% of all cases relate to the consumption of alcohol by minors, and 12% of cases considered by common courts.[37] In a district court, i.e. at the beginning of their career, Polish judges earn an average of 10,410.33 PLN, while in the Appellate Court, having gained experience and seniority, they earn as much as 15,503.11 PLN.[38] Given the above data, it can be assumed that the social costs of handling judicial cases only in common courts are: 154,735,813.81 PLN (12% * 10,322 judges * 10,410.33 PLN * 12).

According to ALICE RAP Deliverable 6.1, the costs of probation officers constitute 24.6% of the working time of a probation officer devoted to cases related to the abuse of alcohol by minors and 12.8% in such cases with regard to adults.[39] According to the information presented by the Ministry of Justice, 61.3% of probation officers were dealing with adults, while 38.7% - with minors, and, therefore, the average load of cases related to the abuse of alcohol can be estimated at 17.37% (24.6% * 38.7% + 12.8% * 61.3%). The salary of a probation officer is estimated at 4,600.00 PLN.[40] The number of employees in the group of probation officers is as follows: district probation officers and their deputies - 93 positions, professional probation officers for adults – 3,137.5 positions, professional probation officers for families – 1,977 positions, social probation officers for adults - 18 043 positions, social probation officers for families - 13,242 positions.[41] Given the above data, it can be assumed that only the social cost of handling of cases by professional probation officers is estimated at 49,039,053.48 PLN (17.37% * 3,137.5 professional probation officers for adults + 1,977 professional probation officers for families * 4,600.00 PLN * 12).

According to ALICE RAP Deliverable Report, the costs of the customs service and the border guard service, related to the issue of alcohol abuse, constitute approx. 9.6% of the total working time of the customs service and 6,2% – of the border guard.[42] The employment in the Border Guard, as of 31 December, 2009, totalled 20,343 people, including 16,169 officers and 4,174 civil employees, and the average salary of the BG officers with discretionary and annual rewards amounted to 4,193.16 PLN.[43] Given the above, it can be assumed that the total costs of handling of alcohol-related cases by the border guard are estimated to

[35] ALICE RAP D6.1, p. 116.
[36] Data taken from the website: www.wynagrodzenia.pl
[37] ALICE RAP D6.1, p. 117.
[38] The analysis No. 16/2014, Civil Development Forum, Warsaw 2014.
[39] ALICE RAP D6.1, p. 118.
[40] According to the data published on the website: http://www.moja-pensja.pl/
[41] The current situation surrounding judicial guardianship in Poland (based on data obtained from the Department of Statistics of the Ministry of Justice and the Commission for Monitoring of Working Conditions, Salaries and the Extent of Job Responsibilities at the National Council of Probation Officers) for 2011.
[42] ALICE RAP D6.1, p. 119.
[43] The response of the Secretary of State in the Ministry of Internal Affairs and Administration - by the authority of the Minister – to the interpellation No. 14643 on the state of employment and salaries in the Ministry of Internal Affairs and Administration and subordinate units in 2009.

reach at least 50,442,607.81 PLN (6.2% * 16,169 officers * 4,193.16 PLN * 12). The employment in organisational units of the Customs Service, as of the end of the third quarter of 2012, was 15,586.81 job positions[44], while the average salary of the customs service officers was approx. 5,162.00 PLN.[45] Given the above, it can be assumed that the total cost of the customs service work on handling alcohol-related cases is at least 92,688,898.43 PLN (9.6% * 15,586.81 officers * 5,162.00 PLN * 12).

In ALICE RAP Deliverable 6.1, penitentiary costs associated with serving time by alcohol users (for a wide range of offences) was also estimated. It was assumed in the report that the annual costs of serving time for alcohol-related offences amount to 49,745,100.00 EUR[46], or 198,801,317.64 PLN. In addition, the report points to the provision of post-criminal assistance to interested persons, which reached the amount of 0.61 million EUR (17.02% of the total value); however, the report does not indicate what part of this value has been allocated to the support for people who consume alcohol.

Another area of costs identified in ALICE RAP Deliverable 6.1 is the cost of the health care system. The estimated costs of hospitalisation, attributable to alcoholism, reached the value of 126,302,500.00 EUR, i.e. 504,755,311.00 PLN. Additional costs of medical consultation provided to such patients, based on the National Health Fund data, have been estimated at 19,390,900.00 EUR, i.e. 77,493,792.76 PLN. The costs of services provided to people under the influence of alcohol by emergency ambulance service and in emergency rooms have been estimated at 11,455,000.00 EUR, i.e. 45,778,762.00 PLN. The costs of medicines, reimbursed by the NHF, administered to alcohol abusers, amount to 54,400,000.00 EUR, i.e. 217,404,160.00 PLN.[47]

In addition, ALICE RAP Deliverable 6.1 presents an estimation of the GDP loss due to the lack of produced values of goods and services by persons who died prematurely due to alcohol abuse. The estimated value in relation to 6,705 people dying from alcohol consumption is: 148,330,000.00 EUR (592,786,012.00 PLN), or approximately 0.04% of GDP.[48] Additionally, it was assumed that if, in 2010, among people working in Poland, no one suffered from alcohol-related diseases, these people could work approx. 2,357,700 days more and produce additional GDP growth of approx. 147,290,000.00 EUR (588,629,756.00 PLN), i.e. 0.04% of GDP for 2010. Summing up, total losses in the GDP reach approx. 295,620,000.00 EUR, or 0.08% of the annual GDP.

The welfare system costs, presented in ALICE RAP Deliverable 6.1, refer to the costs of social security which can be attributed to alcohol consumption and are estimated at a total value of 55,676,800.00 EUR, i.e. 222,506,763.52 PLN. [49]

The total support in the form of social assistance benefits, estimated on the basis of GUS (Central Statistical Office) and the Polish Ministry of Labour and Social Policy, paid to individuals and families affected by the problem of violence of people abusing alcohol, is estimated at: 30,850,000.00 EUR (of which 22.96 million Euros paid in cash), i.e. 123,288,940.00 PLN, and was paid to a total of 64.8% of all families entitled to these benefits. [50]

[44] Statistical Bulletin of the Customs Service for I-III quarters of 2012, No. 3/2012, the Ministry of Finance, Warsaw, January 2013.
[45] The response of the Undersecretary of State in the Ministry of Finance – by the authority of the Minister – to the interpellation No. 16871 on discrimination against civil servants employed in the customs houses.
[46] ALICE RAP D6.1, p. 125.
[47] ALICE RAP D6.1, p. 144-146.
[48] ALICE RAP D6.1, p. 146.
[49] ALICE RAP D6.1, p. 158.
[50] On the basis of ALICE RAP D6.1, p. 160.

In addition, ALICE RAP Deliverable 6.1 presents data on the values of benefits paid from the social welfare system to homeless families with alcohol problems, which amount to 11,500,000.00 EUR (of which 8.96 million Euros paid in cash), i.e. 45,958,600.00 PLN.[51]

The costs associated with the operation of sobering-up centres countrywide are estimated in ALICE RAP Deliverable 6.1 at the amount of 13,500,000.00 EUR, i.e. 53,951,400.00 PLN.

Total expenditure on the rescue and fire fighting system, primarily expenditures on salaries of persons involved in fighting fires arising as a result of starting the fire by persons under the influence of alcohol, is estimated at 268,680.00 EUR, i.e. 1,073,752.75 PLN.[52]

Public expenditure on the prevention and resolution of alcohol problems for 2010 is estimated at the total amount (for all levels, both governmental and self-governmental) of 154,500,000.00 EUR, i.e. 617,443,800.00 PLN.

The above calculations do not include the costs of medical treatment of those injured and material losses resulting from anti-social actions taken by individuals consuming alcohol. Such costs may include: material costs of accidents, fire, or crimes committed by people under the influence of alcohol; costs associated with the financial support of families, especially children who are orphaned as a result of the death of people consuming alcohol, including the costs of care for children and minors, people with disabilities (alcohol consumption often results in children born with disabilities); the cost of caring for those injured involved in accidents and hazardous situations caused by people consuming alcohol; costs of theft, assaults and robberies resulting from the activities of such persons; costs of abandoning investment plans, economic activities and social activities in the areas populated by high numbers of people consuming alcohol or costs of reduction of the value of real property, populated by individuals consuming alcohol, and socially perceived as areas inhabited by dysfunctional persons, hence, unattractive places to live.

It should be emphasised that these are not all identifiable costs, and the fact of their non-inclusion in the analysis is predominantly caused by the absence of the primary data and the failure to carry out socio-economic research which would identify such values. Although the analysis presents the main types of socio-economic costs, identification of additional values would serve to demonstrate the redoubled impact of proposed solutions, while it would not change the logic of reasoning and the directions of revealed benefits.

Table 5.1. The estimated annual value of the socio-economic costs of alcohol consumption in Poland

Number	Type of socio-economic costs	Estimated annual value in PLN	Estimated annual value in EUR
A.	**Premature mortality related to alcohol abuse (annualised)**	**21 379 947 740,00**	**5 349 801 756,58**
B1.	The value of tax revenue lost due to the total number of lost years of professional activities	639 044 746,13	159 905 101,12
B2.	Dealing with offences, being a consequence of alcohol consumption, by police	53 152 688,70	13 300 142,30
B3.	Dealing with events, being a consequence of alcohol consumption, by prosecutor's office	187 301 835,00	46 867 639,63
B4.	Judicial handling of cases, being a consequence of alcohol consumption, by common courts	154 735 813,81	38 718 800,37
B5.	Dealing with issues deriving from alcohol abuse by probation officers	49 039 053,48	12 270 807,10
B6.	Dealing with alcohol-related issues by the border guard service	50 442 607,81	12 622 011,76
B7.	Dealing with alcohol-related issues by the customs service	92 688 898,43	23 193 098,40
B8.	Prison costs associated with serving time by alcohol abusers	198 801 317,64	49 745 100,00
B9.	Hospital costs attributed to alcoholism	504 755 311,00	126 302 500,00
B10.	The costs for additional consultation	77 493 792,76	19 390 900,00

[51] On the basis of the ALICE RAP report, p. 160.
[52] On the basis of the ALICE RAP report, p. 160.

Number	Type of socio-economic costs	Estimated annual value in PLN	Estimated annual value in EUR
B11.	The costs of outpatient and emergency services rendered to people under the influence of alcohol	45 778 762,00	11 455 000,00
B12.	The costs of medicines reimbursed by the National Health Fund, administered to alcohol abusers	217 404 160,00	54 400 000,00
B13.	The value of the GDP lost due to the loss of labour resources as a result of mortality due to alcohol abuse	592 786 012,00	148 330 000,00
B14.	The value of GDP lost due to exclusion from work due to alcohol-related diseases and conditions	588 629 756,00	147 290 000,00
B15.	Social security costs that are attributable to alcohol consumption	222 506 763,52	55 676 800,00
B16.	Targeted social assistance benefits to individuals and families affected by violence of people under the influence of alcohol	123 288 940,00	30 850 000,00
B17.	The benefits paid from the social welfare system for homeless families with alcohol problems	45 958 600,00	11 500 000,00
B18.	The costs associated with the operation of sobering-up centres	53 951 400,00	13 500 000,00
B19.	Salaries of people involved in fighting fires arising as a result of starting the fire by persons under the influence of alcohol	1 073 752,75	268 680,00
B20.	Public expenditure on the prevention and resolution of alcohol problems	617 443 800,00	154 500 000,00
	Socio-economic costs without the costs of premature mortality due to alcohol abuse – annualised (positions B1 to B20):	**4 516 278 011,03**	**1 130 086 580,68**

Source: Own calculations based on the ALICE RAP and external data. The exchange rate of the NBP in 2010 of PLN/EUR = 3.9964 PLN per 1 EUR was adopted.

6. The analysis of the impact of the minimum price of alcohol on reduction of the socio-economic costs of alcoholic beverages consumption

In order to determine possible directions and the potential scale of impact of the proposed reference minimum price of alcohol serving on the identified socio-economic costs, changes in the volume of demand in relation to changes in the retail price have been estimated. For the needs of the analysis, the minimum price of alcohol of 2,00 PLN per 10 g of pure alcohol (reference serving) was used. For these assumptions, price elasticity of Marshall demand in the short-term and long-term period for different types of alcoholic beverages as well as the total one for all types has been calculated.

For the purposes of the analysis, the share in the consumption of alcoholic beverages in 2010 was taken into account in the following proportions: 55.2% of beer, 9.3% of wine, and vodka and liqueurs jointly - 35.5%. This was followed by estimating the weight share of consumption in each group. This is an assumption which requires additional market analyses, as at this stage, there is no access to such data.

On the basis of the pattern of alcoholic beverages consumption in individual groups, weighted average was determined in the group of changes in demand in relation to changes in prices in the short-term and long-term period. Analyses show that as a result of the introduction of a reference minimum price in the amount of 2.00 PLN and the resulting price changes on individual alcoholic beverages, the total decline in demand for beer was observed; in the short-term period, it decreased by 17.5%, while in the long-term - by 14.2%. In the case of wine, such drops reached 0.7% and 1%, respectively, while in the case of spirits, they reached the value of 30.9% and 26.3%, respectively. Given the aforementioned assumptions, the total change in demand for alcoholic beverages, weighted by the structure of consumption, should reach -20.7% in the short term and 17.3%. in the long term (see table 6.1).

The aforementioned values will serve to assess the impact of the introduction of the proposed solution on reduction of the socio-economic costs identified in the study. However, due to the lack of results of research confirming the level of elasticity between particular types of costs, the assumption of weights of significance of the impact of demand on a particular type of cost has been adopted for caution in evaluation. The adopted weights decrease the scale of impact of the changes in demand for alcoholic beverages on selected types of socio-economic costs.

Weights in the range of 0.15 to 0.8 were assumed. In this approach, with the weight of 0.15, the change in the demand for alcoholic beverages impacts the change of individual types of costs only by 15%, while with the weight of 0.8, such influence is as high as 80%. The application of weights has significantly reduced the level of change in some of the costs. Additionally, in two cases (due to the need to seal the borders) the weight of -1.5 was assumed, which will translate into an enhanced impact on the expenditure by 150% by the means of its increase. These are the costs of handling alcohol-related cases by the border guard and the customs service.

The reduction of socio-economic costs of alcohol consumption in Poland (in relation to the cost of premature mortality resulting from alcohol abuse) as a result of the use of the reference minimum price of 2.00 PLN within a short period amounts to 879.305.217,69 EUR, while in the long term - 667.465.940,40 EUR annually. However, if the most significant cost of premature deaths resulting from alcohol abuse is excluded, the total annual value of the remaining limited socio-economic costs in the short-term period is 132,436,464.13 EUR (529,269,085.25 PLN), and in the long term - 613,178,965.69 EUR (442,018,707.37 EUR) per year. It is estimated that an increase in the cost of border protection (the customs service and border guard in a short-term period will total 11,120,914.43 EUR (44,443,622.45 PLN), and in the long term - 9,287,623.93 EUR (37,117,060.29 EUR) per year.

Table 6.1 The estimated change in the size of demand in relation to changes in the retail price using minimum price of alcohol of 2,00 PLN per 10 g of pure alcohol (reference serving), taking into account the price elasticity of Marshall demand in the short-term and long-term period for different types of alcoholic beverages and the total for all types.

Alcoholic beverage	Share in consumption of alcoholic beverages in 2010	Alcohol content in %	Estimated share of consumption in the group (the sum in the group equals 1)	Weighted average in the group		Total weighted average	
				Changes in the volume of demand in relation to changes in prices in the short term	Changes in the volume of demand in relation to changes in prices in the long term	Changes in the volume of demand in relation to changes in prices in the short term	Changes in the volume of demand in relation to changes in prices in the long term
Beer	55,2%	0,5	1/30	-17,5%	-14,2%	**-20,7%**	**-17,3%**
		1,1	1/30				
		2,5	1/30				
		3,5	1/15				
		4,5	1/10				
		5,6	1/10				
		6,0	2/15				
		6,5	1/6				
		7,8	1/6				
		9,5	1/6				
Wine	9,3%	10,0	1/6	-0,7%	-1,0%		
		13,0	1/2				
		19,0	1/3				
Liqueur Vodka	35,5%	21,0	1/10	-30,9%	-26,3%		
		32,0	1/10				
		40,0	1/5				
		38,0	1/5				
		40,0	2/5				

Source: Own calculations based on the PARPA data.

Table 6.2. The estimated changes in annual socio-economic costs of alcohol consumption in Poland as a result of the use minimum price of alcohol of 2,00 PLN per 10 g of pure alcohol (reference serving).

Number	Type of socio-economic costs	Adopted weight of significance of the impact of demand on an individual type of costs	Short-term period		Long-term period	
			The level of change in the socio-economic cost	The value of change in the socio-economic cost in EUR	The level of change in the socio-economic cost	The value of change in the socio-economic cost in EUR
A.	Premature mortality related to alcohol abuse	**0,75**	**-15,53%**	**-830 580 826,26**	**-12,97%**	**-693 658 997,70**
B1.	The value of tax revenue lost due to the total number of lost years of professional activities	0,5	-10,35%	-16 550 658,27	-8,64%	-13 822 270,71
B2.	Dealing with offences, being a consequence of alcohol consumption, by police	0,5	-10,35%	-1 376 604,68	-8,64%	-1 149 670,44
B3.	Dealing with events, being a consequence of alcohol consumption, by prosecutor's office	0,5	-10,35%	-4 850 941,48	-8,64%	-4 051 260,39
B4.	Judicial handling of cases, being a consequence of alcohol consumption, by common courts	0,5	-10,35%	-4 007 512,14	-8,64%	-3 346 870,97
B5.	Dealing with issues deriving from alcohol abuse by probation officers	0,5	-10,35%	-1 270 065,39	-8,64%	-1 060 694,23
B6.	Dealing with alcohol-related issues by the border guard service	-1,5	31,05%	3 919 248,39	25,93%	3 273 157,56
B7.	Dealing with alcohol-related issues by the customs service	-1,5	31,05%	7 201 666,05	25,93%	6 014 466,38
B8.	Prison costs associated with serving time by alcohol abusers	0,75	-15,53%	-7 723 150,90	-12,97%	-6 449 984,09
B9.	Hospital costs attributed to alcoholism	0,8	-16,56%	-20 916 300,99	-13,83%	-17 468 234,18
B10.	The costs for additional consultation	0,8	-16,56%	-3 211 226,23	-13,83%	-2 681 853,35
B11.	The costs of outpatient and emergency services rendered to people under the influence of alcohol	0,75	-15,53%	-1 778 440,36	-12,97%	-1 485 263,23
B12.	The costs of medicines reimbursed by the National Health Fund, administered to alcohol abusers	0,8	-16,56%	-9 008 901,44	-13,83%	-7 523 777,75
B13.	The value of the GDP lost due to the loss of labour resources as a result of mortality due to alcohol abuse	0,75	-15,53%	-23 028 900,80	-12,97%	-19 232 570,44
B14.	The value of GDP lost due to exclusion from work due to alcohol-related diseases and conditions	0,75	-15,53%	-22 867 436,12	-12,97%	-19 097 723,32
B15.	Social security costs that are attributable to alcohol consumption	0,5	-10,35%	-5 762 716,03	-8,64%	-4 812 728,28
B16.	Targeted social assistance benefits to	0,5	-10,35%	-3 193 067,66	-8,64%	-2 666 688,23

	individuals and families affected by violence of people under the influence of alcohol					
B17.	The benefits paid from the social welfare system for homeless families with alcohol problems	0,25	-5,18%	-595 142,27	-4,32%	-497 032,65
B18.	The costs associated with the operation of sobering-up centres	0,5	-10,35%	-1 397 290,55	-8,64%	-1 166 946,23
B19.	Salaries of people involved in fighting fires arising as a result of starting the fire by persons under the influence of alcohol	0,5	-10,35%	-27 809,19	-8,64%	-23 224,82
B20.	Public expenditure on the prevention and resolution of alcohol problems	0,5	-10,35%	-15 991 214,07	-8,64%	-13 355 051,27
The total change per annum (positions B1-B20) in EUR			**-11,72%**	**-132 436 464,13**	**-9,79%**	**-110 604 220,64**
The total change per annum (positions B1-B20) in PLN				**-529 269 085,25**		**-442 018 707,37**

Source: Own calculations based on the PARPA data.

7. Conclusions and recommendations

In the last fifteen years, the individual consumption of alcoholic beverages in Poland increased at a rate of approx. 4.1% per year, while in constant prices - by approx. 1.4% per year. A particularly significant increase has been observed in the consumption of beer (approx. 83%). In the last five years, differences in the rate of growth in consumer prices of individual alcoholic beverages were neglectable, and in the entire period, all types of these beverages have become relatively cheaper. According to the CBOS research, the only category of products perceived more frequently as decreasing than increasing in price were alcoholic beverages; also, types of alcoholic beverages were rarely changed to their cheaper equivalents. An average monthly spending on alcohol was less than 50 PLN.

On the Polish market, all three types of alcohol are characterised by inelastic demand. The values of price and income elasticity of demand for beer and wine are much lower than those for alcohol. Consequently, these two types of alcohol can be considered as essential goods with inelastic demand. Vodka can be classified as luxury goods. Importantly, almost all types of alcohol considered in the study, are complementary goods; this is especially true for the beer and vodka relationship.

The suggested value of a reference minimum price of alcohol serving is 2.00 PLN per 10 g of pure alcohol. This value is comparable to the solutions adopted in other countries in the world where the minimum price model has been implemented.

With this level of the reference minimum price for beers with alcohol content of 3.5%, no change is observed in the volume of consumption as a result of the introduction of the proposed value of the reference minimum price for alcohol serving. Beers with alcohol content of 4.5% and above become clearly less commercially attractive and their demand falls within a short period from 4.92% to as little as 37.49%, while in the long term, as a result of stabilisation and return of a part of consumers despite the increased prices, a decline in demand is estimated at the value of 4.00% for beers with alcohol content of 4.5% to as much as 30.46% for beers with alcohol content of 9.5%. Simultaneously, with a decrease in demand for beer, a drop in demand for vodka would be observed, reaching the level of 5,93-46,88% in the short-term period and 5,05-39,91% in the long term, depending on the type of the analysed vodka.

The scale of the costs associated with increased mortality caused by alcohol consumption in Poland is estimated at 21,379,947,740.00 PLN , which is 5,349,801,756.58 EUR per year.

The value of other socio-economic costs of alcohol use in Poland is estimated at 4.516.278.011,03 PLN, i.e. 1.130.086.580,68 EUR per year. This includes costs of shortened life span due to alcohol consumption, the costs of administration of justice (the uniformed services, probation, officers, the judiciary and prosecutor's office, but also border guard and customs service) in criminal cases being a result of the consumption of alcohol, the costs of the health care system, lost GDP values, the costs of the welfare system, the direct provision of social assistance, expenses related to sobering-up centres, the costs of the national rescue and firefighting system, public expenditures on the prevention and resolution of alcohol problems, but also the costs of increased mortality and lost value of tax revenues due to a shorter period of economic activity resulting from the years of life lost due to alcohol consumption.

The above calculations of this analysis do not include additional costs, such as costs of medical treatment of injuries and material losses resulting from anti-social actions taken by individuals consuming alcohol. Such costs may include: material costs of accidents, fire, or crimes committed by people under the influence of alcohol; costs associated with the financial support of families, especially children who are orphaned as a result of the death of people consuming alcohol, including the costs of care for children and minors, people with disabilities (alcohol consumption often results in children born with disabilities); the cost of caring for the injured involved in accidents and hazardous situations caused by people consuming alcohol; costs of theft, assaults and robberies resulting from the activities of such persons; costs of abandoning investment plans, economic activities and social activities in the areas populated by high numbers of people consuming alcohol or costs of reduction of the value of real property, populated by individuals consuming alcohol, and socially perceived as areas inhabited by dysfunctional persons, hence, unattractive places to live.

Assuming a share in the consumption of alcoholic beverages in 2010 in the following proportions: 55.2% of beer, 9.3% of wine, and 35.5% of vodka and liqueurs jointly, the total change in demand for alcoholic beverages, weighted by the consumption structure, given the above assumptions, should reach -20.7% in a short-term period, and -17.3% in the long term. Analyses show that, as a result of the introduction of a minimum price reference in the amount of PLN 2.00 and the resulting price changes regarding individual alcoholic beverages, the total decline in demand for beer in a short-term period will reach 17.5%, while in the long-term - 14.2%; in the case of wine, such decrease will be 0.7% and 1%, respectively, while in the case of spirits, it will reach the value of 34.3% and 24.4%.

The estimated annual reduction of the basic socio-economic cost of alcohol consumption in Poland – which is premature mortality due to alcohol abuse - as a result of the application of a reference minimum price of 2.00 PLN in the short term will amount to 830,580,826.26 EUR, while in the long term - 693,658,997.70 PLN annually.

If the cost of premature mortality resulting from the abuse of alcohol was excluded, the total annual value of the remaining limited socio-economic costs would amount to 132,436,464.13 EUR, (529,269,085.25 PLN) annually. Such an important value of benefits stemming from the decrease of socio-economic costs should clearly focus analytical and legislative work towards the rapid introduction of the proposed solutions.

It is recommended to continue the research in the analysed scope, especially in the area of identifying demand and price relationship between different types of alcoholic beverages, changes in consumer behaviour and the consequences of the aforementioned proposals for public finances (tax revenue to the state budget). It can be expected that the proposed model of intervention in alcohol prices will have a positive impact on revenues from VAT and will remain indifferent to excise duty.

8. Literature

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PART III

The cost of illicit drugs to the criminal justice system: estimating the costs of illicit drugs based on the current legislation in Poland, Portugal and Spain

Alessandra Liquori O'Neil
Luca Di Censi
Francesco Fabi
Eva M. Stambøl
Carla Rossi
Leif Villadsen
Jonathan Lucas

1. Introduction

The ALICE RAP WP6 study, led by the Polish State Agency for the Prevention of Alcohol-related Problems, estimated the social/externality costs of substance use (in particular alcohol, drugs and tobacco) in Poland, Portugal and Catalonia (Mielecka-Kubien et al. 2014). The estimates include health, social and lost productivity costs.

Based on WHO 'International Guidelines for Estimating Costs of Substance Abuse' (Single et al. 2001, 2003), the Deliverable 6.1[53] study used a Cost of Illness (COI) methodology to estimate shares of costs of various diseases linked to alcohol, tobacco and illegal drugs use (Mielecka-Kubien et al. 2014). COI is a top-down approach where costs are estimated based on prevalence for a specific year compared with a hypothetical counterfactual that there was no disease or risk behavior in that year. It takes the total costs (crime costs, health costs, lost productivity costs) and determines through epidemiological reviews what proportion of those costs that can be attributed to the risk factor or disease (Godfrey & Parrott S. 2007: 3).

Although several national-level studies have been conducted in Europe which estimate the social costs of substance use, these studies have often used different methods of estimation, something which makes comparison across countries based on cost-of-illness studies difficult (Horverak 2010, Postma 2004, Laramée 2013). Deliverable 6.1 study has overcome this problem through estimating costs to various geographical units in Europe – Poland, Portugal and Catalonia – in a comparative framework. Moreover, the study has added value to the field of substance use social cost estimations, by taking into consideration various types of substance use (alcohol, illicit drugs and tobacco), as well as estimating costs not only to the health sector but also to the social and, partially, the criminal justice sector.

Part III of Deliverable 6.2 focuses on the relationships between policies and costs in Poland, Portugal and Spain, especially for costs occurring in the criminal sector.

1.1 Challenges of obtaining criminal justice system estimates

Comparisons of criminal justice system data between different countries can be challenging, due to the complexity of comparing data which are not subject to precise classifications, as opposed to, for example health statistics, and due to the many variables at stake, deriving from differences in criminal justice systems and juridical traditions. Structural and cultural factors may influence the way criminal justice systems are organized and deliver their duties, with systems which are governmentally centralized and others which delegate services to private entities; some countries have complicated bureaucratic apparatuses and a high number of laws and regulations, which might create backlogs in the administration of justice; criminal justice outcomes might be influenced by the citizens' perception and level of trust in the police and magistrates, which impacts on their willingness to report a crime or comply with the laws.

Differences in legal definitions of crime across countries also pose challenges in the reliability and use of statistics in the criminal justice field. Countries might classify crimes and sentences differently and frequently there are no clear specifications as to the way crimes are counted or recorded, (for example in the case of re-offending, how are re-arrests or reconvictions counted?); countries might show differences in the way crimes are recorded, for example, a crime might be recorded when it is reported to the police or when the police actually record it or when prosecutors actually open an investigation.

[53] (http://www.alicerap.eu/resources/documents/doc_download/219-deliverable-06-1-social-costs-of-addiction.html)

Figure 1. Challenges of comparing international crime statistics

Source: UNODC

At the United Nations level, data from Member States are collected and organized under the United Nations Surveys of Crime Trends and the Operations of Criminal Justice Systems[54]. The main goal of this survey is to collect data on the incidence of reported crime and the operations of criminal justice systems with a view to improving the analysis and dissemination of that information globally. The survey results provide an overview of trends and interrelationships between various parts of the criminal justice system to promote informed decision-making in administration, nationally and internationally. Data collection through the CTS is conducted on an annual basis, through a questionnaire.

Another tool for collection of crime statistics is the International Crime Victim Survey, which has a European subset in the European Survey on Crime and Safety (EU ICS)[55]. The ICVS is based on a number of sample household surveys through the use of a standardized questionnaire to collect experience with crime.

1.2 Global and European studies of criminal justice costs attributable to substance use and addiction

At a global and European level there have been several attempts to estimate costs to the criminal justice system which can be attributed to people who are using or who are addicted to illicit substances.

In Europe, data on public expenditures are now used by a number of countries as a tool for planning and evaluating the implementation of drug policies (EMCDDA 2011: 23). In its annual reports the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) briefly reports on the trends of drug-related expenditures of all EU Member States and Norway. Expenditures on law enforcement are often non-labelled, as opposed to health expenditures which are more often labelled[56] (EMCDDA 2008). This means

[54] United Nations Surveys on Crime Trends and the Operations of Criminal Justice Systems (CTS), www.unodc.org

[55] ICVS - International Crime Victims Survey, http://www.unicri.it/services/library_documentation/publications/icvs/

[56] Labelled drug-related expenditure is that which is planned – and which is found through reviews of budget and/or fiscal year-end accountancy reports for an implemented/executed budget – and which reflects the commitment of the state in the field of drugs (EMCDDA 2008: 11). Non-labelled drug-related expenditure is that which cannot be identified in national budgets and year-end reports, and which must therefore be estimated through economic modelling (EMCDDA 2008: 19).

that law enforcement expenditure data is harder to obtain as it needs to be estimated through economic modelling.

Several larger studies have also been made at the European level on drug-related public expenditure in European countries, most of which were carried out under the auspices of EMCDDA (Kopp & Fenoglio 2003, Postma 2004, EMCDDA 2008, Andlin-Sobiecki & Rehm, 2005). All the studies include expenditure on law enforcement. More recently, EMCDDA has undertaken a study on public expenditure on drug law-offenders in European prisons (22 countries)[57] (EMCDDA 2014).

The study of Kopp & Fenoglio (2003) is a retrospective study that estimated 'drug budgets', namely the direct and indirect costs that European countries sustained for drug using individuals between 1990 and 2000[58]. Law enforcement expenditures, justice, prison costs for individuals convicted for drug-law offences and the costs of customs and other law-enforcement organizations involved in controlling drugs were estimated per problem user in 15 EU Member States in the mid-1990s. Country estimates were compared with the entire European State expenditure applying equal economic and demographic weights. The study particularly compared countries' drug budgets in relation to GDP, and looked at what proportions of drug budgets were allocated to law enforcement and to health respectively. The study found that the European average drug budget followed a division of 68% to law enforcement and 32% to health, which was also the most normal division of resources among EU Member States (Kopp & Fenoglio 2003: 18). When looking at the share of each country in contributing to the European total, overall large, rich countries in the north with developed welfare systems contributed more than the European average while southern countries (with the exception of Spain) contributed less (Kopp & Fenoglio 2003: 21). As an explanation to this, Kopp & Fenoglio note that:

> "It would seem quite logical that public expenditure on drugs would be greater when the country in question has a large drug-consumption problem. However, it seems that the amount of public drug expenditure for a given country does not rely on the prevalence rate, or on the country's wealth, but depends on its population and on the size of the State's budget" (Kopp & Fenoglio 2003: 16).

One EMCDDA study looked into public expenditure on drugs in the European Union from 2000 to 2004[59] (Postma 2004). It confirmed the domination of law enforcement expenditures over health in EU countries' budgets (over 50%). It also found that although prevention was a top priority in EU's drug policy, it only accounted for a small share of the expenditure.

The 2008 EMCDDA study of European drug-related expenditure divided drug-related expenditure into labeled and non-labeled expenditure. While labeled expenditure followed a distribution of 67% health and 22% public order and safety, non-labeled expenditure amounted to 828 million euro for health and 6 billion euro for public order and safety at a European level.

[57] This study does not, however, tell us anything about the economic costs of substance users who come in contact with the criminal justice system due to other offences than drug-related offences, such as acquisitive crimes, which are common among people with a drug addiction in order to sustain their habit. It also does not tell us of costs to police, prosecutors, courts, customs, or other types of penal and administrative sanctions than incarceration, which are important if total costs of law enforcement are to be estimated. The study will thus not be described in detail here.

[58] These studies look at public expenditures but not on social costs (Kopp &Fenoglio 2003, Postma 2004). Public expenditure studies do not include all kinds of costs, such as indirect costs like production losses due to drug-related illness; indirect effects on social assistance and security; private costs; or so-called transfer payments of taxes and theft (Postma 2004).

[59] Differently from Kopp &Fenoglio (2003) who only looked at health and law enforcement costs, this study took four categories into account; 1) prevention & research, 2) treatment & rehabilitation, 3) law enforcement (police, justice, customs and prisons), and 4) cost-of-illness and treatment. It also took both a top-down and a bottom-up approach.

According to the same report, "the new estimate of drug-related public expenditure in Europe is €34 billion, which is equivalent to 0.3 percent of the combined GDP of all EU Member States. This suggests that State expenditure for the estimated 288,000 drug users costs the average EU citizen €60 a year."

In the report EMCDDA noted that public expenditure studies do not show us the whole picture of expenses and service provision in the drugs field, as social policy interventions are likely to involve private stakeholders such as families, insurance companies and NGOs. Moreover, public expenditure studies are only the first step in economic evaluations, as benefits must also be considered. EMCDDA was also careful to emphasize that estimations of expenditures tell us very little on the efficiency of the policies for which resources have been allocated (2008: 25).

Apart from these larger studies, each EMCDDA annual report contains a resume on European countries' drug-related expenditures, which are regularly reported by Reitox national focal points. For instance, the EMCDDA Annual Report 2011 broke down total expenditures in 12 countries into categories, which showed that 'supply reduction'[60] accounted for between 48% and 92% of the total drug-related expenditures in European countries (2011: 22). The expenditures most frequently reported were those for justice, police, customs and prisons.

There are no equivalent studies of drug-related criminal justice costs or expenditures at a global level. However, some countries outside of Europe have done comprehensive cost-estimations, such as the USA, Australia and Canada. In the US, the costs of drug 'abuse' amounted to an estimated $180,9 billion[61], with an annual average increase of 5.3 % from 1992 to 2002 (ONDCP 2004: vi). The most rapid increase in drug use costs were noted in the criminal justice system, particularly due to increased rates of incarceration for drug offences and drug-related offences as well as increased spending on law enforcement and adjudication (Ibid.). In 2007, the total costs of illicit drug use in the US were estimated to be $193 billion[62](National Drug Intelligence Center 2011: ix). Crime costs amounted to an estimated $ 61,376,694 and included criminal justice system costs ($56,373,254), victimization costs ($1,455,555), and other crime costs ($3,547,885). Health costs amounted to USD 11,416,232 and productivity costs, including drug-induced incarceration and drug-induced homicide amounted to 120,304,004. In another scenario presented in the study, drug-induced incarceration and drug-induced homicide are counted under crime costs, thus making the crime sector costs soar to $113,277,616 and productivity costs decrease to $68,403,082. The report also offers some comparisons between drug costs and other societal costs produced by some serious non communicable diseases in the U.S., such as diabetes, costing more than $174 billion each year, obesity, which totaled more than $147 billion in 2008 (Finkelstein et al., 2009); heart disease taking the highest toll, with an estimated $316 billion in 2010 alone, and smoking, costing about 440,000 premature deaths per year between 1995 and 1999 and which was responsible for at least $157 billion per year in health-related economic costs (CDC, 2002). The report concludes that illicit drug use is not just a health problem and that both law enforcement and community-based prevention and intervention efforts should be valued in making drugs as much difficult and costly to obtain as possible. The report also recommends that early intervention in individual drug careers can be effective to avoid treatment, hospitalization and productivity costs due to disability or incarceration. In this regard, it is important to provide access to early screening and treatment and to divert nonviolent drug users to alternative treatment settings whenever possible.

[60] This category was also denominated 'law enforcement' or 'public order and safety'.

[61] The estimate includes resources to address health and crime consequences as well as loss of potential productivity from disability, death and withdrawal from the legitimate workforce (ONDCP 2004: vi).

[62]The Economic Impact of Illicit Drug Use on American Society, U.S. Department of Justice, National Drug Intelligence Center, 2011. The estimate is based on a cost-of-illness methodology and includes costs on crime, health and lost productivity.

In Australia, drug-related costs were estimated and compared for alcohol, tobacco and illicit drugs for 1998-99, and findings indicated that crime costs[63] related to alcohol amounted to $ 1,235 million, illicit drugs amounted to $ 2,500 million, and alcohol and illicit drugs combined amounted to $ 582,3 million (Collins & Lapsley, 2002). The follow-up study for 2004-05 found that crime costs by type of drug amounted to $1,424 million (0,20% of GDP) for alcohol and $ 3,644 million (0,48% of GDP) for illicit drugs (Collins & Lapsley, 2008b: 8). For Canada, social costs of abuse[64] of tobacco, alcohol and illegal drugs were estimated to total $ 39.8 billion in 2002[65] (Rehm *et al*. 2006). Law enforcement costs were found to be the second largest direct cost and third highest contributor to total substance-related costs – with a cost of $ 5.4 billion or 13.6% of the total. Of the total social costs, illegal drugs made up 20.7% or $ 8.2 billion of the total; where the largest economic costs were attributed to lost productivity ($ 4.7 billion), law enforcement ($2.3 billion) and direct health costs (more than $ 1.1 billion).

1.3 Policy options which could reduce substance use-related criminal justice expenditure

The Deliverable 6.2 report estimates avoidable costs based on a COI-methodology. Here we present literature on how policies and interventions with regard to drugs can contribute to reduce social costs and public expenditure.

Questions have been raised in recent years about how much money countries spend on penalizing (and thus addressing the problem through a criminal justice perspective) low level drug offenders, which are often themselves users or addicted to drugs. A debate on the issue has been particularly salient as drug addiction increasingly has been viewed as a (often chronic) disease (UNODC 2010).

In Europe, substance use offences are normally subject to either administrative sanctions or lenient penalties such as fines, warnings, suspended processes or suspended prison sentences (EMCDDA 2009: 12). Furthermore, several European countries have in recent years 'decriminalized' possession of small amount of drugs, either by changing the legal status of the offence (criminal or non-criminal), or by changing the category of drugs (when the category determines the penalty) or by changing the size or amount of penalty available (EMCDDA 2011a: 23). According to Böllinger, the trend towards decriminalization in Europe are mainly of three types: formal procedural law decriminalization; 2) de facto and informal practices of not enforcing law; and 3) substantive law decriminalization (2004: 499).

There has also become gradually more common in European countries to divert drug users from the criminal justice system through alternatives to prosecution and incarceration[66] (EMCDDA 2005). With the term 'alternative measures' we identify measures which substitute penal prosecution or incarceration (Giacomello 2014). Such measures can be applied at different phases: a) the moment of arrest, b) before preventive prison, c) in sentencing, and d) when deciding on release of an inmate (Giacomello 2014: 2). In most European countries alternatives for problem drug users and addicted users are more common than for occasional users, reflecting the view of addiction as a disease which should be treated. Treatment is not

[63] Crime costs included policing, criminal courts, prisons, customs, National Crimes Authority, forgone productivity of criminals, private security services and home security, property theft, violence, money laundering, illegal sales of tobacco and legal expenses.

[64] In economic terms abuse occurs when use imposes costs on society that exceed the costs to the user of obtaining the substance (Rehm et al. 2006: 1).

[65] The study used a cost-of-illness methodology based on the International Guidelines for Estimating the Costs of Substance Abuse (Single *et al*. 2001, 2003).

[66] Such solutions are grounded in the UN Single Convention on Narcotic Drugs 1961, Art 36. 1(b); UN Convention on Psychotropic Substances 1971, Art.22.1(b); UN Convention against illicit Traffic 1988, Art. 3.4(b-d); 1998 UNGASS Declaration, Art. 14; and Objective 10 of the Guiding principles on drug demand reduction, agreed by ECOSOC in March 1999. See also UNODC 2006. In Europe, such options are supported among other by the EU Action Plan on Drugs 2000-2004, Action 3.4.2. and the EU Action Plan on Drugs 2005-2008, Objective 10.

merely an alternative for people who have committed drug-offences, but also for users who have committed acquisitive crimes. The suspension of prosecution or sentence usually depends on successful completion of treatment. Sometimes treatment comes in addition to, rather than instead of, punishment. It varies whether treatment is court ordered or requires the user's consent[67] (EMCDDA 2005). Moreover, many European countries have implemented drug court models (Norway, Belgium, Ireland, Scotland, England, Wales, Northern Ireland) and Portugal has, since 2001, had a comprehensive system of so called 'Commissions for the Dissuasion of Drug Abuse', to which drug users are supposed to be preferably channeled instead of being processed through the criminal justice system (EMCDDA 2011b).

Debates on ways to legally regulate (instead of prohibit) drug markets have become increasingly accentuated globally in recent years. Uruguay and the USA States of Washington, Colorado and recently Alaska, have decided to legally regulate their marijuana markets.

In general, we are witnessing an increasing number of different interventions, legislations and policies which establish alternatives to processing drug users through the criminal justice system, or alternatives to incarceration under the auspices of the criminal justice system. How do these alternatives impact on drug-related social costs and public expenditures, particularly regarding criminal justice systems?

Studies of the economic impacts of *decriminalization* are rarer than studies of other types of impact (on drug use, mortality rate, incarceration etc.). Although several studies have been done on the Portuguese experience with decriminalizing drug use and possession (Hughes & Stevens 2007, 2010 and 2012), only one study looks into the economic and social cost consequences of the Portuguese reform[68] (Gonçalves *et al*. 2014). The study finds that following the approval of the National Strategy for the Fight Against Drugs (NSFAD) in 1999, social costs declined with 12% in the first five-year period, and a significant 18% until 2010 (Gonçalves *et al*. 2014: 2). The authors of the study are, however, careful to note that the Portuguese decriminalization cannot be studied per se, but needs to be seen in relation to the comprehensive health-centered National Strategy for the Fight Against Drugs (NSFAD) which also establishes a range of different health interventions. Moreover, they highlight that the methodological framework does not allow for a thorough examination of the causal relations between decreases in social costs and the changes in law and policy (impact assessment of NSFAD) in Portugal. According to the authors, the reduction in social costs can only partly be attributed to a reduction of the (direct and indirect) legal system costs due to less people incarcerated for drug law offences, while a reduction in (particularly indirect) health costs also plays an important role. Also a comparative study of decriminalization in Australia and the US from 2000[69], showed that the approaches in both countries had been cost saving for the criminal justice systems[70] (Single *et al*. 2000). Interestingly, the latter study mentions that the Australian system with 'on the spot' police fining for minor cannabis offences instead of prosecution led to a dramatic increase in number of detected minor cannabis offences. The authors attribute this to a 'net widening' where the police are more likely to give a reaction in cases where they would before only give an informal warning.

Diversion of drug users from the criminal justice system seems to have a positive economic outcome for criminal justice systems. Several studies show that treatment and other health-centered approaches are by

[67] For a detailed account of alternatives to prosecution or incarceration in European national legislations, see: http://www.emcdda.europa.eu/html.cfm/index13223EN.html

[68] This study closely follows the methodology of Kopp et al. (2001), who analyze the social costs of drugs – taking into account health- and non-health related costs, both direct and indirect, associated with illicit drugs – using a cost-of-illness approach.

[69] In the US 11 states enacted 'decriminalization' laws in the 1970s which reduced penalties of cannabis possession to only a fine and in Australia several states have gone through with similar measures – such at the South Australia 'civil penalty on minor cannabis offences (Single et al. 2000).

[70] For example, in California the total cost of marijuana enforcement declined from $17 million in the first half of 1975 to under $4.4 million in the first half of 1976 (Single et al. 2000).

far less costly – and more cost-effective – than incarceration (UNODC 2010, EMCDDA 2005, McVay et al. 2004, Poulopoulos 2012). A meta-study of the costs and benefits of drug courts in the US found that these courts saved money compared with simple probation or incarceration – although not all the persons diverted to drug courts would have otherwise been sentenced to prison (King & Pasquarilla, 2009). A critique of alternatives to prison is, however, that they contribute to a 'net widening' of people falling under the control and supervision by the criminal justice system, while they often fail to reduce the number of prisoners, or even drug users, in prison (Cohen 1985, Böllinger, 2004, EMCDDA 2005).

There have been several attempts to estimate the economic consequences of *legal regulation of drug markets*. Most of these studies have looked at marijuana markets in isolation (Austin 2005, Bryan et al. 2013, Miron 2005, Gettman 2007, Gieringer 1994). For instance, a comprehensive study of the potential economic impact of legalizing marijuana in England and Wales found that estimates of net external benefits ranged between £280-460 million annually with a low demand response to £430 million in case of a large demand response (Bryan et al. 2013). A study by the Cato Institute looked at the budgetary impacts of regulating all kinds of drug markets in the US (Miron & Waldock 2010). The report found that legalizing all drugs would save roughly $41.3 billion per year in government expenditure on enforcement of prohibition, and yield tax revenue of $46,7 billion annually. All the studies do emphasize, however, that estimates are very uncertain as they analyze an entirely hypothetical scenario. It will be interesting, then, to see the experiences from Uruguay, Washington, Colorado and Alaska, as evaluations become available.

2. Drug control legislations

2.1. Poland[71]

2.1.1 Development of legislation

The phenomenon of drug addiction is regulated by the Act of 29 July 2005 on countering drug addiction (with further amendments), which replaced two former major acts: 24 April 1997 on countering drug addiction and Act of 31 January 1985 on prevention of drug addiction. Within the framework of the system and reform of the State's competencies, some tasks regarding drug prevention remained with the central bodies of the State administration, while the local governments were obliged to implement educational and preventive programs. The forms of educational and preventive actions focusing on the promotion of healthy lifestyles were defined. The principle of voluntary and free treatment was maintained; rights were established for substitution treatment, as well as for treatment and social rehabilitation of addicts in prisons as well as for those under arrest. To this purpose, the possibility to initiate treatment in the preliminary phase, i.e. before sending the case to the court by the public prosecutor, was established. The control of precursors was introduced and the unauthorised production and possession of precursors was criminalized.

The main legal texts currently in force can be divided into the following groups:
1. Act on countering drug addiction;
2. Executive acts on the treatment of addicts, treatment in prisons and arrests, lists of relevant medical professions, conditions of treatment;
3. Regulation on the Council countering drug addiction;
4. Regulation on National Programme countering drug addiction;
5. Regulation on the production, procession, import, export and circulation of narcotic drugs, psychotropic substances and precursors;

[71] **source http://www.emcdda.europa.eu/html.cfm/index5174EN.html**

6. Regulation on the cultivation of poppy seeds and hemp;
7. International Conventions on drugs to which the Republic of Poland is a party.

2.1.2 Controlled substances

The Act of 29 July 2005 on countering drug addiction includes two appendices. The first one covers the list of narcotic substances that are divided into the following groups: I-N, II-N, III-N and IV-N. The second list covers the list of psychotropic substances that are divided into the following groups: I-P, II-P, III-P and IV-P. All the lists and relevant groups follow the pattern used in the international agreements. The previously attached list of precursors has been removed following accession of Poland to the EU. Currently the Act refers directly to the Regulation 273/2004/EC as regards precursors.

2.1.3 Drug use and possession

The use of drugs in itself is not penalised. However, any possession of drugs is penalised (Art. 62.1). In cases of minor importance, the offender can be fined or ordered a limitation of liberty (or deprivation of liberty up to one year maximum (Art. 62.3). The fine is ordered in so-called daily rates (the minimum number of daily rates is 10 and maximum is 360) and the court decides how much one daily rate shall be. Nevertheless, as a rule, one daily rate shall not be smaller than 10 PLN (approx. €2.50) and not exceed 2000 PLN (approx. €500).

The Law sets a number of priorities and of implementing actions, in Art. 1. 2 of the Act, such as education and prevention; treatment and social rehabilitation of addicts; control over the substances that may lead to drug addiction; fight against drug-related criminality; control over the cultivation of plants that may lead to drug addiction; limitation of health damages that are caused by the use of narcotic drugs or psychotropic substances.

Art. 4, point 11) of the Act of 29 July 2005 on counteracting drug addiction defines the term “drug addiction”. According to the definition, it means chronic or habitual use for other than medically warranted purposes of narcotic drugs or psychotropic substances or substitute drugs having an addiction-forming or addiction-sustaining liability.

An important change in national drug policy has been introduced with the amendment to the law in 2011, regarding illegal possession of drugs. The amendment allows the prosecutor and judge to terminate the criminal proceedings against those who possess illegal drugs, in the presence of three conditions:

1. if the defendant is in possession of small amounts of drugs
2. if the drug is held for personal use only
3. if the punishment would be pointless due to the harmless nature of the offense.

However, the legislation raised the penalties for drug dealing from 10 to 12 years in prison and for possession of large quantities of drugs from 8 to 10 years in prison.

2.1.4 Trafficking and drug-related crime

According to Art. 55.1 of the Act of 29 July 2005 on Counteracting drug addiction, trafficking of drugs is punished with a fine and deprivation of liberty up to 5 years maximum. In case of minor offences, the perpetrator may be fined, subjected to limitation of liberty, or imprisoned up to 1 year maximum. In cases where the amount of drugs is substantial or the crime was committed in order to receive profits, the prison sentence cannot be less than 3 years.

Generally drug-related crimes are punishable under the Act on countering drug addiction. Courts may or may not take into account the possible involvement of drugs in other types of crime, which are punishable under the Criminal code. The "drug factor" can be considered according to the general rules (e.g. petty crime committed by an addict) or may be treated as an aggravating circumstance.

The Act on countering drug addiction does not differentiate between drug dealer and user-dealer. Art. 56 of the Act states that introduction of drugs into circulation (i.e. participating in production at any level, with the exclusion of delivering to the final customer)is punished with a fine, limitation of liberty or deprivation of liberty up to 8 years maximum. However, in cases of minor offence, the perpetrator may be fined and/or ordered a limitation of liberty or deprivation of liberty up to 1 year maximum. The situation when a person sells drugs in order to support his/her addiction may be recognised as a minor offence. Nevertheless, each individual case is considered at discretion of the court.

2.1.5 Prevention, care and treatment

In Poland, prevention programs focus primarily on youth and are mainly implemented in schools. The programs usually promote healthy lifestyles; provide information on drugs and on the consequences of their use and aim to develop the psychological skills of youth and children.

According to Art. 25 of the Act of 29 July 2005 on counteracting drug addiction, treatment and rehabilitation are voluntary except in some specific cases, in which the judge may decide for compulsory treatment: 1. minors under 18 and 2. sentenced addicted drug users, who may be sent to treatment before serving the sentence or whose sentence is suspended for treatment purposes. Compulsory treatment cannot exceed two years. The details concerning the medical procedures are also regulated by the Law.

The following are examples of the court's discretion in choosing between punishment or treatment:
1. the prosecutor may conditionally suspend the sentence for treatment purposes, if the person requests treatment voluntarily and if the punishment is less than 5 years (Art. 72.1);
2. when the aforementioned treatment is over, the public prosecutor may request the court to conditionally terminate the sentence (art. 72.2);
3. the person who was sentenced to imprisonment may be transferred to a treatment centre at the discretion of the court (art. 71.3); after the treatment the court may decide whether to execute the prison sentence or not (art. 71.5).

2.2 Portugal [72]

2.2.1 Development of legislation

In Portugal, the main law regulating control, use and trafficking of narcotic drugs, psychotropic substances and precursors is the Decree Law 15/93, of 22 January 1993, as amended by Decree Law 81/95, of 22 April 1995, and Law 45/96, of 3 September 1996, and partially revoked by the Law 30/2000, of 29 November 2000. The Decree-Law 15/93 regulates several aspects regarding penalties, medical prescriptions, authorisations, certification and control activities, as well as responsibilities concerning treatment, prevention, criminal investigation, making a clear distinction between trafficking related crimes and drug use related crimes.

[72] source http://www.emcdda.europa.eu/html.cfm/index5174EN.html

The year 1999 was a turning point in the Portuguese drug policy. With the Decree Law 31/99, of 5 February, the Portuguese Institute for Drugs and Addiction (IPDT) was created and, with the Resolution of the Council of Ministers 46/99 of 26 May, the government approved the National Strategy for the Fight against Drugs covering the period up to 2008. As a consequence, a series of legislative amendments took place during 2000. The Decree Law 89/2000, of 18 May, created the Coordination Board for Drugs and Drug Addiction, while the Decree Law 88/2000, of 18 May, created the National Board for Drugs and Drug Addiction. It is important to mention the changes in the functions attributed to the IPDT introduced by Decree Law 90/2000, of 18 May, and the adoption of the Action Plan on Drugs, in the implementation of the drug strategy and in the identification of 30 objectives to be achieved by 2004.

Moreover, in November 2000, Law 30/2000 amended the main drug Law of 1993, by introducing a regime of decriminalization for the use and possession for personal use of all illicit drugs. This law entered into force in July 2001 following the adoption of its operational Regulation Decree Law n.º 130-A/2001.

2.2.2 Controlled substances

Controlled substances are annexed to the main Decree Law 15/93 in 6 lists, regularly updated by decree laws. List I is divided into opiates; coca derivatives; Cannabis and derivatives. List II is divided into Hallucinogens; Amphetamines; Barbiturates. List III contains preparations with controlled substances; List IV tranquillisers and analgesics and lists V and VI contain precursors.

2.2.3 Drug use and possession

Until July 2001, drug use was considered a criminal offence punishable with imprisonment up to 3 months or a fine. If the quantity of illicit drugs found in possession exceeded 3 daily doses, the penalty could go up to 1 year or a fine. The law envisaged the suspension of the sentences for occasional users. Possession of drugs was also punished depending on the motivation behind the offence: whether the drug was for personal use, for retail, or for trafficking.

After the adoption of the Portuguese strategy on drugs in 1999 and the adoption of Law 30/2000 use and possession for use of all illicit drugs has been decriminalised. The new law in force from July 2001 maintains the status of illegality for all drugs and for using them without authorisation. However, the punishment for illegal drug use has changed. Anyone caught in possession of a modest quantity of drugs for personal use (as per the Law, this shall not exceed the quantity required for an average individual consumption during a period of 10 days), the police having no further suspicions or evidence that more serious offences are involved (sale, traffic), the drug will be seized and the case transmitted to a local Commission composed of a lawyer, a doctor and a social assistant. The Commission meets the person charged with illegal drug use/possession, in order to evaluate his/her situation with the aim of treating any state of addiction and with the ultimate aim at rehabilitating the person; sanctioning, even if possible, is not the main objective in this phase. Control of sale of drugs for commercial purposes still remain one of the objectives of law enforcement authorities.

2.2.4 Trafficking and drug related crime

Drug trafficking is defined in Chapter III Art. 21 of Decree Law 15/93: ‘traffic and other illicit activities’. Producing, offering, selling, preparing or cultivating illicit drugs are the typical offences constituting drug trafficking. It must be mentioned that the same article expressly excludes drug use offences, which are defined in Article 40 of the same Decree Law.

Portuguese law differentiates prosecution of drug trafficking according to several criteria. The nature of the substance is one of the main criteria. Trafficking in substances included in the lists I to III attract a sentence

of between 4 and 12 years of imprisonment, while substances in list IV (tranquillisers and analgesics) may be punished by between 1 and 5 years in prison.

The state of addiction of the trafficker is also taken into account by art. 26 of Decree Law 15/93. If the user sells drugs to finance his own consumption ('addict-trafficker'), the penalty is reduced: Lists I, II, III up to 3 years (instead of 4-12) - list IV up to 1 year (instead of 1-5).

The 'traffic of minor importance', being defined by article 25, is also considered. If the crime is reputed minor, according to the circumstances, modalities of the crime, quantity and nature of the substances, the penalties will be substantially reduced; between 1 and 5 years imprisonment (lists I to III) and up to 2 years or fine (list IV).

Of course the law includes also aggravating circumstances by which the minimum and maximum penalties for trafficking can be increased by one fourth in all cases. Criminal association is punished with 10-25 years. Trafficking of precursors attracts penalties up to 12 years of imprisonment and the abandonment of syringes is fined or punished by up to 1 year of imprisonment.

The Decree-Law 43/2002, created the System of Marine Authority (SAM), establishing its scope, attributions, and its co-ordination structure. This law aims to increase the capacities of the organisms and security force, to implement the objectives of the government in the matter of illicit drugs trafficking.

2.2.5 Prosecution and judicial practice

The changes of the Drug Law in 2001 (Law 30/2001) is having an impact on the daily practice of police and magistrates.

A prosecutor is obliged by law to start an inquiry whenever he/she is informed about a crime. In the case of drug use/possession, the prosecutor, before the 2001 changes, would investigate, confirming the evidence of the crime and charging the persons. In case the defendant was proven to be addicted to drugs, the prosecutor would ask for a fine. Occasionally, the belief that medical treatment would be more effective than repressive responses would lead the prosecutor to request treatment for the subject sentenced.

However, the prosecutor would rarely apply the possibility to waive or temporarily suspend the penalty, unless the defendant was a first offender, charged with a minor offence. The new regime introduced in 2001 was expected to change this radically, by bringing more coherence between punishment of traffickers and treatment of addicts.

2.2.6 Prevention, care and treatment

The Decree Law 15/93 especially provides for the involvement of the health services in the enforcement measures (Chapter IV).

The person addicted to drugs is considered sick rather than a criminal and Portuguese legislation includes a comprehensive legal system in support of drug addicts. Although the legislation foresees various therapeutic alternatives to prison, the limited availability of facilities in the past created rather long waiting lists, with the tendency to apply the punishment measures instead of the treatments.

Nevertheless, the new recently adopted drug strategy prioritises the treatment and rehabilitation of drug addicts as a fundamental pillar of the Portuguese drug policy, and the recent change in legislation gives a very strong and concrete signal in the direction of treatment instead of punishment.

The public prosecutor is now substituted by a Commission (Comissão para a Dissuasão da Toxicodependência) present in each district, composed of three civil servants whose objective is to deal with non-violent drug use offenders in order to provide treatment and full rehabilitation (Decree Law n.º 130-A/2001 of 23 April).

2.2.7 Harm reduction

Harm reduction measures in Portugal are regulated by Decree Law no.183/2001 of 2001, which provides for a normative framework for the implementation of programs and social and health structures, targeting on the one hand awareness and referral to treatment of drug users and, on the other hand, prevention and reduction of risk attitudes or behaviours and minimization of individual and social harm caused by drug use. In accordance with this legislation, several structures were implemented: Drop-in centres for drug users without social or family support; Refuges; Shelters; Contact and information units; Mobile centres for the prevention of infectious diseases; Low threshold substitution programmes; Syringe exchange schemes; Street teams; Programmes for supervised drug use. Methadone maintenance and needle exchange programs can be implemented in all of these structures. According to this text together with Decree-Law 15/93 of 1993, medical doctors are allowed to prescribe substitution treatments and such treatments shall be restricted to adult persons addicted to opiates. Provisions on take-home doses of substitution drugs are not envisaged in the law but are contained in the "Manual of Standards Guiding Therapeutic Programs with Opioid Agonist". In some Portuguese prisons, methadone maintenance and methadone detoxification treatments are available. Syringe exchange schemes are clearly regulated by Arts 50-57 of Decree-Law 183/2001 of 21st of June 2001. This includes provisions on management, access rights, working hours and procedures, premises and location (including the possibility of dispensing machines), coordination with other bodies and assessment. Under this text, injecting drug users are allowed to carry sterile injecting material. The National Commission for the Fight against AIDS, in cooperation with the National Association of Pharmacies, implements the national syringe exchange programme since 1993. Order no. 22 144/2007 of the 21st of September 2007 approved the specific regulation for a syringe exchange pilot project in selected prisons and is currently implemented at Lisbon and Paços de Ferreira prisons.

2.3 Spain[73]

2.3.1 Development of legislation

The Organic Law 1/1992 of 21 February 1992, on the Protection of Citizens ´Security, introduced administrative sanctions to punish the possession and use of drugs in public places. Before this act possession and use of drugs were not prohibited by Spanish law.

In 1993 the Law 19/1993, on measures to prevent money laundering, implemented the related European Directive 91/308/EEC and in 1995 the current Penal Code was passed, by the Organic Law 10/1995 of 23 November, and established the offences and penalties concerning drug trafficking, money laundering and precursors.

In the same year, the so-called 'Law of the Fund' (Law 36\1995) was adopted, creating a common national fund of goods and money coming from drug trafficking and related offences which is used for prevention, treatment and rehabilitation measures and allows, as well, additional financial resources for law enforcement agencies and international co-operation.

[73] **source http://www.emcdda.europa.eu/html.cfm/index5174EN.html**

The Law 3/1996 of 10 January established, in accordance with the Directive 92/109/EEC, administrative controls on precursors. Finally, it is important to mention the Law 17/1967, of 8 April, implementing the UN Convention of 1961 on narcotic drugs, and the Royal Decree 2829/1977, of 6 October, implementing the UN Convention of 1971 on Psychotropic Substances.

In the field of international co-operation, Spain participates in most of the international organisations that are devoted to counter the world drug problem, playing an active role in their projects and initiatives, and has signed bilateral agreements with third countries, especially in Latin America and Europe.

2.3.2 Controlled substances

Under Spanish law there is not a specific definition of narcotic drugs or psychotropic substances, nor specific lists or schedules where the controlled drugs are classified. Therefore, judicial authorities refer directly - for the interpretation and application of the laws in accordance with the art. 2 of the law 17/1967 and art. 1 of the Royal Decree 2829/1977 - to the schedules of narcotics drugs and psychotropic substances included, respectively, in the 1961 Single Convention on Narcotics Drugs and in the 1971 Convention on Psychotropic Substances. They may also refer to several national regulations that, after the approval of these Conventions, have put under control other substances not originally under control. The Spanish Penal Code establishes that the penalties foreseen for drug trafficking should be applied taking into account the seriousness of the health hazard the substances might cause to drug users. For instance selling heroin or cocaine can attract heavier penalties than selling cannabis by reason of the different health risk. Also, the judge will take into account many other elements, including aggravating and mitigating circumstances, for fixing the penalty between the limits established by law.

2.3.3 Drug use and possession

The law 17/1967 considered drug use and drug possession illegal - but authorised for therapeutic reasons, among others – without imposing any punishment.

Drug use and possession for personal use do not constitute a criminal offence under Spanish law. Nevertheless, in 1992 the Organic Law 1/1992 of 21 February on the Protection of Citizens' Security, currently in force, considered drug consumption in public – as well as illicit possession, even if not intended for trafficking - as a serious public order offence punishable by administrative sanctions. Fines are the usual punishment ranging from €300 to €30 000. The law foresees that the execution of the fine can be suspended if the person freely attends an official drug treatment program, in accordance with the procedure regulated in the Royal Decree 1079/1993.

2.3.4 Prosecution and judicial practice

The Spanish legal system operates on the legality principle, which means that all legal actors (police, prosecutors and judges) are obliged to prosecute every crime they are aware of and apply the law accordingly, which means that there is very little space for discretional criteria.

Scenario 1: possession of heroin for personal use by an adult offender.
If the examining judge considers that the quantity of the drug apprehended (by the police) is exclusively for the personal use of the offender and that any involvement of this person in sale or trafficking can be excluded, he will most probably close the case taking no further action.

Scenario 2: property crime committed by a drug user to finance her/his drug addiction.
Normally a person who has committed a property crime (e.g. shoplifting) would be arrested by the police and detained. A report would be made and the person will be placed at the judge's disposal. The judge, if

there are no pending charges, no risk of disappearance, and no major social alarm is caused, will release the person until called to appear in court on a given date.
The judges or courts facing a property crime committed by a drug addict can declare the crime non punishable when those committing the crime were completely under the effects of the drugs or suffered from withdrawal at the time of the crime. In both cases the judge or court will order the person to attend a residential treatment. The judge or court can also apply, if the legal requisites concur, the mitigating circumstance of "strong drug addiction" (foreseen in art. 21.2ª of the Penal Code). In this case the penalty to be imposed for committing the property crime cannot exceed half of the maximum penalty foreseen in the law.
Moreover, in cases where the maximum penalty is equal or less than three years, its execution can be provisionally suspended and definitively reduced or dropped if the offender agrees voluntarily to undergo treatment, given that the offender will not leave the treatment or commit any crime in the time set (between 3 and 5 years). In any case when the maximum penalty is less than one year it can be substituted with weekend arrest and/or fines.
Stealing goods to the value of €100, if it involves violence or intimidation, would result in the person being detained and not released but rather put at the disposition of the judge. Burglary valued at €1000 would be considered a crime. The penalties will be a prison sentence between 2 and 5 years.

Scenario 3: small-scale distribution of drugs by a drug user to finance her/his drug addiction.
The Spanish legal system does not foresee any attenuating circumstances in case of small dealing or dealing as activity to finance one's own addiction. Penalties therefore will take into account the usual circumstances and the person will be charged with illicit sale of drugs.

2.3.5 Prevention, care and treatment

Spain is a parliamentary monarchy divided into 17 autonomous communities and two autonomous cities, which have legislative powers in specific domains.

The autonomous communities have therefore legislative and executive competences in the fields of health, hygiene and social assistance [art.148.1. paragraphs 20º and 21º of the Constitution], into which fall some aspects related to drug prevention and the treatment and rehabilitation of drug users. In these cases the laws passed by the autonomous communities have necessarily to be taken into account, even though the national laws are also applicable (for example, regulations on advertising, on health, education…).

Drug addicts who have committed an offence may benefit from alternative measures to prison once the sentence against them has been pronounced [art. 87 Law nº10/1995, of 23 of November]. However the conditions posed by the law heavily limit the recourse to alternative measures; the prison penalty can not exceed 3 years, with "adequate certification (…) that the convicted person has overcome his addiction or is undergoing treatment for this purpose at the time of the decision on suspension. That the convicted persons are not habitual offenders, (…) that the convicted person commits no further offence during the period appointed, which shall be from three to five years."

These people can benefit from unemployment grants and will be taken into account by the employment policies carried out by the government, in accordance with the law 36/1999 of 18 October.

2.3.6 Trafficking and drug related crime

Due to its geographical position Spain is one of the countries of the European Union more targeted by the international traffic. In response to this the Spanish government has set up a prominent structure to face the problem. Therefore, recent years have seen the intensification of police forces through the

establishment of new units specialised in the fight against drug trafficking - such as the 'UDYCO' (*Unidad de Drogas y Crimen Organizado*).

The main role of the Government Delegation for the National Plan on Drugs is the co-ordination, on the one hand, of all public activities carried out for the prevention of drug use and the treatment and rehabilitation of drug users and, on the other, of all anti drug trafficking activities carried out by law enforcement agencies.

Independent of the competences of other Judges and Courts in this field, the *Audiencia Nacional* is the court competent to judge all cases of drug trafficking and money laundering in, or related to, Spain when committed by organised groups and with effects in two or more provinces.

The law foresees heavy penalties (in line with the seriousness of the health damages associated to the drugs and the aggravating and mitigating circumstances that may exist), which appear to be in the range of the most severe in Europe reaching up to 20 years and 3 months in prison. Articles 368 to 378 of the Penal Code regulate penalties for illicit drug and precursors trafficking, which are considered crimes against public health.

The penalties are more severe when the crime of illicit drug trafficking involves substances which might cause serious health risks, and when some special circumstances exist, such as: drugs are adulterated, big quantities of drugs are involved, drugs are sold to minors under 18, drugs are introduced into schools, prisons or military establishments, drugs are sold in public establishments by employees of the establishment or are offered to those undergoing drug treatment, etc [2].

When no aggravating or mitigating circumstances exist, those who committed the crime can be sentenced to prison for 1 to 3 years, if the drugs do not cause a serious health damage and from 3 to 9 years when they do. Also, in all cases, a fine is imposed and the drugs and goods used (cars, boats…) are seized as well as the revenues.

3. Criminal justice system costs estimate

3.1 Objective and methodology of the cost analysis

This report aims to analyse the costs illicit drug control posed to the criminal justice system of three EU countries, Poland, Portugal and Spain in 2010-2011. This study estimates only the direct costs for the following three criminal justice sectors: police, justice (prosecution and courts) and prison.

The cost estimation was effected in order to shed light on the domestic distribution of resources for drug control in the three countries, i.e. to understand how each country apportions the different budget quotas dedicated to drug control in the criminal justice chain, i.e. policing, justice and prison. Cost estimates are subsequently compared among the three countries to highlight the differences within the framework of the type of drug control legislation in place.

For the police law enforcement and supply reduction sector, the estimate was obtained for 2010, by dividing the total cost for police salaries by the total number of all officially recorded crimes. Included in the definition of officially recorded crimes are all crimes that were recorded by police officers according to EUROSTAT. The resulting average cost per crime was then multiplied by the number of drug-related offences (defined as including both drug possession and trafficking) to obtain the estimate of the costs for drug related policing salaries in 2010.

For the judiciary sector, the estimate was obtained for 2010 by dividing the total annual approved budget allocated for personnel salaries by the total number of all officially recorded crimes, as defined above. The resulting average cost for each crime was multiplied by the drug-related offences, as defined above. For the justice sector, we obtained a second estimate based on the total annual approved budget allocated for the entire justice system (as reported by the CEPEJ Report for 2012) divided by the total number of all officially recorded crimes. The resulting average of the cost for each crime was multiplied by the drug-related offences. Rather than using the number of prison sentences to build the estimates, we decided to use the number of drug-related offences since prison sentences alone would not account for all costs, being only one part of the judicial process and would not include, for example, prosecution costs, the duration of the judicial proceeding or remand costs.

For the prison sector, the estimate of costs for drug-related detention was obtained for the year 2011, by multiplying the number of person-days detained individuals for drug-related offences by the average cost per day. Prison population reported on specific days was multiplied by 365, in order to obtain an average daily prison population to arrive at a yearly person-day detained individual estimate. Final-sentenced inmates do not generally constitute the total number of inmates. Other types of detainees were added to the calculation, assuming that the proportion of such detainees being held for drug related offences would be the same as for sentenced individuals. The number of non-sentenced individuals (detainees) was calculated as the difference between the reported total prison population and the sentenced prison population.

The costs for the three sectors considered, public police, justice and prisons, were subsequently normalized for GDP, population, purchasing power parity and mean salary values of the three countries, in order to compare the costs of the three countries with the different levels of economic development and population size.

Data were collected from international and national institutional sources. The main data sources accessed and the items searched are listed below:

For the police sector:
EUROSTAT (Population; GDP and main components - Current prices; Police officers; Prison population; Crimes recorded by the police).

For the justice sector:
Council of Europe – European Commission for the Efficiency of Justice (CEPEJ) - SCHEME FOR EVALUATING JUDICIAL SYSTEMS 2012 (Annual public budget allocated to (gross) salaries 2010 and 2011; Annual public budget allocated to computerisation (equipment, investments, maintenance) 2010 and 2011; Annual public budget allocated to justice expenses 2010 and 2011; Annual public budget allocated to court buildings (maintenance, operating costs) 2010 and 2011; Annual public budget allocated to investments in new buildings 2010 and 2011; Annual public budget allocated to training and education 2010 and 2011) (http://www.coe.int/t/dghl/cooperation/cepej/evaluation/default_en.asp)

For the prison sector:
Council of Europe Annual Penal Statistics – SPACE I – 2010, 2011, 2012 (Total number of prisoners (including pre-trial detainees); Breakdown of sentenced prisoners (final sentence) in 2010 and 2011; Average amount spent per day for the detention of one person in 2010 and 2011; Average amount spent per day for the detention of one person in pre-trial detention in 2010 and 2011 (€/day); Average amount spent per day for the detention of one person in correctional facility in 2010 and 2011 (€/day); Total number of days spent in penal institutions in 2010 and 2011 (incl. pre-trial detention); Number of days spent in pre-trial detention in 2010-2011;Average amount spent for all categories of inmates in 2010 and 2011).

The main data set was compared with data from other sources to verify their reliability. Other sources included the World Drug Report, the United Nations Survey of Crime Trends and Criminal Justice Systems, data provided by the ALICE RAP country focal points, national Ministries, national statistics offices and national EMCDDA Reitox reports and research reports and studies.

Costs estimates presented are to be considered cautiously and in the light of the obvious limitations connected to the type of data, to the different geographical, economic and judicial situations of the three countries and to the differences in the types of indicators that were chosen to obtain the estimates i.e., salaries for police and justice costs and cost of inmates to estimate prison costs. Due to these limitations, the study only aims to offer a partial view of the actual criminal justice investment each country makes for drug control in each of the sectors analysed. The peculiar characteristics and the complexities of the illicit drug market and drug control strategies in place in each country can obviously only partially be reflected in the estimates presented in this study, which wishes to offer a "glimpse" of the overall picture and hopes to be thought provoking enough to inspire further research in this field.

In particular, in the conclusions, this study presents some reflections for further investigating the relationship between the laws and their actual policy implementation. The picture that originates from the estimates could be useful, in fact, to deepen the understanding of the relationship between the legal drug control framework enacted in the three countries in 2010 and the way each country distributed the resources within the three criminal justice sectors analysed. More interesting would be to understand whether this apportionment was consistent and in line with the requirements of the laws and what practical implications and consequences this had on the actual policy implementation and eventually, on the lives of the citizenry.

The data presented aim to offer a contribution to the current debate on illicit drug control, which is at the centre of the international agenda and shall be at the centre of the policy decisions at the United Nations Special Session of the General Assembly in 2016.

3.2 General overview: economic and criminal justice data

Economic evaluations have become increasingly important for policy makers and budgetary implications weigh more and more in politicians' policy choices (Horverak 2010). This might particularly be the case in a Europe ridden by financial crisis and tough austerity measures.

It is important to note, however, that policies should be evaluated not only with regard to their costs or cost-benefits, but also to their overall impact on society, in relation to their human rights, public health and overall social implications. The best policy would then be one that not only reduces economic costs, but also reduces social marginalization and inequality, protects human rights and values public health and social well-being.

This report looks into the economic costs of drug control to the criminal justice systems in three European countries, Poland, Portugal and Spain, with the aim to provide a contribution to the debate on the costs of illicit drugs to society and to suggest additional paths for research and investigation which could provide some evidence on the need to consider drug control in a holistic, societal perspective beyond merely economic and budgetary considerations.

At the global level, extensive evidence has been collected and research carried out on the importance of estimating the costs of crime to society (Cohen 2000). However, there is still little evidence on some selected aspects of the criminal justice costs and of these costs considered in relation to the laws and regulations for which they were incurred. The study of Farrell and Clark (2004) is one example of an empirical estimate of the direct cost of public expenditure on the global criminal justice system, conducted on seventy countries[74]. The study found that global criminal justice expenditure in 1997 was estimated at $360 billion (the equivalent of $424 billion in 2004 prices) of which 62% was spent on policing, 3% on prosecutions, 18% on courts and 17% on prisons. Using six different regression models, the study found that there was a direct relationship between the wealth of nations and the amount spent for criminal justice[75] with richer countries spending more GDP per capita than less developed countries.

Poland, Portugal and Spain show both differences and commonalities in terms of their geographical position, economic development and criminal justice system organization in relation to drug control. All three countries are based on a civil law system and have old judicial traditions. Spain is the most populated country among the three, followed by Poland and Portugal. Spain is also the richest country, in terms of GDP and per capita earnings, followed by Portugal and Poland.

Below, some of their economic characteristics are detailed:

Poland is located in Central Europe. Economically, the country has accessed the European Union but is not yet part of the Euro zone. Poland population as of 1st January 2010 was 38,167,329, its GDP was € 354,616 million and its GDP per capita was € 9,359, at less than 40 % below the EU-28 average. Poland price levels were less than 40% below the EU-28 average. Poland criminal justice budget in 2012 was €2.542.706.750, corresponding to 0,97% of its GDP.

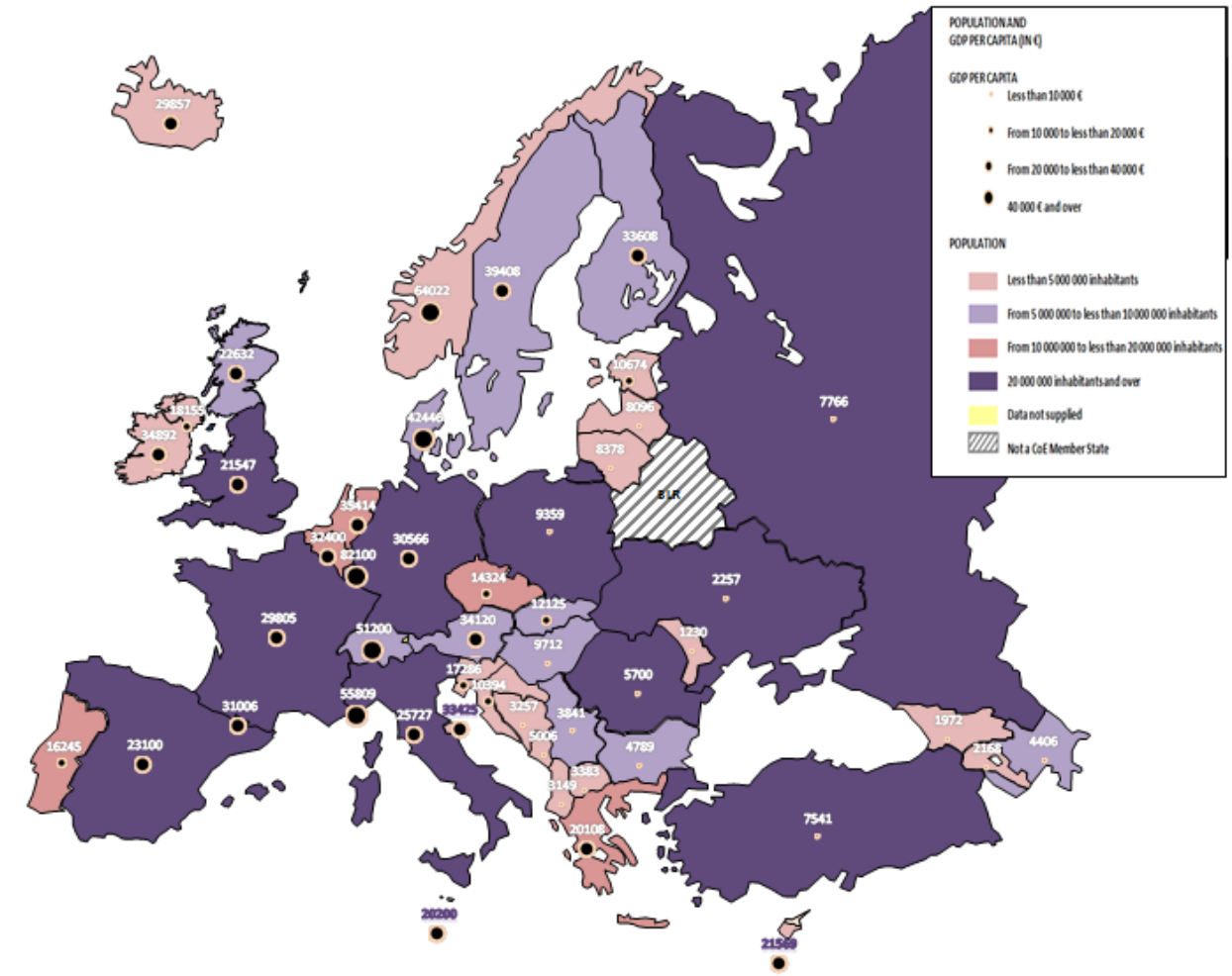
Portugal is located in South-Western Europe, sharing the Iberian Peninsula with Spain, and it is the westernmost country of mainland Europe. Economically, the country is part of the Euro zone. Portugal population as of 1st January 2010 was 10,573,479, its GDP was € 172,859 million and its GDP per capita was € 16,245, at around 20 % below the EU-28 average. Portugal price levels were at around 20% below the EU-28 average. Portugal overall criminal justice budget in 2012 was €1.078.464.698, corresponding to 0,65% of its GDP.

Spain is located with Portugal in South-Western Europe. Economically, the country is part of the Euro zone. Spain population as of 1st January 2010 was 46,486,619, its GDP was € 1,045,620 billion and its GDP per capita was € 23,100, at around 10 % below the EU-28 average. Spain price levels were at around 10% below the EU-28 average. Spain overall criminal justice budget in 2012 was divided as follows: budget from Justice Ministry: €1.574 million; budget from Home Affairs: €8.610 million; corresponding to 0,149 % of the GDP for the Justice Ministry and 0,82 % for the Home Affairs.

[74]G. Farrell, K. Clark, What does the world spend on criminal justice? The European Institute for Crime Prevention and Control, affiliated with the United Nations, Helsinki, HEUNI Paper No. 20, 2004

[75]See also G. Newman, GJ Howard “Resources in criminal justice”, in: Global report on crime and justice, Ed. By G. Newman, New York, OUP, 1999

Figure 2: Level of population and per capita GDP in Europe in 2010



Source: Council of Europe

3.3 Brief description of the drug market and the law enforcement and supply reduction operations in the three countries, and estimated costs

Before introducing the costs estimates for the police sector, we thought it might be interesting to provide some information on the drug market and the supply reduction operations in the three countries. All three countries present distinctive features as regards their drug markets. Portugal and Spain are mostly exposed to drug trafficking by sea routes. According to the EMCDDA, three quarters of the police seizures of cocaine in Europe take place in Spain and Portugal. Poland is mostly exposed to drug trafficking by land routes, but its sea borders are becoming increasingly permeable to drug trafficking, especially for stimulants.

Poland

Major drug trafficking routes in Europe go through the Polish territory. Drugs are transited or they are directly exported from Poland to the Western European markets. Crime syndicates are active in amphetamine trafficking. Polish amphetamine reaches such countries as Germany, France, Sweden, the United Kingdom and Ireland. Drugs, especially amphetamine, are smuggled to Scandinavian countries by sea from Polish ports. In 2010, the Police seized 1679 ml of liquid amphetamine. Shipment and post agencies are used to smuggle amphetamine to the US and Australia. Cocaine is trafficked from South America to Poland by sea. Heroin, mainly from Afghanistan, is trafficked to Poland by the Balkan route (Turkey-Bulgaria-Romania-Hungary) or the silk route (former Soviet Union republics). From Poland heroin is trafficked to Germany and the United Kingdom. Ecstasy is smuggled from Poland to the Netherlands and

Belgium. In recent years, a rise in the domestic cannabis crops by crime syndicates has been recorded. To a large extent, heroin comes from trafficking. The domestic manufacture is evidenced by poppy straw and 'kompot' seizures. Amphetamine available on the Polish market comes from Polish clandestine labs. However, ecstasy containing MDMA, MDE, and MDEA is unlikely to originate in Poland and reaches the Polish market from other countries. In 2010, there was a rise in hashish seizures and a record quantity of marijuana was seized. In the case of amphetamines, ecstasy and LSD, higher quantities were seized compared to 2009. There was a fall in cocaine and heroin seizures with heroin figures falling considerably. The highest number of marijuana plantations was recorded in 2010[76].

Portugal

Portugal is a gateway for drug trafficking of cocaine from Central and South America, heroin from Spain, hashish from Morocco and Southern Africa and heroin and ecstasy from the Netherlands. Portugal is a transit country for an estimated 77% of drugs seized destined for the external market (mostly other European countries)[77]. The two biggest drugs trafficked are cocaine and cannabis, with an estimated 35% of all cocaine seizures in Europe according to the world drug report 2011[78]. Between 1999 and 2010, there was limited change in the number of drug seizures, except for heroin, while there was an overall increase by 499% in the quantity of illicit drugs seized. Seizures involving significant quantities in 2010 represented 4% of the total number of heroin seizures, 4% of hashish, 2% of liamba, 12% of ecstasy and 19% of cocaine seizures. However, in terms of quantities seized, those seizures involving significant amounts represented 46% of liamba, 95% of ecstasy and 79% of heroin and 99% of the hashish and cocaine seized in the country in 2010. At the regional level, the districts of Lisbon and Porto were the ones with the higher number of seizures at the level of several substances, although the districts of Lisbon, Setúbal, Faro and Coimbra registered the largest quantities seized of heroin, cocaine, hashish and liamba[79].

By 2007, West Africa had assumed an important role as a hub for cocaine on its way from South America to Western and Central Europe. UNODC's database of individual drug seizures showed that, out of the total number of cocaine seizures made in Europe, 22% had been smuggled via Africa to Europe. The most important South American transit country for cocaine seizures actually made in Africa is Brazil, followed by Venezuela. The geographical position of Western Africa makes it an ideal staging post from South America to the growing cocaine market in Europe. The shortest distances between Venezuela and Brazil and Western African countries (especially Guinea-Bissau, Sierra Leone and Liberia) are around 10 degrees of latitude north and it is exactly where most cocaine seizures with a link to Africa have been made by the Spanish and British Navies. So many cocaine seizures destined to Africa have been made in this Atlantic band that the European law enforcement agencies now refer to as "Highway 10".

Spain

Due to its geographical position, Spain is one of the countries in the European Union most targeted by international drug traffickers. According to information from law enforcement agencies, seized cocaine

[76] 2011 NATIONAL REPORT (2010 data) TO THE EMCDDA (by the Reitox Polish Reitox Focal Point) "*POLAND New Development, Trends and in-depth information on selected issues*".

[77] It is important to underline that Portugal is the main door in Europe for the cocaine coming from Brazil and transiting in Western Africa lusophone countries. In this sense an emblematic case is Guinea-Bissau, a former Portuguese colony, that has in recent years turned into such an important cocaine hub, that it is considered by the international community a "narco-state". Guinea-Bissau is geographically situated in Africa's most westerly point, and South American smugglers are thought to transport drug shipments from here on to Cape Verde and then to Portugal, taking advantage of the fact that traffickers don't need visa for transit in the Portuguese territory. The Atlantic waters of Cape Verde and the African countries in the Gulf of Guinea are used to bypass the controls enacted by the international community in the Caribbean sea. Reportedly, Brazil has become South America's largest drug exporter to Africa.
The Atlantic waters of Cape Verde and the African countries in the Gulf of Guinea are used to bypass the controls enacted by the international community in the Caribbean sea. See Senate Foreign Relations Committee, Subcommittee on African Affairs: *Confronting Drug Trafficking in West Africa*, June 2009; and U.S. Government, *Strategy to combat transnational organized crime, Addressing converging threats to National Security*, July 2010.

[78] http://www.unodc.org/documents/data-and-analysis/WDR2011/World_Drug_Report_2011_ebook.pdf

[79] 2011 NATIONAL REPORT (2010 data) TO THE EMCDDA (by the Reitox National Focal Point), "*PORTUGAL New Development, Trends and in-depth information on selected issues*".

generally originates from the Andean countries of South America and is destined for other European countries; practically all seized cannabis resin comes from territories under Moroccan control; heroin comes from Afghanistan via Turkey and the Balkan route; and synthetic drugs are smuggled into Spain from the Netherlands and Belgium.

In 2010, the number of seizures and the amounts confiscated of hashish, cocaine and heroin declined, that of ecstasy having risen slightly. Overall, the number of drug seizures has increased over the past 10 years, and cannabis products remain the illicit substances most frequently seized in Spain.

Cocaine is brought to the rest of Europe, through various routes:

- North or Sailboat Route: from the Carribean to Europe over the Azores, taking advantage of the Gulf current for sailing. The type of craft usually used is sailboats;
- Central or Cargo Ship and Fishing Boat Route: used by fishing type boats and small cargo ships which load cocaine on board in the close vicinity of the coasts of Venezuela, Guyana, Surinam or even Brazil;
- The African Route was first detected at the beginning of 2004. Over the past few years, a decline has been noted in the number of seizures, although the different international agencies and organizations are still advising as to Africa being used as a transit point before sending the cocaine to Europe.

If, according to the EMCDDA, three quarters of all seizures of cocaine takes place in Spain and Portugal, a UNODC study examining the production against the seizures of cocaine from South and Central America, showed that law enforcement agencies managed to take out up to 42 percent of drugs in the market, which as a conservative calculation, would equal to around 180 million tons of cocaine coming into Spain and Portugal alone each year[80]. The abundance of cocaine in Spain can also be guessed from its street price which has been falling over the last two decades and it still stands approximately at the 1990 prices, considering inflation rates.

Practically, all of the hashish seized in Spain comes from the Kingdom of Morocco[81]. The growing of cannabis plants has been found to be proliferating in Spain, normally in greenhouses for obtaining marijuana for one's own use and rarely for trafficking. Nevertheless, the estimated scope of these crops is insignificant compared to the quantities seized, and those used as inferred from the surveys on the use of cannabis.

MDMA and ecstasy seized come from Northern/Central Europe. Despite equalling the number of seizures for 2009, the amount seized in 2010 totals a 56.95% increase (634629 of ecstasy tablets seized in 2010), this percentage meaning that the shipments seized were comprised of a larger number of pills.

Most of the heroin seized is of the "brown sugar" type, produced in Afghanistan and Pakistan, following the route traversing Iran, Turkey and the South-Eastern European countries along the route known as "the Balkan Route". In 2010, the amounts of heroin have also dropped by 22.33% compared to 2009 (from 300 to 233 kg of heroin seized).

[80] UNODC estimate.

[81] During the period 2000-2011, global seizures of cannabis resin were dominated by Spain, which is the main entry point to Europe for Moroccan cannabis resin. In 2011, Spain accounted for 34% of global seizures. See UNODC *World Drug Report 2012*

3.3.1 Estimated cost for police salaries for drug control, 2010

Salaries of police officers were used to obtain the estimate on the costs of drug-related public policing, law enforcement and supply reduction operations for the year 2010 and 2011. The estimate excluded infrastructure and technological costs, because they could not be found for the years under consideration.

The definition of police officers is taken from EUROSTAT and includes in most cases all ranks: criminal police, traffic police, border police, gendarmerie, uniformed police, city guard, and municipal police. The definition excludes civilian staff, customs officers, tax police, military police, secret service police, part-time officers, special duty police reserves, cadets, and court police. The range of personnel included in the definition differs among countries and comparisons based upon absolute figures can be misleading. For this reason, for each country the following categories were considered:

For Spain: state police, autonomous communities' police and municipal police.

For Poland: criminal police, uniformed police, traffic police and court police.

For Portugal: Number of police officers reported by police forces. From 2005, three new police forces (criminal military police; forest guard and maritime police)[82] were included in the statistics of crimes registered by the police. Nevertheless, to avoid breaking the data series, the number of police officers of those three police forces is not included in the estimate.

Table 1 shows police personnel costs dedicated to law enforcement and drug supply reduction operations in 2010. The estimate was obtained by dividing the total cost of police salaries by the total number of all officially recorded crimes. The resulting average cost per crime was then multiplied by the number of drug-related crimes.

Table 1.Estimated police salary costs for drug control in 2010 (in €)

	N. of policeofficers 2010*	Average annual salary of a police officer in 2010 (in €)**	Total annual salary of police officers in 2010 (in €)	Total number of crimes 2010*	Police salary cost per crime 2010 (in €)	Number of drug related crimes 2010*	Estimated total police salary costs for drug control 2010 (in €)
Poland	97,535	9,744	950,361,533	1,151,157	825.57	72,375*	59.750.682
Portugal	46,632	24,786	1,155,804,417	422,587	2,735.07	4,546	12.433.622
Spain	241,267	28,957	6,986,368,519	2,297,484	3,040.92	319,474*	971.495.670

*: Eurostat; Poland: Statistical Yearbook 2013
: Spain:PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD - Secretaría de Estado de Servicios Sociales e Igualdad Delegación del Gobierno para el Plan Nacional sobre Drogas.
*: **Poland**: Statistical Yearbook 2013
**: Portugal: Polícia de Segurança Pública Balanço Social 2010and 2011; Balanço Social Guarda Nacional Republicana
**Spain: Boletín Oficial del Estado Dijous 23 de desembre de 2010;

[82]Futhermore, on September 2007, an agreement was concluded among seven EU Member countries to set up a centre for analysis and coordination in operations against drug trafficking at sea, the Maritime Analysis and Operations Centre – Narcotics (MAOC-N), located in Lisbon. This centre aims to coordinate the operations carried out at sea by the authorities of the state concerned, as well as collecting, exchanging, and analyzing drug-related information. It covers an area extending from the eastern part of the Atlantic Ocean to European and WesternAfrican coastal areas. See V. Delicato, *Maritime Security and the fight against drug trafficking in the Mediterranean and Atlantic approaches*, The German Marshall Fund of the United States, Washington 2010.

Table 1 shows Poland as having the lowest average police salaries, a little less than Euros 10.000 per year, as compared to Portugal at Euros 24.000 and Spain at Euros 28.000 per year.

According to this estimate, Poland expenditure for salaries of police forces on drug control amounts to 6.3% of the total budget for police salaries. It should be noted that the number of drug related crimes reported in Poland is higher than in Portugal and Spain. Portugal, the country with the lowest number of reported drug related crimes and with the lowest expenditure on police salaries, spends only 1.1% on drug enforcement of the total police salary costs. The percentage of the total cost for police salaries invested by Spain in drug control equals to approximately 13.9% of the total national budget for police salaries. It should be noted that Spain reports the highest number of police officers, a high number of drug related crimes, as well as the highest police salary among the three countries. This could explain the high costs in this sector.

Table 2.Estimated police salary costs for drug control per capita and GDP percentage, 2010

Country	Estimated total police salary costs for drug control in 2010 (in €)	Population on 1st January 2010*	GDP, 2010 (in millions of €)*	Estimated drug related police cost per capita, (Population as of 1 Jan. 2010, €)	Percentage of GDP spent for police salaries on drug related operations, 2010
Poland	59.750.682,10	38,167,329	354,616.1	1.57	0.017
Portugal	12,433,621.67	10,573,479	172,859.5	1.18	0.007
Spain	971,495,669.69	46,486,619	1,045,620.0	20.90	0.092

*Eurostat

Table 2 shows the estimated police salary costs for drug control in 2010, normalized by per capita and GDP values. These were estimated in order to further understand the cost borne by citizens and the portion of GDP each country devoted to this expenditure item in 2010.

The cost per capita was calculated by dividing the total police salary costs for drug control in 2010, as shown in Table 1, by the population on 1st January 2010. The percentage of the GDP dedicated to this expenditure was calculated by dividing drug related police salary costs by the national 2010 GDP value.

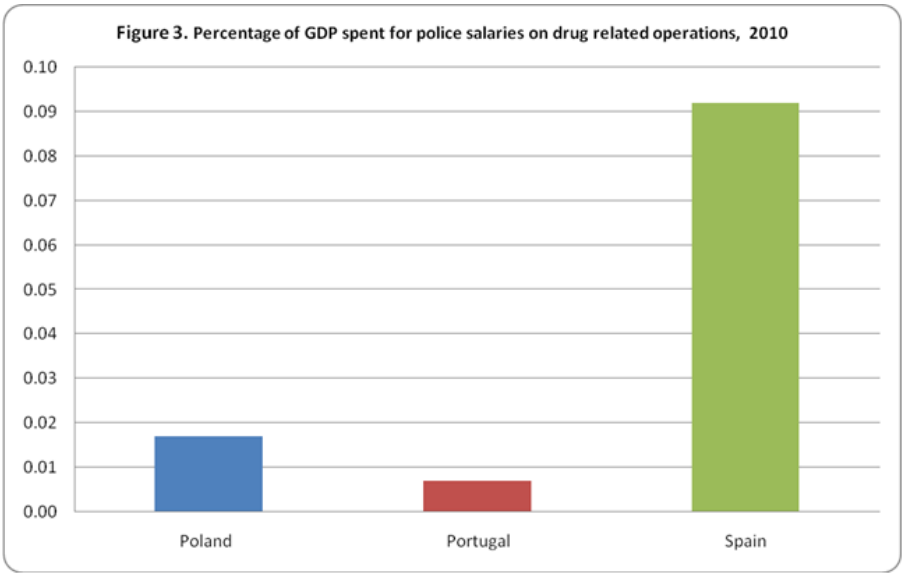
Again and in line with what already observed in Table 1, the lowest values are recorded for Portugal, with an expenditure of Euros 1.18 per capita, followed by Poland with Euros 1.57 and by Spain with Euros 20.90. Portugal devotes 0.007% of its GDP to drug related law enforcement salaries, Poland is higher by ten more points (0.017%) and Spain shows the highest quota, equal to 0,092% of its GDP.

Although per capita and GDP values approaches may not provide for accurate pictures of one country economic status, these estimates were considered necessary to put the costs in perspective, given the differences in the size of both the economies and the population in the three countries and given the diverse approaches their governments adopt on drug control policies and strategies, as well as the financial resources and the priorities they identify to address, according to their financial and economic strength and to the moment in history.

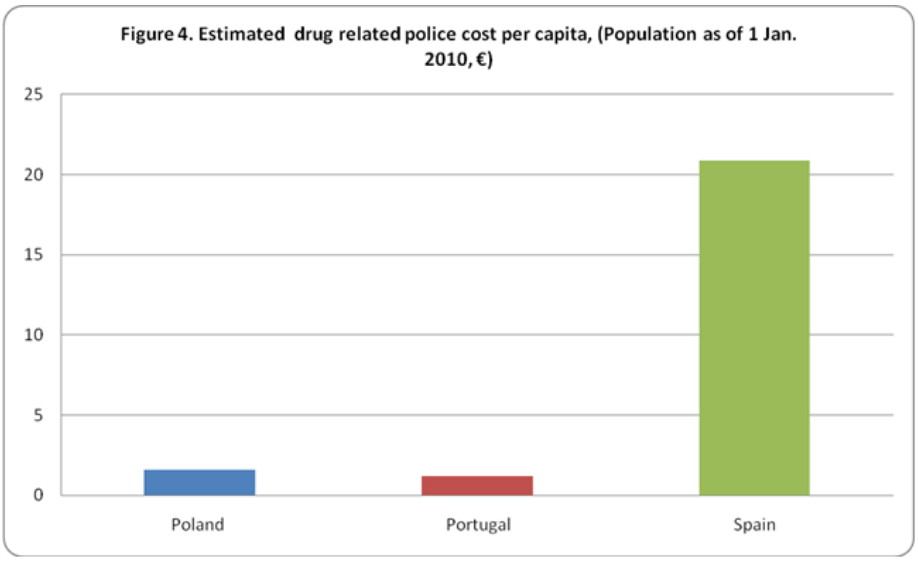
In the case of Portugal, for example, the low number of drug related police recorded crimes and the consequent low expenditure for police could be interpreted as one of the consequences of the decriminalization of personal use for all drugs, currently enacted only in Portugal, as compared to the other two countries, where the drug laws and policies are more restrictive in relation to personal possession and

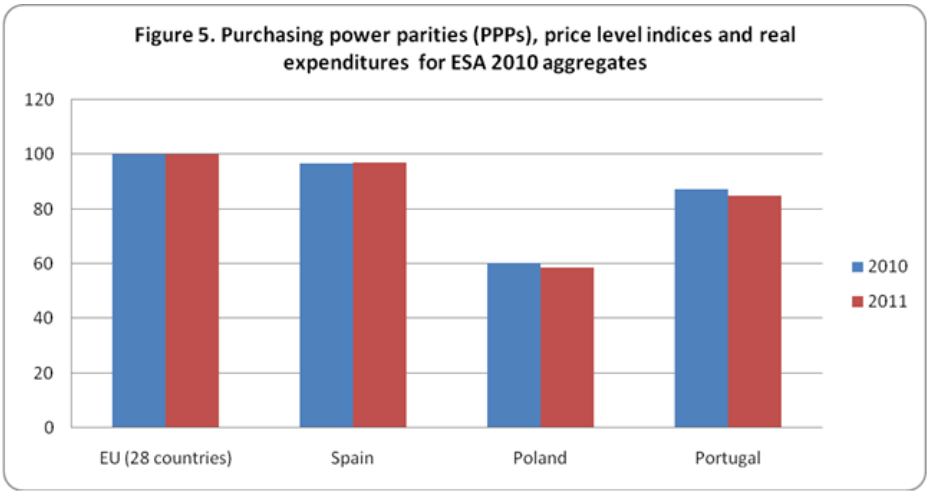
consumption, thus increasing the number of police recorded drug crimes. However, it should be also noted that Portugal is the country with the lowest population size (approx.10mln) as compared to Poland (38mln) and Spain (approx. 46mln). Portugal also shows a relatively high police salary and relatively high police officer density - 45 per 10,000 inhabitants, as compared to 26 per 10,000 inhabitants in Poland and to 52 per 10,000 inhabitants in Spain, where the high density of police officers might also be a contributing factor for the overall high costs of the police sector.

The incidence of the costs for police personnel engaged in drug control on the GDP is estimated to be very high in Spain and low in Portugal and Poland (Figure 3), suggesting for both these countries a much lower level of investment in this sector. However, when the estimate is adjusted to the cost of living (Figure 6), there is a growth in the incidence of costs for Poland, which is likely due to the fact that among the three, Poland is the country with the lowest per capita earning and purchasing power. The ratio is shown in relation to the EU average (EU28 = 100), i.e. If the index of the comparative price levels shown for a country is higher/ lower than 100, the country concerned is relatively expensive/cheap as compared with the EU average **(**Figure 5)[83].



[83]Comparative price levels are considered as the ratio between Purchasing power parities (PPPs) and market exchange rate for each country. PPPs are currency conversion rates that convert economic indicators expressed in national currencies to a common currency, called Purchasing Power Standard (PPS), which equalises the purchasing power of different national currencies and thus allows meaningful comparison.





Eurostat [tec00120] - Comparative price levels - Comparative price levels of final consumption by private households including indirect taxes (EU28 = 100). Data is expressed in relation to EU28 = 100.

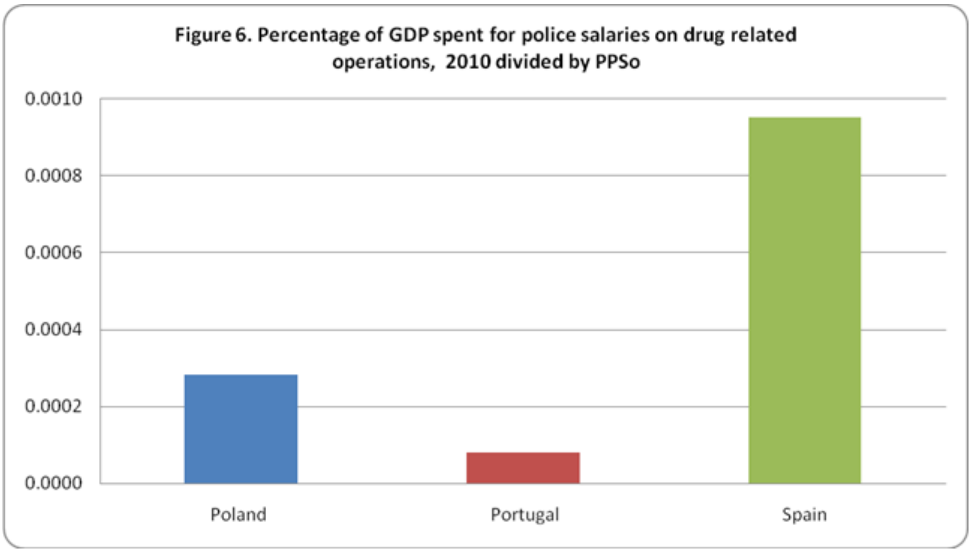
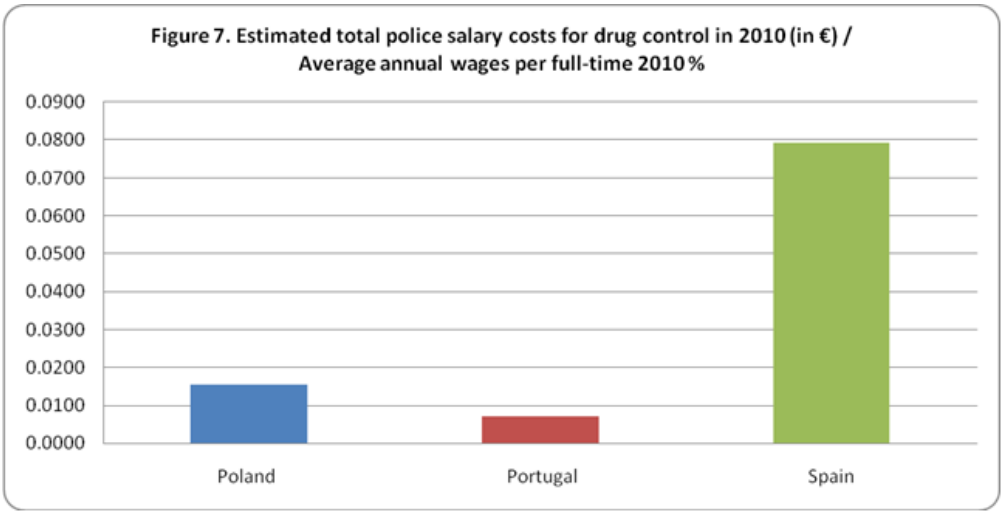


Table 3: Average annual wages (in EURO)

Country	2010	2011
Poland	10,039	9,372
Portugal	16,257	16,352
Spain	26,361	26,745

Organization for Economic Co-operation and Development

In order to further understand the differences in the estimated police costs in relation to the economic power of the three countries, per capita expenditure was divided by the average annual wages[84] for full-time and full-year equivalent employee (Table 3). Also in this case, a similar scenario is found, in which Portugal shows a much lower burden for drug related policing costs on citizen's salaries. It is revealing to observe that Poland, with salaries less than half those of Spain and almost half of those of Portugal, shows a higher percentage of expenditure than Portugal. (Figure 7).



3.3.2 Estimated cost for units specialised in drug law enforcement in Europe

An additional estimate was calculated, based on the police units specially dedicated to drug law enforcement in Europe. Data were taken from the 2013 EMCDDA report "Drug squads: units specialised in drug law enforcement in Europe"[85]. This estimate aims to provide another element for understanding and evaluating the areas where governments set their drug control priorities and where they allocate resources to respond to those priorities, as well as the overall investments they make in law enforcement and supply reduction policies and strategies.

The study was carried out on 26 EU Member States and the data were collected through the administration of a questionnaire. The study aimed to investigate how drug law enforcement is implemented and how it is organised in Europe, in terms of mandates and institutions involved. Variations exist in the EU countries as

[84]Average annual wages per full-time equivalent dependent employee are obtained by dividing the national-accounts-based total wage bill by the average number of employees in the total economy, which is then multiplied by the ratio of average usual weekly hours per full-time employee to average usually weekly hours for all employees. For more details, see: www.oecd.org/employment/outlook.
For further details on these estimates, please see http://www.oecd.org/dataoecd/32/50/43948033.pdf

[85]European Monitoring Centre for Drugs and Drug Addiction (2013), *Drug squads: units specialised in drug law enforcement in Europe*, EMCDDA Papers, Publications Office of the European Union, Luxembourg

regards the organisation of their drug specialized squads, depending on historical, cultural and legal factors. The "style" of drug law enforcement in EU counties is in fact defined by the type of technical mandate of the actors involved and reflecting some specific features of the drug markets and additionally drug and security policies as well as political decisions.

The majority (24 out of 26 participating EU countries) of EU governments place their drug squad administrations under the Ministry of Interiors, followed by the Ministries of Finance (customs) and Justice. The strategic direction of the drug squads is however frequently mandated to the justice system, generally through a prosecutor supervising the judicial and criminal police. 10 countries reported their drug squads organized into MDLE units (Multi-agency drug law enforcement units), where multiple agencies collaborate together, under the authority of one Ministry or Governmental Office.

Spain, which has a large number of drug squads, (118 units, with 3900 dedicated personnel units, corresponding to 1.5% of total police forces), locates them within the domain of judicial and criminal investigation, gendarmerie (military-like police) and customs. Spain also uses drug squads within marine and coastal guards.

Portugal (53 units, with 589 dedicated personnel units, 1.2% of total police forces), places its drug squads into a broad domain comprising the judicial and criminal investigation authorities, public police, gendarmerie and customs. The Finance Ministry has broad responsibilities in their management and Portugal also has created police units with a strong mandate to fight street-level drug trafficking. In order to better coordinate the work of the various agencies involved in law enforcement and supply reduction specialized activities, Portugal set up in 1995 a joint drug law intelligence protocol, that operates under the direction of the judicial police and whose the members meet regularly to overcome possible conflicts arising from the different mandates of the drug squads.

Poland has a very large number of drug squads (301 units, with 1.150 dedicated personnel units, 1.2% of total police forces) and falls under the direction of the judicial and the criminal and public police forces. (Table 4).

Table 4. Number of drug law enforcement units and assigned staff in EU countries

Country	Drug law enforcement units	Assigned staff
Bulgaria	32	60
Czech Republic	2	236
Denmark	1	
Germany	250	3 000
Estonia	6	100
Ireland	29	416
Spain	118	3 900
France	99	3 500 (3 000–4 000)
Italy	41	500 (200–800)
Cyprus	1	179
Latvia	3	67
Lithuania	12	100
Luxembourg	8	44
Hungary	2	80
Malta	1	47
Netherlands	5	175 (150–200)
Austria	10	350
Poland	301	1 150
Portugal	53	589
Romania	44	330
Slovenia	13	80
Slovakia	2	85

Country	Drug law enforcement units	Assigned staff
Finland	26	250
Turkey	4	3 750 (3 500–4 000)
Norway	28	
Total	1 145	18 988

European Monitoring Centre for Drugs and Drug Addiction (2013), *Drug squads: units specialised in drug law enforcement in Europe,* EMCDDA Papers, Publications Office of the European Union, Luxembourg

The estimate of the costs for drug squads in Spain, Portugal and Poland was obtained by multiplying the average salary of a police officer by the number of police officers belonging to the special units that deal exclusively with law enforcement and supply reduction offences as reported in the EMCDDA study.

Table 5. Estimated cost of drug squads personnel, 2010 (in €)

	Average yearly salary of a police officer in 2010 (in €)*	Drug law enforcement units**	Staff assigned to specialised drug law enforcement units **	Police estimated costs exclusively dedicated to drug squads (in €)
Poland	9,743.80	301	1,150	11,205,370.00
Portugal	24,785.65	53	589	14,598,747.68
Spain	28,957.42	118	3,900	112,933,952.57

*Portugal: Polícia de Segurança PúblicaBalanço Social 2010and 2011; Balanço Social Guarda NacionalRepublicana
*Spain: BoletínOficialdelEstadoDijous 23 de desembre de 2010;
*Poland: Statistical Yearbook 2011; Statistical Yearbook 2013
**European Monitoring Centre for Drugs and Drug Addiction (2013), *Drug squads: units specialised in drug law enforcement in Europe,* EMCDDA Papers, Publications Office of the European Union, Luxembourg

In this estimate, Poland and Spain show a much lower cost, notwithstanding the higher number of drug squads and dedicated personnel. However, this cost should be considered again in perspective, given that for example Poland's mean salaries value is approximately 50% lower than the other two countries. The highest number of personnel involved in specialized drug law enforcement is observed in Spain and this investment decision may be related to the geographical position of the country along the drug routes originating from South America and along West Africa, particularly for cocaine trafficking.

Drug squad's high costs might be interpreted as a sign that Portugal, notwithstanding the decriminalization of drugs, still maintains a high level of territorial control on the illicit market[86], especially when compared to Poland. In other words, although Portugal does not record a high number of drug related crimes (approx. 4000), the attention to law enforcement remains high both in terms of human and economic investment, especially in light of its geographical position along the routes of cocaine trafficking from South America and its active commitment to international co-operation in drug supply reduction[87].

[86] The EMCDDA Report notes that Portugal is the only EU country which maintains a drug squad especially dedicated to the detection of street level drug dealing. In addition, Portugal is the only country which has set up a specific Protocol for the effective collaboration and coordination among the various agencies involved in the fight against drug trafficking.

[87] Portugal hosts the Maritime Analysis and Operations Centre – Narcotics (MAOC-N), a centre for analysis and coordination in operations against drug trafficking at sea, The EMSA, European Maritime Safety Agency and the EMCDDA, European Monitoring Centre for Drugs and Drug Addiction all located in the capital.

Table 6. Estimated cost of drug squads personnel, percentage of GDP, 2010

Country	Estimated police costs exclusively dedicated to drug (in €)	Population as of 1st January 2010	GDP - Current prices 2010(**in milions of €**)	Estimated per capita cost for drug squads, 2010	Percentage of GDP for drug squads, 2010
Poland	11,205,370.00	38,167,329	354,616.1	0.294	0.003
Portugal	14,598,747.68	10,573,479	172,859.5	1.381	0.008
Spain	112,933,952.57	46,486,619	1,045,620.0	2.429	0.011

Because it was not possible to have the same data at disposal for the other two criminal justice sectors, prosecution and prison, it was decided not to include this estimate in the overall estimates comparison which will be presented in Chapter 4.

3.4 Brief description of the justice system in Poland, Portugal and Spain, and estimated costs

The justice sector in Europe is characterized by similarities and differences in the organization of the courts and in the allocation of resources for prosecution, judicial process and access to justice. The European Commission for the Efficiency of Justice (CEPEJ) of the Council of Europe, carries out a biennial survey for the evaluation of the European judicial systems, where their main characteristics in 46 European states are evaluated and compared, relative to their organizations, budget allocations the degree of access to justice and fair trial, the effectivness in the judicial system functions as well as the protection of the independence of the judiciary, in order to improve their efficiency and quality.

Before introducing the estimates obtained for the justice system costs in Poland, Portugal and Spain, it would be useful to highlight some elements of the justice systems of these three countries which are contained in the 2010 CEPEJ evaluation, in light of the fact that the data for the estimates presented below were mostly drawn from the CEPEJ surveys.

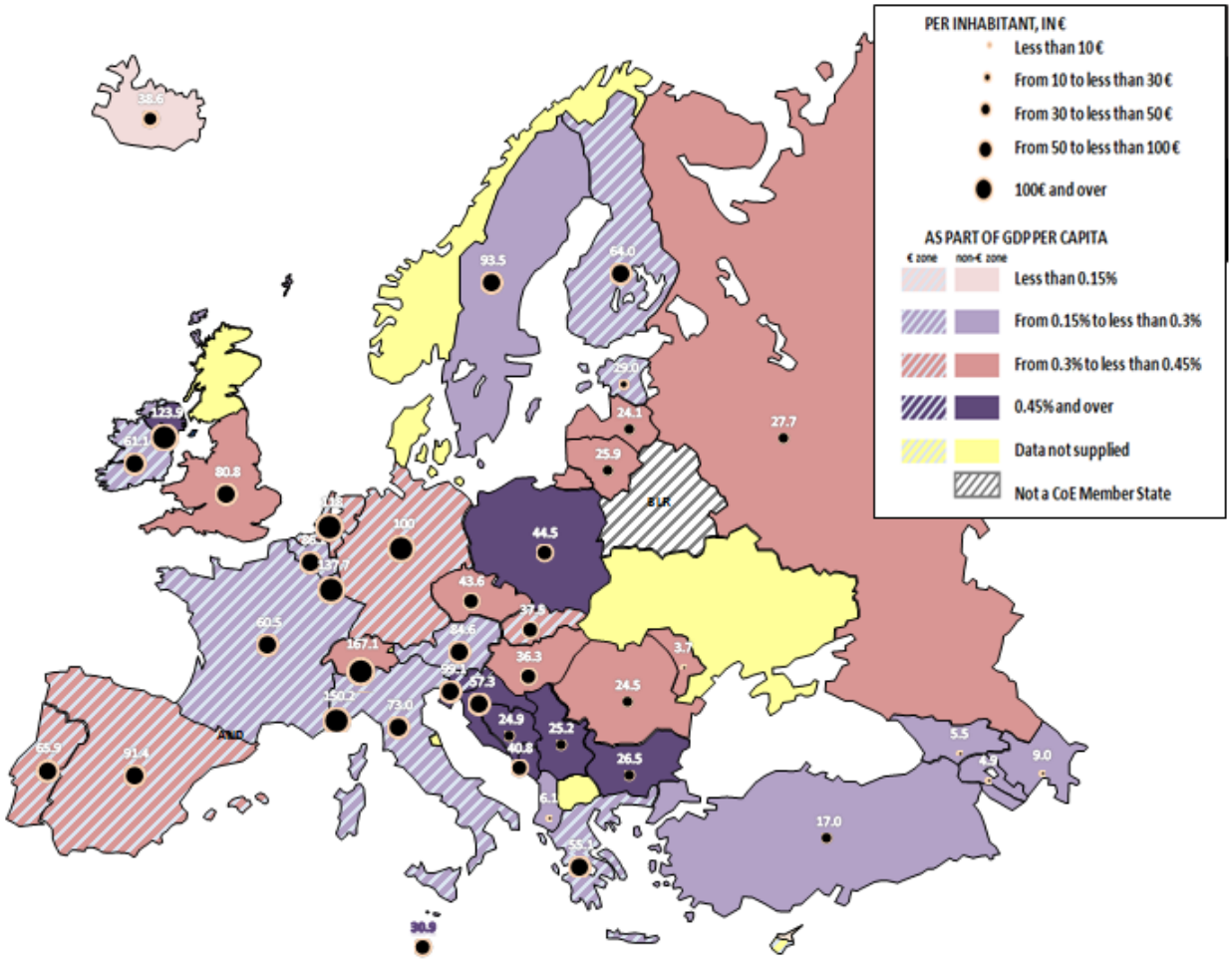
The total budget allocation to the justice system in Poland amounted in 2010 to 44,5 Euros per capita and corresponded to the 0.48% of the GDP. Portugal spent 65,9 Euros per capita and 0,41% of its GDP. Spain spent 91,4 Euros per capita and 0.40% of its GDP (Figure 8).

In 2010, there were 1.8 courts in Poland every 100.000 inhabitants, 1.6 in Spain and 3.2 in Portugal (Figure 9). The number of professional judges sitting in courts for 100.000 inhabitants, were respectively, 27,8 in Poland, 18,4 in Portugal and 10,2 in Spain (Figure 10). The CEPEJ report highlights that, in general, the judicial systems of Central and Eastern Europe Member States operate with a higher ratio of judges per inhabitant than in the Western Europe States.

The number of non-judge staff whose task is to assist the judge, calculated per one professional judge was 1,9 for Poland and 3,1 for Portugal (Figure 11). No data was reported for Spain. The number of public prosecutors per 100.000 inhabitants in 2010, were 14.8 for Poland, 13.9 for Portugal and 5.2 for Spain (Figure 12).

The report also investigates the salaries of judges and prosecutors and whether they are in line with their position and their responsibilities. Apart from the existence of significant differences between states, on average, at the European level, salaries represent the highest expenditure for the justice sector (66.1%). On average, in Europe, the salary of a judge and a prosecutor at the Supreme Court or at the Highest Appellate Court are respectively 4.5 times and 3.6 times higher than the national average gross annual salary. In Poland, salaries for judges and prosecutors were 5.9 and 4.6 times higher than the average gross annual salary, in Portugal and in Spain they were respectively 4.2 times and 3.6 times higher for both categories. With regard to the distribution of resources in the three countries, in addition to salaries, the largest investment was in computerization in Portugal and Spain and in training and education in Poland with the creation of a National School for Judiciary and Prosecution, with a separate budget and the implementation of a number of EU funded programmes, in response to the requests for justice reform by EU based and international organizations.

Figure 8. Total annual public budget allocated to all courts, public prosecution and legal aid per inhabitant in €, and as part of the GDP per capita, in 2010



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If we consider the relative distribution of parts in the public budget between courts, legal aid and public prosecution (Figure 13), Poland shows 80.3% devoted to courts, 18.4% devoted to prosecution and 1.4% to legal aid. Portugal devoted 75.5% to courts, 17.1% to prosecution and 7.4% to the legal aid system. Data for Spain were not available; however, we can assume they would be similar to those from Portugal, given the similarities among the two countries in the legal traditions. In fact, if we consider the annual public budget allocated to legal aid per inhabitant in 2010 (Figure 14), Spain and Portugal fall not very far from the

EU average of €7,7, with a quota of respectively €5,2, and €4,9, while Poland shows a very low figure, only €0,6, per inhabitant, which confirms the figures on the distribution of resources above.

Figure 9. Number of all courts (geographic locations) per 100.000 inhabitants in 2010

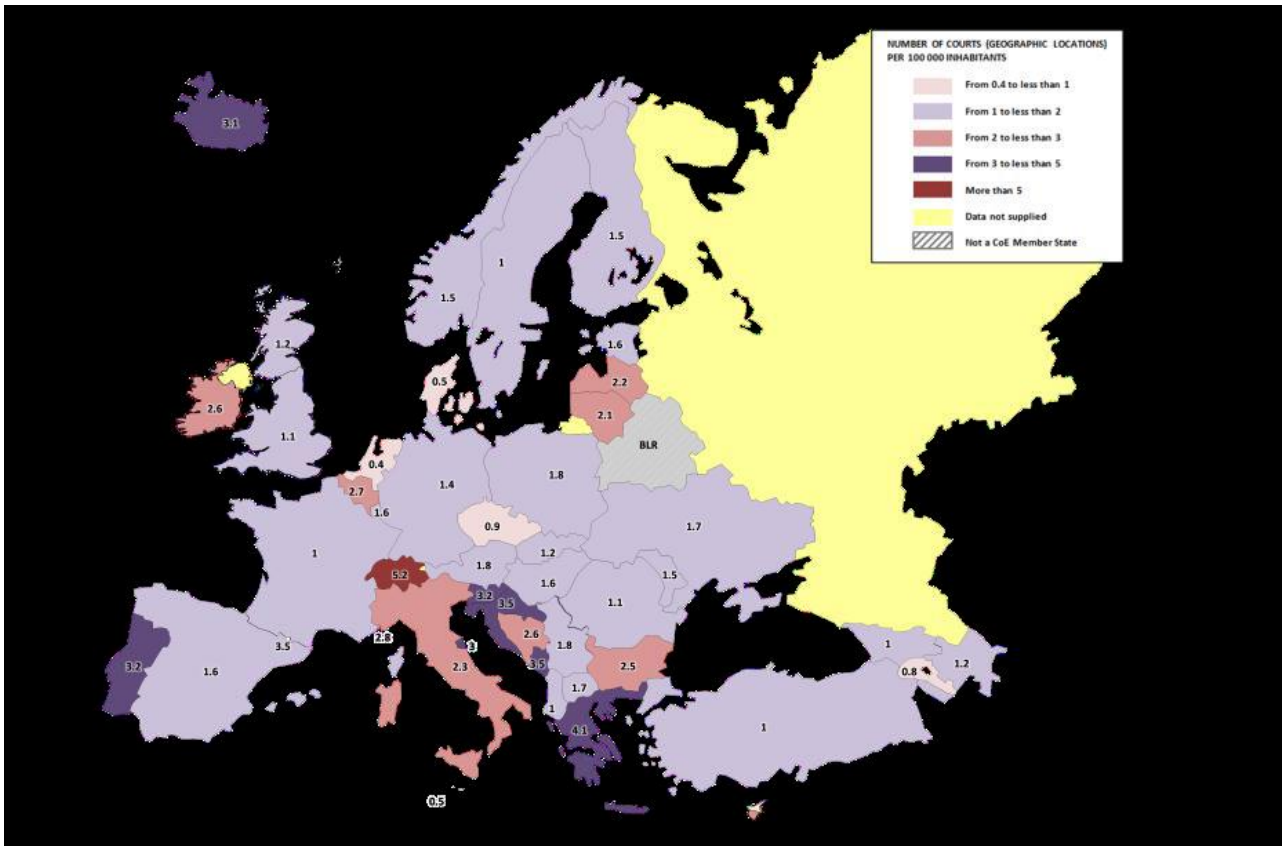

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Figure 10. Number of professional judges sitting in courts (FTE) for 100.000 inhabitants, in 2010

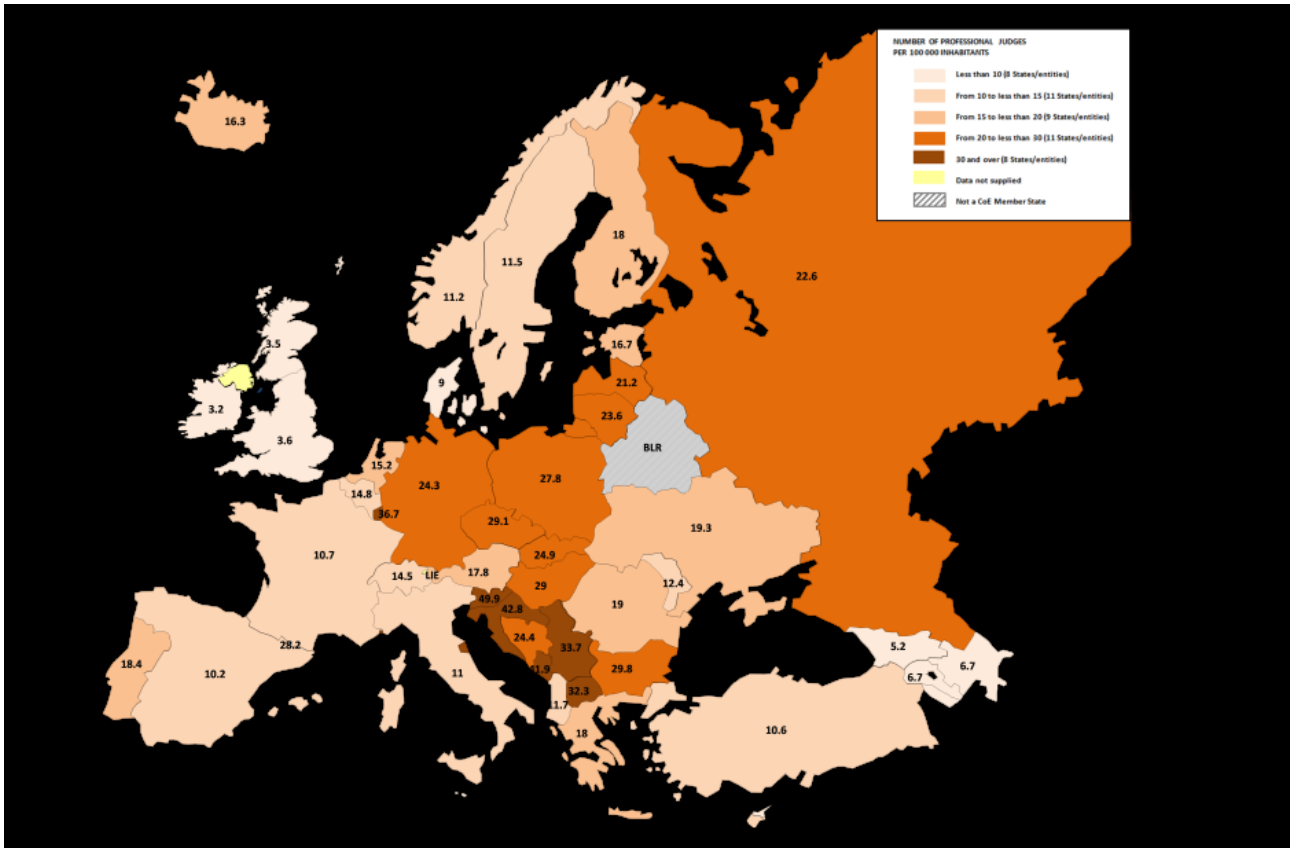

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Figure 11. Number of non-judge staff whose task is to assist the judge per one professional judge

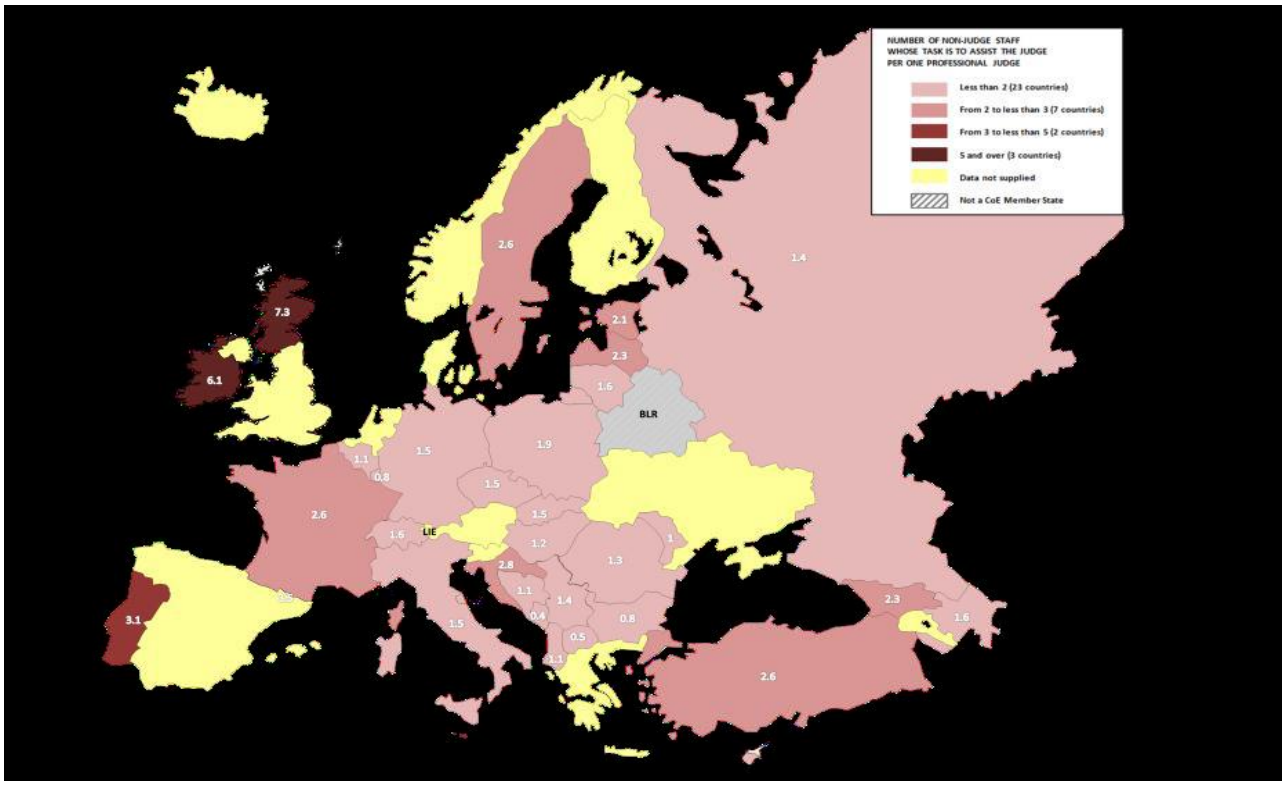

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Figure 12. Number of public prosecutors per 100.000 inhabitants in 2010

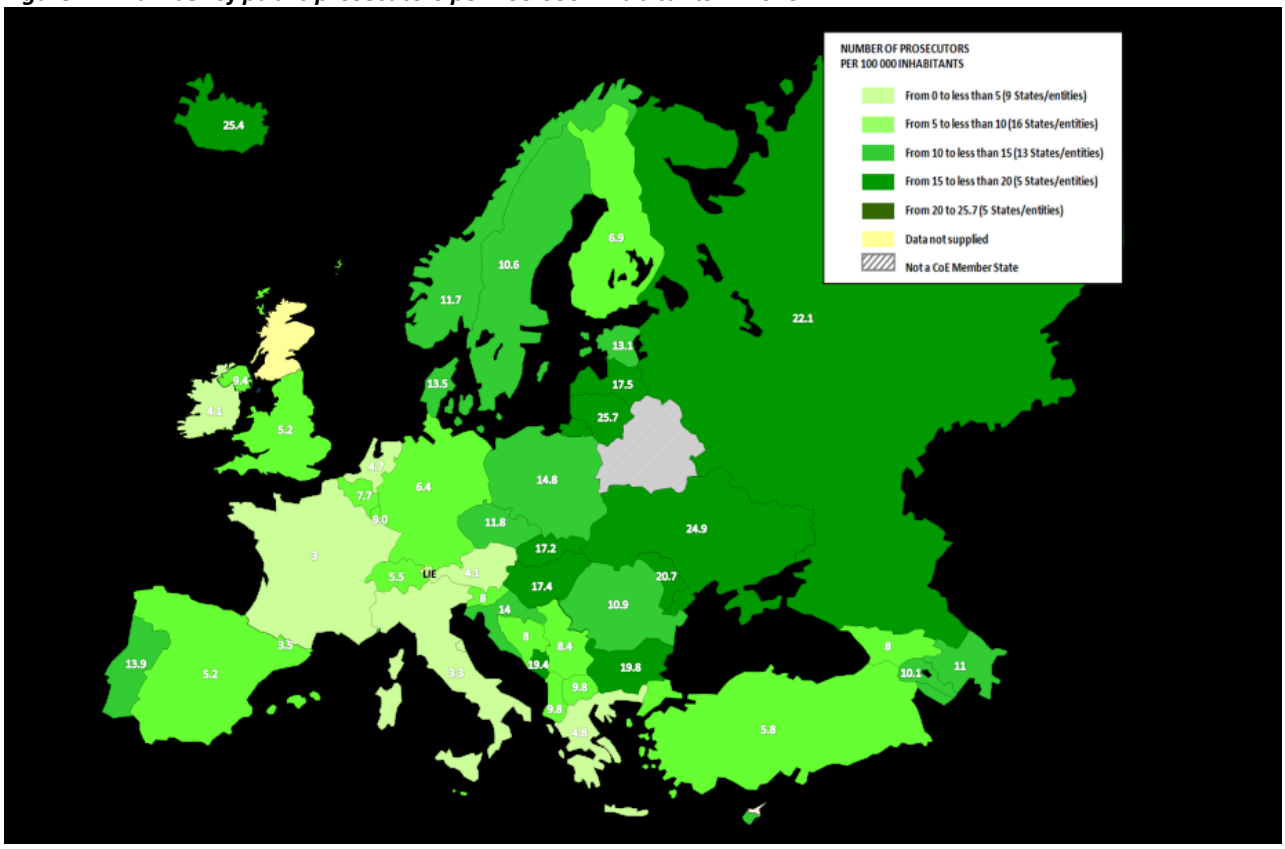

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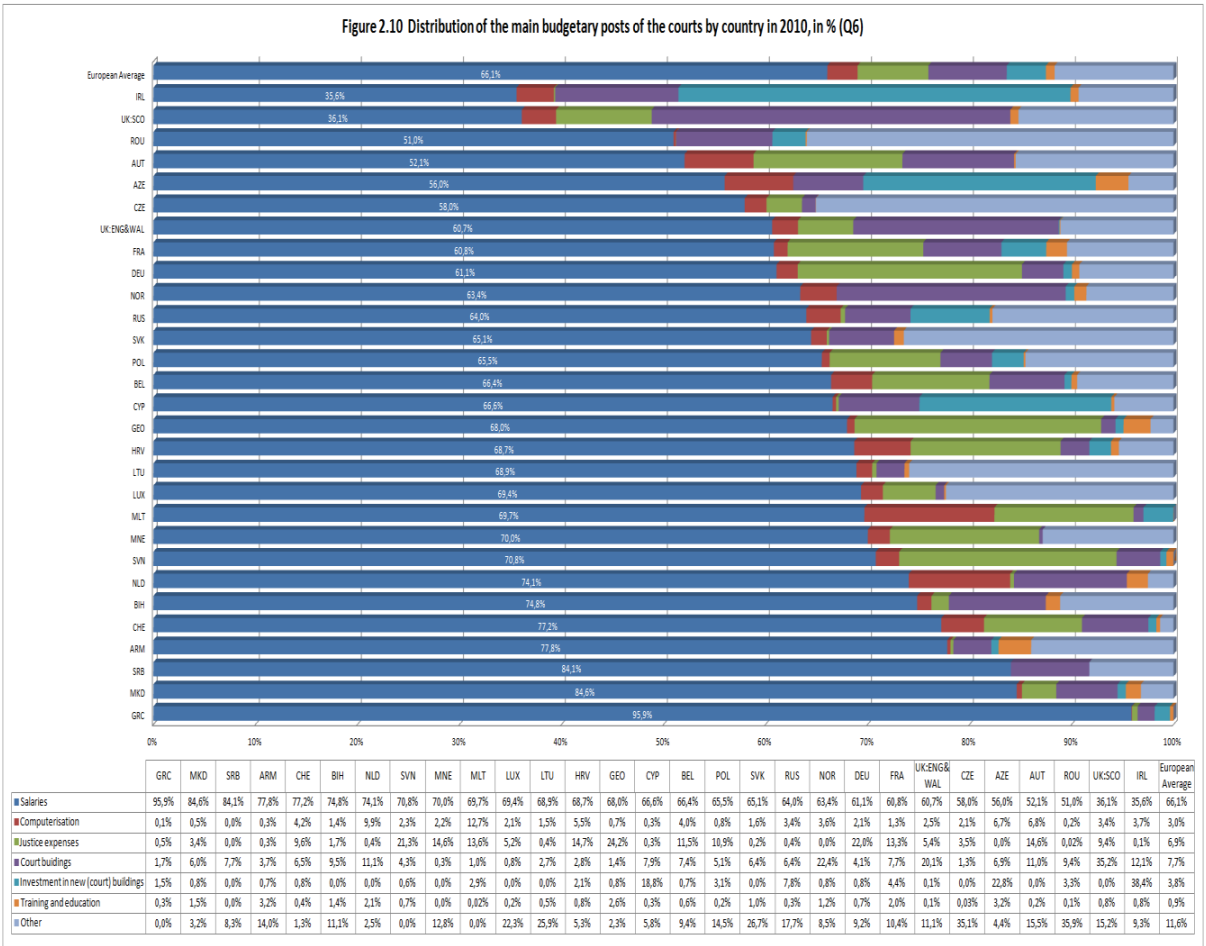
Figure 13. Distribution of the financial resources for the justice sector, 2010



	GRC	MKD	SRB	ARM	CHE	BIH	NLD	SVN	MNE	MLT	LUX	LTU	HRV	GEO	CYP	BEL	POL	SVK	RUS	NOR	DEU	FRA	UK:ENG&WAL	CZE	AZE	AUT	ROU	UK:SCO	IRL	European Average
Salaries	95,9%	84,6%	84,1%	77,8%	77,2%	74,8%	74,1%	70,8%	70,0%	69,7%	69,4%	68,9%	68,7%	68,0%	66,6%	66,4%	65,5%	65,1%	64,0%	63,4%	61,1%	60,8%	60,7%	58,0%	56,0%	52,1%	51,0%	36,1%	35,6%	66,1%
Computerisation	0,1%	0,5%	0,0%	0,3%	4,2%	1,4%	9,9%	2,3%	2,2%	12,7%	2,1%	1,5%	5,5%	0,7%	0,3%	4,0%	0,8%	1,6%	3,4%	3,6%	2,1%	1,3%	2,5%	2,1%	6,7%	6,8%	0,2%	3,4%	3,7%	3,0%
Justice expenses	0,5%	3,4%	0,0%	0,3%	9,6%	1,7%	0,4%	21,3%	14,6%	13,6%	5,2%	0,4%	14,7%	24,2%	0,3%	11,5%	10,9%	0,2%	0,4%	0,0%	22,0%	13,3%	5,4%	3,5%	0,0%	14,6%	0,02%	9,4%	0,1%	6,9%
Court buidings	1,7%	6,0%	7,7%	3,7%	6,5%	9,5%	11,1%	4,3%	0,3%	1,0%	0,8%	2,7%	2,8%	1,4%	7,9%	7,4%	5,1%	6,4%	6,4%	22,4%	4,1%	7,7%	20,1%	1,3%	6,9%	11,0%	9,4%	35,2%	12,1%	7,7%
Investment in new (court) buildings	1,5%	0,8%	0,0%	0,7%	0,8%	0,0%	0,0%	0,6%	0,0%	2,9%	0,0%	0,0%	2,1%	0,8%	18,8%	0,7%	3,1%	0,0%	7,8%	0,8%	0,8%	4,4%	0,1%	0,0%	22,8%	0,0%	3,3%	0,0%	38,4%	3,8%
Training and education	0,3%	1,5%	0,0%	3,2%	0,4%	1,4%	2,1%	0,7%	0,0%	0,02%	0,2%	0,5%	0,8%	2,6%	0,3%	0,6%	0,2%	1,0%	0,3%	1,2%	0,7%	2,0%	0,1%	0,03%	3,2%	0,2%	0,1%	0,8%	0,8%	0,9%
Other	0,0%	3,2%	8,3%	14,0%	1,3%	11,1%	2,5%	0,0%	12,8%	0,0%	22,3%	25,9%	5,3%	2,3%	5,8%	9,4%	14,5%	26,7%	17,7%	8,5%	9,2%	10,4%	11,1%	35,1%	4,4%	15,5%	35,9%	15,2%	9,3%	11,6%

Figure 14. Annual public budget allocated to legal aid per inhabitant in 2010

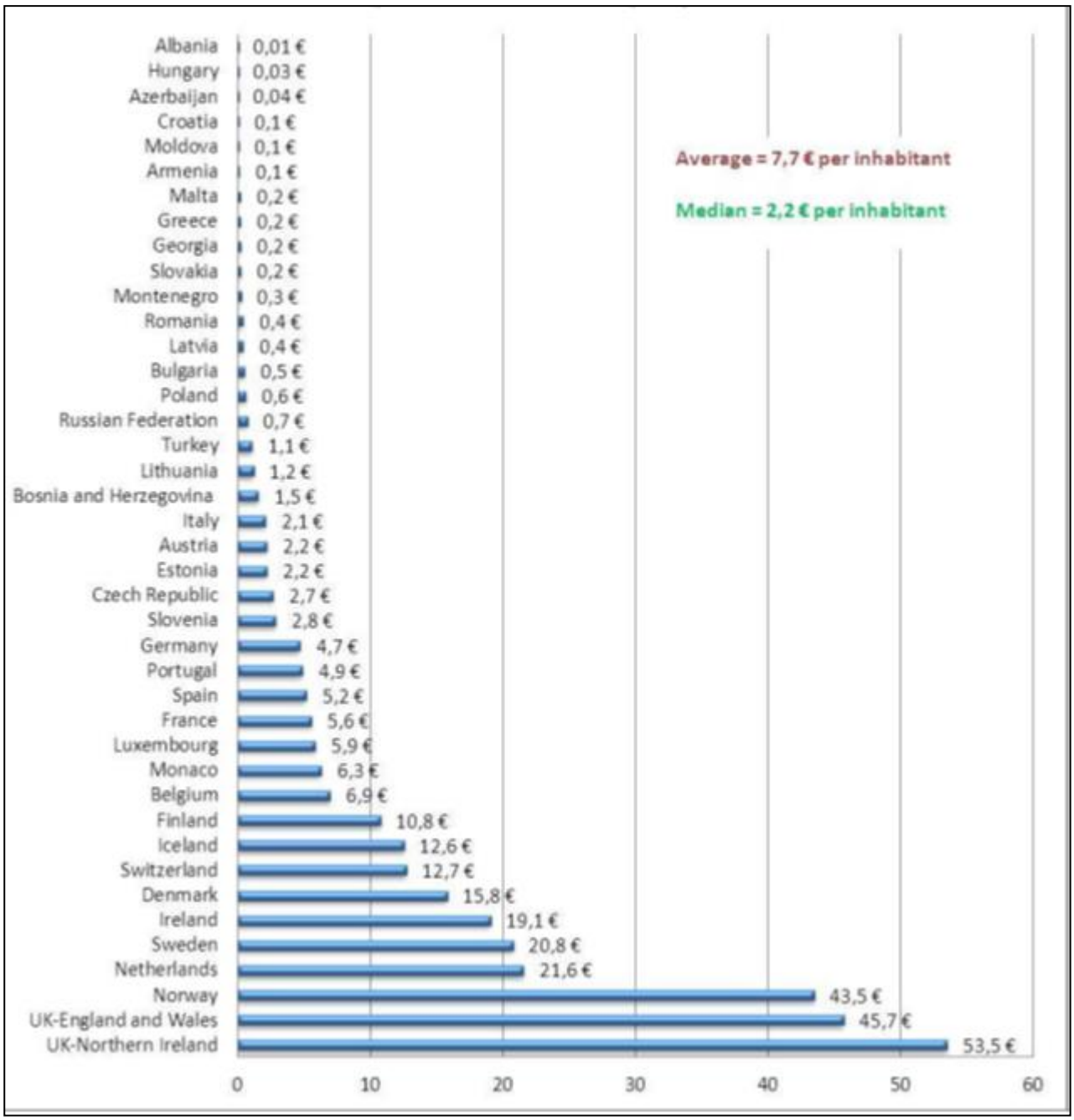
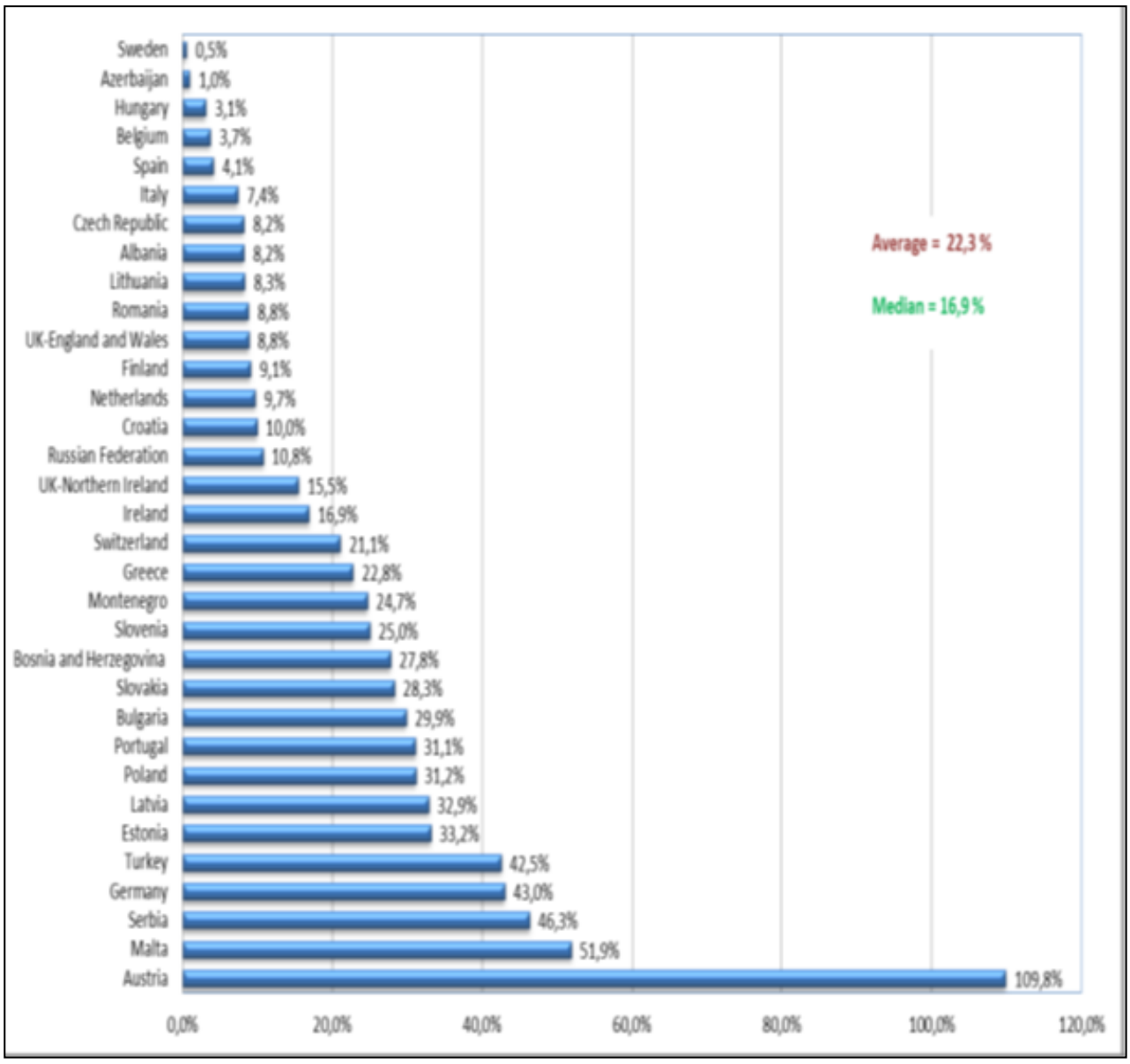


Figure 15. Share of court fees in the overall justice sector budget



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Payment of court fees is now widespread in Europe. Court taxes and fees are increasingly recognized as a significant means to raise financial resources, to supplement the budget for maintenance and operational activities of the judiciary system and as an effective means to balance the costs of public services between the users and the taxpayers. It is interesting to note that in this picture, Spain is way below the European average of 22,3%, with only 4,1% of the share represented by taxes and fees collected from litigants, while Portugal and Poland are slightly above the average, with a share of respectively 31,1% and 31.2% (Figure 15).

The CEPEJ Report underlines the need for countries to increase the use of such systems, which, if accompanied by an effective legal aid system, can add efficiency to the justice system.

3.4.1 Estimated cost for the justice sector

First estimate (justice sector salaries, 2010)

For the justice sector, one estimate was obtained for 2010, by dividing the total annual approved budget allocated for personnel salaries by the total number of crimes. The resulting average cost for each crime was multiplied by the drug-related recorded crimes. A second estimate was obtained by dividing the total annual approved budget allocated for the whole justice system by the total number of recorded crimes. The resulting average of the cost for each crime was multiplied by the drug recorded crimes.

Table 7. CEPEJ scheme for evaluating judicial systems, 2012

	Poland	Portugal	Spain
Annual public budget allocated to (gross) salaries 2010	894,463,000	429,475,486	1,329,868,250
Annual public budget allocated to computerisation (equipment, investments, maintenance) 2010	10,512,000	10,565,978	158,163,660
Annual public budget allocated to justice expenses 2010	148,297,000	27,544,641	NA
Annual public budget allocated to court buildings (maintenance, operating costs) 2010	68,961,000	38,762,543	NA
Annual public budget allocated to investments in new buildings 2010	42,381,000	NAP	NA
Annual public budget allocated to training and education 2010	2,329,000	22,594,517	NA
Other 2010	198,142,000	NA	NA
Total	**1,365,085,000**	**528,943,165**	**1,488,031,910**
	Poland	**Portugal**	**Spain**
Total annual approved public budget allocated to all courts with neither prosecution nor legal aid 2010	1,365,085,000	528,943,165	NA
Total annual approved public budget allocated to legal aid 2010	23,244,000	51,641,260	237,898,199
Total annual approved public budget allocated to the public prosecution system 2010	312,514,570	119,901,622	NA
Total annual approved budget allocated to all courts and legal aid 2010	1,388,329,000	580,584,425	NA
Total annual approved budget allocated to all courts and public prosecution 2010	1,677,599,570	648,844,787	3,964,118,020
Total annual approved public budget allocated to all courts, public prosecution and legal aid 2010	1,700,843,570	700,486,047	4,202,016,219
Total annual approved budget allocated to the whole justice system 2010	**2,821,561,570**	**1,693,952,793**	**4,632,278,011**

Council of Europe, European Commission for the Efficiency of Justice (CEPEJ) - SCHEME FOR EVALUATING JUDICIAL SYSTEMS 2012

Rather than using the number of prison sentences to build these estimates, it was decided to use the number of police drug recorded crimes, as a more reliable indicator, because it was not possible to find the number of legal proceedings based on type of offence.

Table 7 shows the costs for the justice system in 2012, based on the data available from the Council of Europe "Commission Européenne pour l'Efficacité de la Justice (CEPEJ). As previously pointed out above, the tables also show how, for these countries, the highest costs for the criminal justice is represented by personnel salaries (judges, prosecutors and general court staff).

Table 8 shows cost for salary of the justice sector in 2010 and the portion of the salaries spent for drug related offences. The estimate was obtained by multiplying the cost for one crime by the number of drug recorded crimes. According to data, Spain reports the highest cost for the annual budget allocated to the justice sector salaries, followed by Poland and Portugal. However, Portugal reports the highest cost per crime for salaries of the justice sector, based on the number of the total recorded crimes in 2010. Overall, Poland, in regards to the police sector, shows a very high budget for justice salaries related to drug control.

Table 8.Estimated justice sector salary costs for drug related crimes 2010 (in €)

	Annual public budget allocated to Justice (gross) salaries 2010*	Total number of crimes 2010*	Justice system salary cost per crime, 2010	Number of drug crimes 2010**	Estimated costs for the justice sectorgross salaries related to drug control, 2010 (in €)
Poland	894,463,000	1,151,157	777.00	72,375	56,236,256
Portugal	429,475,486	422,587	1,016.30	4,546	4,620,103
Spain	1,329,868,250	2,297,484	578.84	319,474	184,923,303

* European commission for the efficiency of justice (cepej) - scheme for evaluating judicial systems 2012
** Eurostat; Spain: ObservatorioEspañol de la Droga y lasToxicomanías (OEDT) - Delegación del Gobierno para el Plan Nacional sobre Drogas (DGPNSD) - INFORME 2011
** **Poland**: Statistical Yearbook 2013
****Spain:**PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD - Secretaría de Estado de Servicios Sociales e Igualdad Delegación del Gobierno para el Plan Nacional sobre Drogas.

Table 9 shows the estimated justice sector salary costs for drug control in 2010, normalized by per capita and GDP values, calculated in order to understand the cost borne by citizens and the portion of GDP each country devoted to this expenditure item in 2010.

The percentage of the GDP dedicated to this expenditure was calculated by dividing drug related justice sector salary costs by the national 2010 GDP value (Figure 16).The cost per capita was estimated by dividing the total justice sector salaries costs for drug control 2010, as shown in Table 9, by the population on 1st January 2010 (Figure 17).

Again and in line with what already observed in Table 9, the lowest values are recorded for Portugal, where the ratio with respect to the population per capita expenditure equals to less than Euros 0.50, followed by Poland with Euros 1.47 and by Spain with Euros 3.97.

Similarly, when the percentage of the GDP devoted to the justice sector is estimated, Portugal shows a 0.003% of its GDP dedicated to drug related salaries for the justice sector, followed by Poland with the 0.016% and Spain with 0,017%. The low estimates for Portugal depends on the total number of reported drug crimes, which are much less than what reported by the other two countries. As already pointed out for the police costs, the low number of drug related offences reported might be a consequence of the decriminalization of the personal use for all drugs, enacted by the law in 2000.

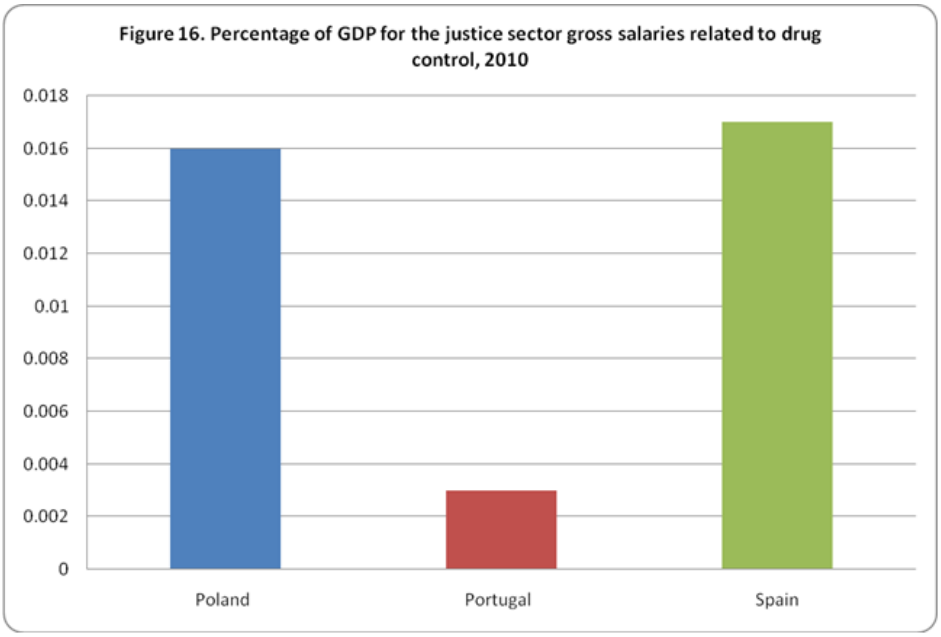
Comparisons between population size and judicial sector density provide the following proportions: Spain with approx. 46 millions inhabitants has a density of 1.5 judges and prosecutors per 10,000 inhabitants, Portugal with approx.10 millions inhabitants has a density of 2.2 judges and prosecutors, while Poland, with

36 millions, has a density of 3.2 judges and prosecutors every 10,000 inhabitants. Here, the high density of judges and prosecutors might be one element to consider as contributing to the high costs for the justice sector.

Table 9. Estimated justice sector salary costs for drug control in 2010 per capita cost and GDP

	Population on 1st January 2010	GDP - Current prices 2010(in millions of €)	Estimated costs for the justice sector gross salaries related to drug control, 2010 (in €)	Per capita costs of justice sector gross salaries dedicated to drug control, 2010 (in €; Population as of 1st January 2010	Percentage of GDP for the justice sector gross salaries related to drug control, 2010
Poland	38,167,329	354,616.1	56,236,256	1.473	0.016
Portugal	10,573,479	172,859.5	4,620,103	0.437	0.003
Spain	46,486,619	1,045,620.0	184,923,303	3.977	0.017

Costs of justice in Poland remains high even when the estimate is adjusted for the purchasing power standard (PPS)[88]. Poland obtains a percentage higher than Spain, confirming the elevated cost for the justice sector in this country. (Figure 18).The cost adjusted for the average full time salary[89], (Figure 19), shows an incidence of expenditure five times higher than Portugal and almost equal to Spain, even if the median salary of Poland is much lower in comparison to the other two countries.



[88] Comparative price levels are considered as the ratio between Purchasing power parities (PPPs) and market exchange rate for each country. PPPs are currency conversion rates that convert economic indicators expressed in national currencies to a common currency, called Purchasing Power Standard (PPS), which equalises the purchasing power of different national currencies and thus allows meaningful comparison.

[89] Average annual wages per full-time equivalent dependent employee are obtained by dividing the national-accounts-based total wage bill by the average number of employees in the total economy, which is then multiplied by the ratio of average usual weekly hours per full-time employee to average usually weekly hours for all employees. For more details, see: www.oecd.org/employment/outlook.
For further details on these estimates, please see http://www.oecd.org/dataoecd/32/50/43948033.pdf

Figure 17. Per capita costs of justice sector gross salaries dedicated to drug control, 2010 (in €; Population as of 1st January 2010

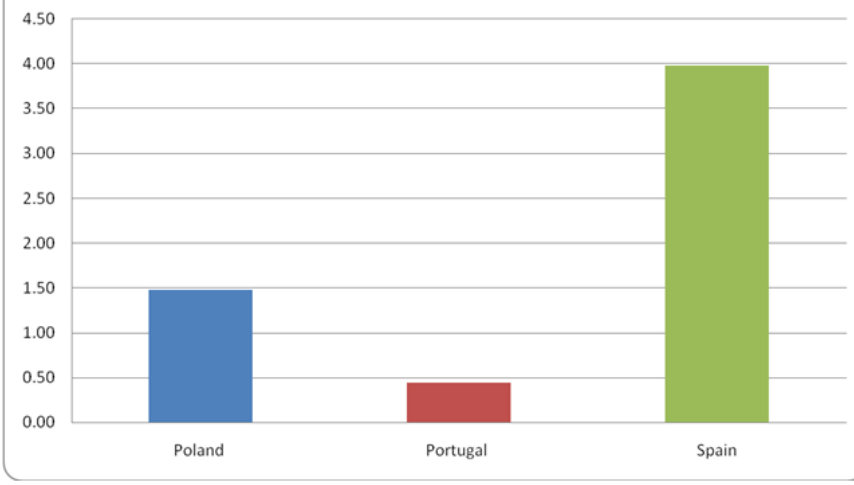


Figure 18 Percentage of GDP for the justice sector gross salaries related to drug control, 2010/ Purchasing Power Standard

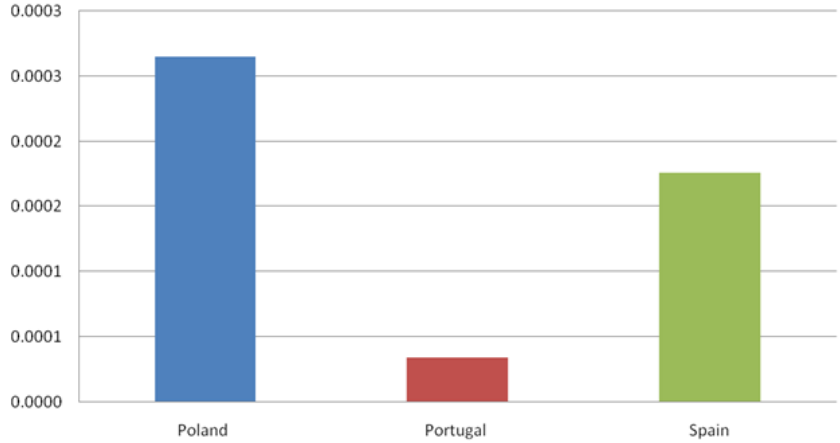
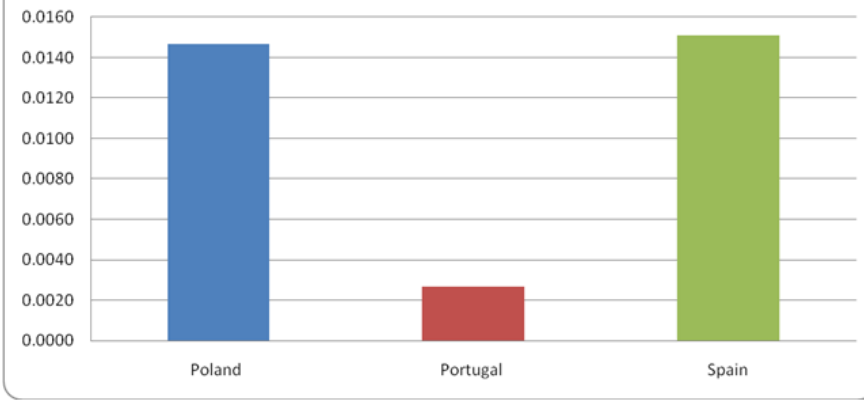


Figure 19. Estimated costs for the justice sector gross salaries related to drug control, 2010 (in €)/ Average annual wages per full-time 2010 * 100



Second estimate (whole justice sector costs, 2010)

If the costs for the justice sector are estimated including the total annual approved budget allocated to the whole justice system and not just to personnel salaries, we obtain much higher proportions for all three countries.

This additional estimate was obtained by dividing the overall budget by the total number of crimes. The resulting average of the cost for each crime was multiplied by the drug-related crimes (Table 10).

Even Portugal in this estimate shows a considerable increase in the costs for the justice system. The proportion of expenditure for infrastructure is higher for Spain than Poland (Figure20). Portugal maintains similar proportions of expenditures between the first and second estimates.

Table 10 Estimated total justice sector costs for drug control, 2010 (in €)

	Total annual approved budget allocated to the whole justice sector in 2010*	Total number of crimes2010*	Total annual approved budget allocated to the whole justice sector 2010 (/)Total number of crimes 2010	Number of drug crimes 2010**	Estimated total justice sector costs for drug control, 2010 (in €)
Poland	2,821,561,570	1,151,157	2,451.1	72,375	177,395,888
Portugal	1,693,952,793	422,587	4,008.5	4,546	18,222,779
Spain	4,632,278,011	2,297,484	2,016.2	319,474	644,136,101

Font:
*European commission for the efficiency of justice (cepej) - scheme for evaluating judicial systems 2012
** Eurostat; Spain: ObservatorioEspañol de la Droga y lasToxicomanías (OEDT) - Delegación del Gobierno para el Plan NacionalsobreDrogas (DGPNSD) - INFORME 2011
***: Catalonia: Spain datas rescaled with the population
****Spain:**PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD - Secretaría de Estado de ServiciosSociales e IgualdadDelegación del Gobierno para el Plan NacionalsobreDrogas.

Table 11 shows per capita and GDP proportions against the overall costs. Expenditures increase considerably for Poland. The proportion of expenditure for infrastructure is higher for Poland than for Spain also when it is related to the countries purchasing power standards (Figure 22). Portugal maintains similar proportions of expenditures between the first and second scenarios.

Table11. Per capita cost and GDP percentage for overall justice sector for drug control, 2010

	Population on 1st January 2010	GDP - Current prices 2010(in milions of €)	Estimated totaljustice sector costs for drug control, 2010 (in €)	Per capita cost for totaljustice sectorrelated to drug control, 2010 (in €) (/) Population as of 1st January 2010	Percentage of GDP for overall justice sector costs related to drug control, 2010 (in €)
Poland	38,167,329	354,616.1	177,395,888	4.648	0.050
Portugal	10,573,479	172,859.5	18,222,779	1.723	0.011
Spain	46,486,619	1,045,620.0	644,136,101	13.856	0.061

Figure 20. Percentage of GDP for overall justice sector costs related to drug control, 2010 (in €)

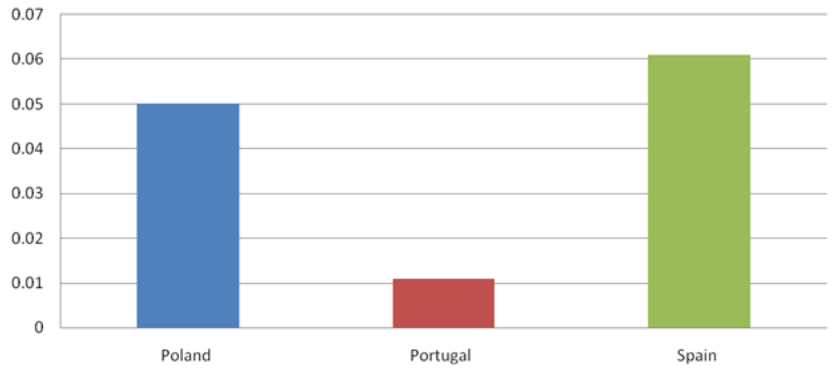


Figure 21. Per capita cost for total justice sector related to drug control, 2010 (in €) (/) Population as of 1st January 2010

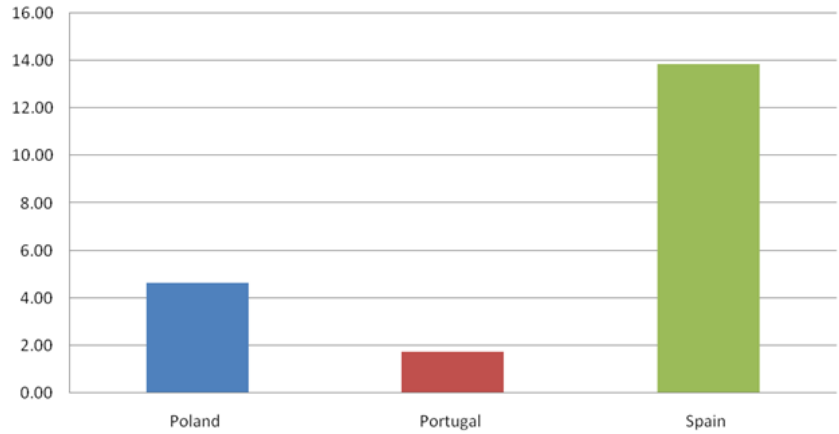
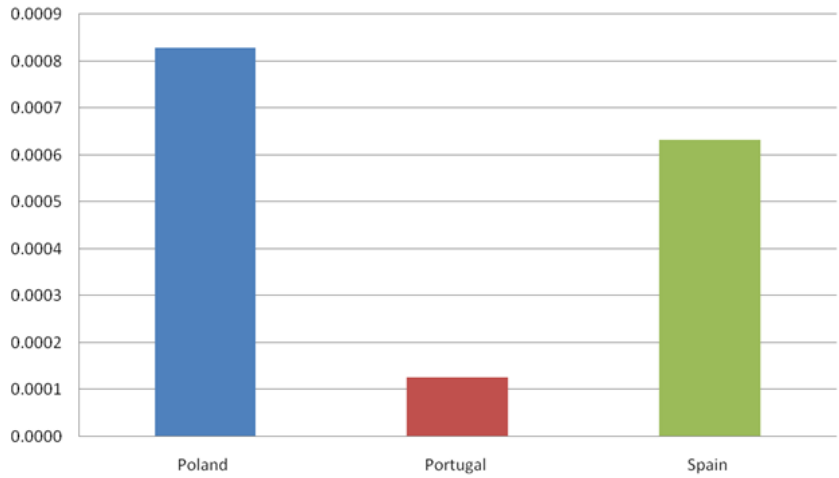
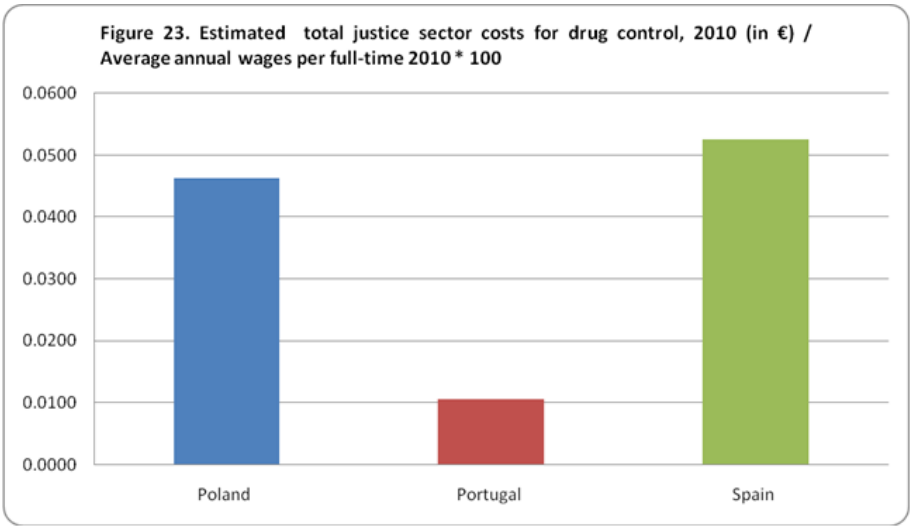


Figure 22. Percentage of GDP for overall justice sector costs related to drug control, 2010 (in €)/ Purchasing Power Standard





3.5 Brief description of the prison situation in the three countries, and estimated costs

Incarceration of non violent drug offenders should be addressed as a health and human rights issue. Persons who use drugs are known to be overrepresented in the prison population and those individuals who used drugs outside continue to do so in prison. The incidence of HIV and other drug related diseases is 2 to ten times higher in prison settings than in the general population and in some settings HIV burden may be up to 50 times higher[90]. Currently, there is extensive evidence pointing to the need for a revision of the current punitive approaches in drug control, to diminish the number of non violent offenders within the prison system, which would dramatically diminish the health and social consequences of such detention, including HIV transmission[91].

Diverting drug offenders from prison to treatment and increasing harm minimization strategies within prison settings have been addressed in various ways by governments worldwide[92] and these approaches have been basically integrated and organized within national criminal justice systems. This has posed various challenges and limitations to the possibility for an effective implementation and organization of alternative measures to incarceration for drug offenders in need for treatment, because judges are not always willing to take responsibilities for decisions that pertain to the medical sphere, such as choice of treatment, referral and supervision of outcome. This issue has represented one of the limits identified in the experience of the drug courts in the US[93].

Various guidelines have been issued by the United Nations and its specialized agencies, on reducing the impact of HIV and other diseases in prison[94]. There are many examples of good practices in the organization

[90] WHO, UNODC, UNAIDS. Interventions to address HIV in prisons. Evidence for action technical papers Geneva, WHO, 2007. Available at www.who.int/hiv/pub/prisons/e4a_prisons/en/index.html

[91] R. Jürgens, A. Ball and A. Verster, "Interventions to reduce HIV transmission related to injecting drug use in prison", Lancet Infectious Diseases, vol. 9, No. 1 (2009), pp. 57-66

[92] Thailand and ChinaUS drug courts where judges are made responsible for the assessment, referral and supervision of drug offenders, making decisions that pertain to the health and medical sphere.

[93] UNAIDS, *Pragmatism vs. Punishment: The Case for Harm Reduction*, speech of Michel Sidibé, Executive Director of UNAIDS, presented during the 53rd Session of the Commission on Narcotic Drugs, 10 March 2010;

[94]

of health services in prisons, which aim to increase access to treatment and harm-minimization strategies, in order to reduce transmission of drug related diseases[95].

Poland, Portugal and Spain are all facing challenges with high rates of incarceration, prison overcrowding and poor prison conditions. The economic recession has worsened the previously reported difficult conditions and financial cuts have posed great difficulties in the working conditions of the guards and produced a rise in the level of conflicts with prisoners. Prisoners report a shortage of food and sanitary products, having to share the cell with persons sick with infectious diseases as well as corruption and violence and abuse by guards. In Portugal and Spain, a high percentage of foreigners are currently incarcerated, predominantly for drug trafficking offences. These foreigners are generally kept on remand for many months and not repatriated and as a result have a high rate of recidivism.

***Poland*[96]**

In 2010, Poland total prison population rate per 100,000 inhabitants was 222 (the highest rate among OECD countries, after the US). Among 57 countries, Poland was 10th for prison population rate and 36th for occupancy with a 89,4% rate, according to a report by the International Center for Prison Studies.

In 2012, the budget allocated to penal institutions (prisons and remand centers) was €602.423.500 which represented 23,69% of the budget for the justice system; in 2012, the cost for investments in prison facilities was € 2.446.805,79 which was 0,41% of the budget for penal institutions.

The Ministry of Justice has responsibility and oversight for prison health care. Medical services for prisoners are provided mainly by the prison healthcare system. Prisoners have access to medical specialists, but overall, access is difficult and there is a long waiting time for appropriate psychiatric care, possibility of rehabilitation and appropriate diagnostic examination. Medical examinations of prisoners are carried out in the presence of a prison officer. According to the data provided by Central Board of Prison Service as of 31 December 2012, 3.044 prisoners were serving their sentence in therapeutic units (including 184 women), which is 4% of total prison population (472 prisoners addicted to drugs and 1.075 addicted to alcohol). Treatment for people addicted to drugs or alcohol is conducted within a network of therapeutic units. However, Poland offers treatment only to those who were following a programme prior to incarceration. The Prison Service in the penitentiary units offers several health and harm reduction programs for both licit and illicit drugs, but it is unclear how widespread and accessible these programmes are.

Prison overcrowding and poor conditions, including shortage of food and sanitary products have also been reported for Poland, as well as corruption, violence and abuse by prison staff.

Portugal

In 2010, Portugal's prison population rate was 129 per 100,000 inhabitants. Among 57 countries, Portugal was 27th for prison population rate and 10th for occupancy with a 112% rate, according to a report by the International Center for Prison Studies..

In 2012, the budget allocated to penal institutions was € 321.267.613,00, corresponding to 29,79% of the budget for prison, rehabilitation and judiciary police.

[95]UNODC Policy brief HIV prevention, treatment and care in prisons and other closed settings: a comprehensive package of interventions, UNODC, 2013

[96]European Prison Observatory, http://www.prisonobservatory.org/

Currrent law requires that prisoners have the right to "access the National Health Services in conditions identical to those guaranteed to all citizens". The relevant statutes also grant prisoners the right to be assisted by any physician of their choice, at their own expense. In 2007, integration of prison health services into the National Health Services was enacted, its full implementation being challenged by budgetary and organizational constraints. Outsourcing to private contractors is also envisaged, which has led to cost-efficiency gains, but it has also resulted in lack of continuity in the provision of health services, due to high levels of staff fluctuation among prison establishments.

The statute sets out requirements for treatment of prisoners suffering from addiction. In fact, there are methadone programmes and, in exceptional cases, as in the drug-free wings, there are programmes adapted for the prison. These programmes do not meet the best medical criteria. MMT is rarely available and treatment is mostly based on tranquilizers. The shortfalls of the available programmes were clearly noted in the CPT Report of 2012, after visiting just three prisons which are not among those with the most severely deficient programmes. As noted in the CPT Report 2012 (pg. 72), "*Drug abuse and drug dependency remains a problem in all the prisons visited, but was particularly pronounced in Paços de Ferreira Prison, where medical staff estimated that 70% of inmates used drugs, with around 30% being drug dependent. Methadone drug-substitution programmes are available in prisons, in conjunction with the National Institute for Drugs and Drug Addictions (Instituto da Droga e da Toxicodependência - IDT), which is responsible for initiating persons onto the programme. However, at Linhó Prison, only prisoners already enrolled in a methadone programme prior to their arrival at Linhó could access the programme*". Infectious diseases associated with drug abuse caused the majority of deaths due to illness. In 2010, approximately 10 percent of the prison population had HIV/AIDS, and more than half of these (57 percent) also were infected with hepatitis C.

Prison overcrowding and poor conditions have worsened with the economic recession. While petty crime in Portugal has been reported to be soaring, with percentages of up to 15% from year to year, many Portuguese go to prison because they can no longer afford to pay fines even for drunken driving or traffic violations. At the same time, less and less is being allocated for prisons. In order to meet the EU economic requirements, Portugal built only one new prison out of 10 that were planned. Portugal's most recent official statistics indicated that its prisons had a surplus of 1,413 prisoners. But the situation is probably underestimated by the numbers and conditions at some prisons are considered "primitive"[97].

Spain[98]

In 2010, the total prison population rate was 147,76 per 100,000 inhabitants, Among 57 countries, Spain is 22th for prison population rate and 40th for occupancy with a 85,7% rate,according to a report by the International Center for Prison Studies.

The budget allocated to penal institutions in Spain in 2012 was 1.196,4 Million €, corresponding to 0,114 % of the GDP.

Also in Spain prison overcrowding is a problem, whereas most of its prisons host more than double their inmates capacity. Spain's Penal Code envisages harsh sentences for drugs trafficking and courts are burdened with the excessive length of judicial proceedings. It is estimated that around 50% of prisoners are incarcerated for drug related charges, while 25% of those being held are constituted by prisoners awaiting trial. Foreigners (Moroccans, Colombians, Algerians and Romanians) constitute a large proportion of drug offenders in prison and this proportion has been increasing since 2000 and it is estimated that more than

[97] CPT Report 2012
[98] European Prison Observatory, http://www.prisonobservatory.org/

six out of every 10 people sent to jail are non-Spaniards. As in other developed countries, personal drug use is depenalised, but the spread of AIDS by the late 1980s, as well as the sharp rise in large and small scale drug trafficking, led the government to crack down on possession.

Prison health is under the management of the Ministry of Justice. All prisons have a nursing department equipped with: rooms for consultation, dental cabinet, cures room, pharmacy deposit and a variable number of beds for patients requiring increased vigilance. Although prison services and hospitals are available for mentally ill prisoners, prisoners complain that the only treatment offered is medicalisation and the same Administration publicly acknowledges that over 40% of prisoners in Spain suffer from some form of mental disorder and that 4% of them suffer from a serious mental illness. Government funded drug-related programmes for treatment and harm reduction have been actively implemented in Spanish prisons between 1999 and 2009 and are currently available in many prisons. In 2011, needle exchange programmes were covering 27 prisons and 7.016 inmates, MMT was covering 13621 inmates.

3.5.1 Estimated cost for prisoners, 2011

The comparability of data related to detention from different countries is a major concern and one of the main problems that any international investigation must address and resolve. The problem is due to different data collection standards regarding the prison population. The costs of detention are clearly related to the total number of inmates (including pre-trial detainees) who are charged with or finally sentenced for drug related crimes. This indicator is commonly known as prison stock. Usually, the total number of inmates includes the standard categories of inmates, such as persons held inside a penal institution at a given date and, more specifically, pre-trial detainees and sentenced prisoners. Some countries include juvenile offenders in the statistics. However, prison stock may also include persons under therapeutic measures, persons held in private facilities or open penal institutions. Moreover, reported prison stock may also include inmates detained for administrative reasons, those on probation or recalled from probation, fine-defaulters, etc.

Table 12. Breakdown of sentenced prisoners (final sentence) on 1st September 2010, by main offence (numbers)

	Poland	Portugal*	Spain
Homicide (incl.attempts)	4,879	1,149	2,698
Assault and battery	NA	149	2,725
Rape	1,886	223	2,134
Other types of sexual offences	881	234	1,057
Robbery	11,499	1,271	15,587
Other types of theft	16,107	1,153	1,889
Economic and financialoffences	113	NA	1,646
Drug offences	NA	1,950	17,878****
Terrorism	NA	0	457
Organisedcrime	424	NA	NA
Other cases	36,078	3,177	8,862
Number of sentenced prisoners (final sentence)	71,867	9,069	51,441
Prison population 2010 (EUROSTAT)***	81,094	11,613	73,929

Council of Europe Annual Penal Statistics – SPACE I – 2010

*: In the breakdown of sentenced prisoners are not included 237 mentally-ill offenders, which are counted separately.

: ***Definition: Total number of adult and juvenile prisoners (including pre-trial detainees) at 1 September (or nearest available date). Including offenders held in Prison Administration facilities, other facilities, juvenile offenders' institutions, drug addicts' institutions and psychiatric or other hospitals. Excluding non-criminal prisoners held for administrative purposes (for example, people held pending investigation into their immigration status).

****: PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDADSecretaría de Estado de ServiciosSociales e IgualdadDelegación del Gobierno para el Plan NacionalsobreDrogas.

Table 13. Average amount spent per day of detention for one person in penal institutions in 2010 (in €)

	Poland	Portugal	Spain
Average amount spent per day for the detention of one person in 2010;	19.60€	53.71€	49.97€
Total number of days spent in penal institutions in 2010 (incl. pre-trial detention);	21,070,033	4,185,820	23,847,275
Average amount spent for all categories of inmates in 2010	412,972,647	224,820,392	1,191,648,332 €

Council of Europe Annual Penal Statistics – SPACE I – 2011

Table 14.Breakdown of sentenced prisoners (final sentence) on 1st september 2011, by main offence (numbers)

	Poland	Portugal*	Spain
Homicide (incl.attempts)	4,905	1,062	2,589
Assault and battery	NA	160	2,918
Rape	1,854	198	2,039
Other types of sexual offences	856	234	873
Robbery	11,266	1,460	14,923
Othertypes of theft	16,265	1,268	2,108
Economic and financialoffences	129	NA	1,558
Drugoffences	2,308	2,075	17,276****
Terrorism	NA	0	454
Organisedcrime	438	NA	NA
Othercases	34,671	3754	8,611
Number of sentenced prisoners (final sentence)	72,692	9,979	49,584
Prisonpopulation 2011 (EUROSTAT)***	81,382	12,248	58,379

Council of Europe Annual Penal Statistics – SPACE I – 2011

*: In the breakdown of sentenced prisoners 232 mentally-ill offenders are not included, which are counted separately.

**: Other types of sexual offences are included abuse, harassment, exhibition and prostitution. Other types of theft are included, among others, thefts of the vehicles and larceny. Economic and financial offences are included fraud, other socioeconomic crimes and crimes against treasury and social security.

: ***Definition:Total number of adult and juvenile prisoners (including pre-trial detainees) at 1 September (or nearest availabe date). Including offenders held in Prison Administration facilities, other facilities, juvenile offenders' institutions, drug addicts' institutions and psychiatric or other hospitals. Excluding non-criminal prisoners held for administrative purposes (for example, people held pending investigation into their immigration status).

****: PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDADSecretaría de Estado de ServiciosSociales e IgualdadDelegación del Gobierno para el Plan NacionalsobreDrogas.

Table 15. Expenses in penal institutions in 2011 (in €) - average amount spent per day of detention of one person in penal institutions in 2011 (in€)

	Poland	Portugal	Spain
Average amount spent per day for the detention of one person in 2011;	19.25€	47.81€	54.66€
Total number of days spent in penal institutions in 2011 (incl. pre-trial detention);	20,189,237	4,456,103	22,575,615
Average amount spent for all categories of inmates in 2011	388,642,812	213,046,284	1,233,983,116

Council of Europe Annual Penal Statistics – SPACE I – 2012

In Table 16, the estimated cost for drug related detention was obtained by multiplying the number of person-days of detained individuals sentenced for drug related offences by the average cost per day. For prevalence reported on a specific day, the numbers have been multiplied by 365 in order to obtain an estimate of the yearly total.

Table 16. Cost for drug related prison detention (final sentence prisoner), 2011

Country	Number of prisoners sentenced for drug offences	Total number of final sentence prisoners	(a) Average amount spent per day for the detention of one person in 2011; (in €)	Total annual expenditure for all prisoners * (in €) 2011	Annual expenditure for prisoners sentenced for drug related offences* (in €) 2011
Poland	2,308	72,692	19.25	572,948,530.00	16,216,585.00
Portugal	2,075	9,979	47.81	221,291,692.65	36,210,098.75
Spain	17,276*	58,379	54.66	1,405,979,824.80	344,671,748.40

*: Not estimated. Total prison population for Drug offences. Font: PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD Secretaría de Estado de ServiciosSociales e IgualdadDelegación del Gobierno para el Plan NacionalsobreDrogas.

In Table 17, an additional proportion of detainees was added to the totals shown in table 16, in order to account for the difference between the total prison population and the number of sentenced prisoners. Assuming that the proportion of the drug related prisoners in this group would be the same as for the sentenced individuals, we multiplied the difference between reported total prison population and sentenced prison population by the average amount spent per day to obtain this additional cost. Since the cost for drug users in prison could not be ascertained, we considered for this category the same cost as for the average amount spent per day for the detention of prisoners.

Table 17. Overall costs for drug related prison detention, including pre-trial inmates, 2011

Country	Prison population 2011	Number of sentenced prisoners (final sentence)	Prison population(-) Total number of sentenced prisoners (final sentence)	Estimated number of pre-trial prisoners (drug offences)	Average amount spent per day for the detention of one person in 2011 (in €)	Total estimated cost for the detention of all drug offenders, 2011 (in €)
Poland	81,544	72,692	8,852	2,589	19.25	18,191,344.40
Portugal	12,681	9,979	2,702	2,636	47.81	46,014,657.00
Spain*	70,472	49,584	20,888	17,276*	54.66	344,671,748.40

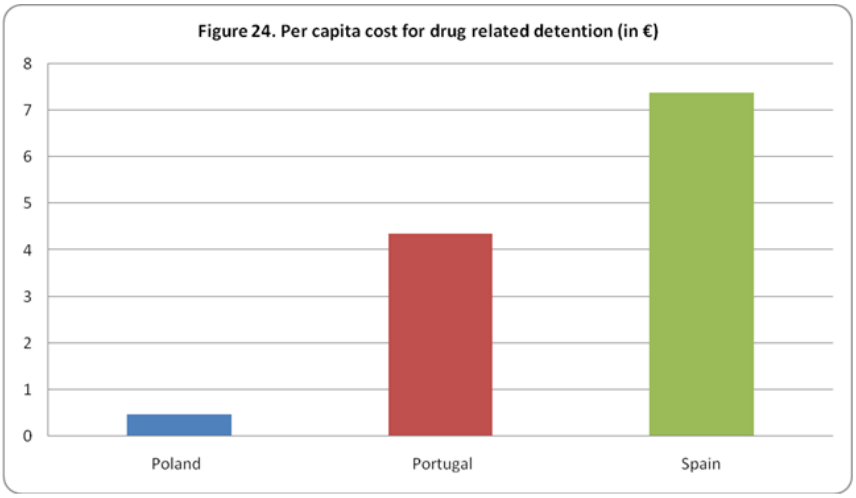
*: Not estimated. Total prison population for Drug offences. Font: PLAN NACIONAL SOBRE DROGAS - MEMORIA 2011, MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD Secretaría de Estado de ServiciosSociales e IgualdadDelegación del Gobierno para el Plan NacionalsobreDrogas.

Table 18 and Figure 24 show the average amount spent per capita for drug related detention. Poland is the country with the lowest level of expenditure, followed by Portugal and Spain. It is to be noted that the overall cost estimates are influenced by a number of factors, such as the daily cost for prisoners, the prison population, and the estimated number of individuals who were in prison for a drug offence at the time.

Table 18. Per capita cost of drug related detention, 2011

Country	Total estimated cost for the detention of all drug offenders, 2011 (in €)	Annual prison expenditure (in €)	Population as of 1st January 2011*	Per capita expenditure for detention in 2011 (in €)	Per capita expenditure for drug related detention (in €)
Poland	18,191,344.40	510,752,165.00	38,529,866	13.25	0.47
Portugal	46,014,657.00	174,140,036.40	10,572,721	16.47	4.35
Spain	344,671,748.40	1,164,713,591.00	46,667,174	24.95	7.38

Authors' elaboration, * EUROSTAT



In Figures 25-26, the percentage of expenditure for drug-related detention is related to the GDP and to the purchasing power standard[99]confirming the high investment of Portugal in this area.

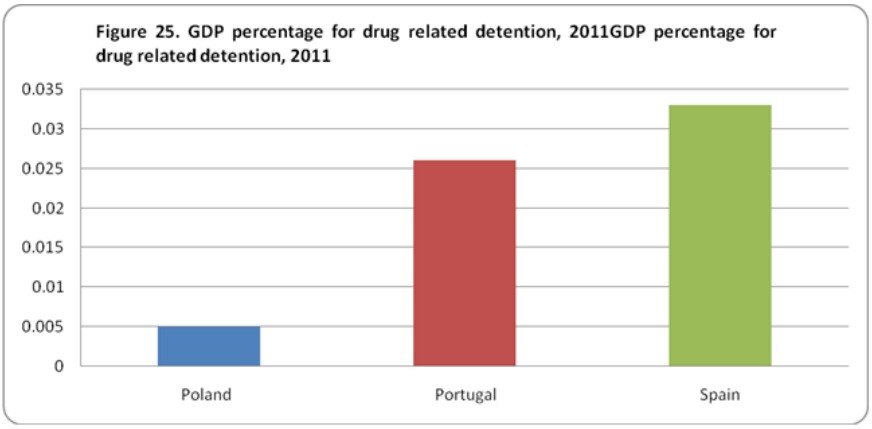
The expenditure for drug prisoners in Poland is just 0.005 of its GDP, much lower than the other countries analysed. Similar result is obtained for the cost per capita. The lower expenditure in Poland is also linked to the lower price level compared to the price level of the other countries. Comparative price levels of final consumption by private households including indirect taxes in Poland are much lower than the average EU level, whereas Spain and Portugal levels are closer to the EU.

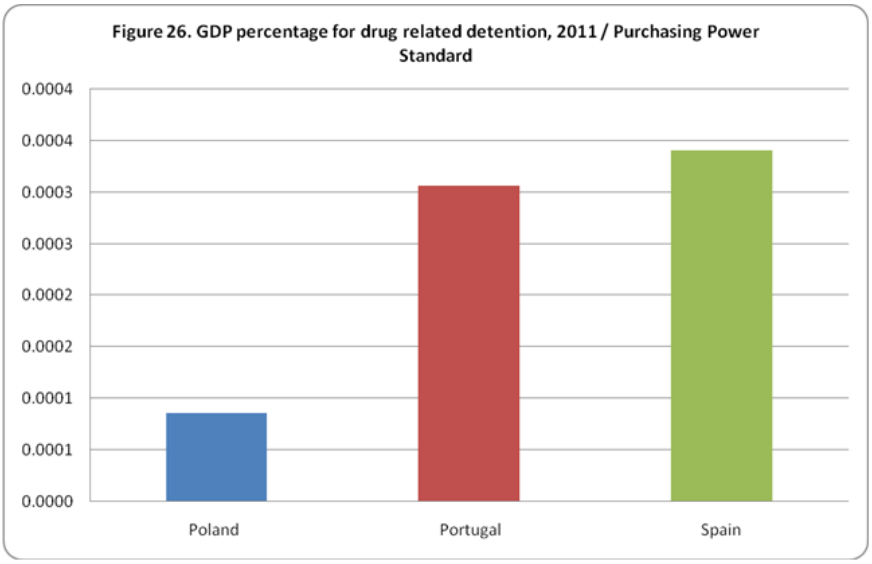
Table 19.GDP percentage of drug related detention cost, 2011

Country	Estimated cost for the detention of drug offenders, 2011 (in €)	Annual prison expenditure (in €)	GDP 2011*(in milions of €)	Expenditure for drug offenders as a percentage of the total prison population expenditure	GDP percentage for drug related detention, 2011
Poland	18,191,344.40	572,948,530.00	370,850.6	3.17	0.005
Portugal	46,014,657.00	221,291,692.65	171,126.2	20.79	0.026
Spain	344,671,748.40	1,405,979,824.80	1,046,327.0	24.51	0.033

Font: Authors' elaboration
*: EUROSTAT

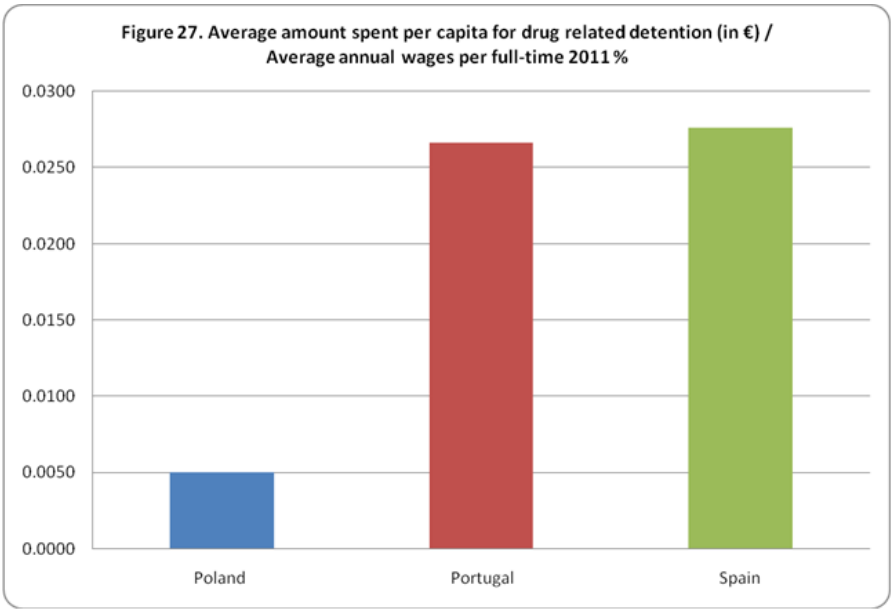
[99]Comparative price levels are considered as the ratio between Purchasing power parities (PPPs) and market exchange rate for each country. PPPs are currency conversion rates that convert economic indicators expressed in national currencies to a common currency, called Purchasing Power Standard (PPS), which equalises the purchasing power of different national currencies and thus allows meaningful comparison.





If the costs for drug related prisoners are put in relation with the average full-time wages [100](Figure 27), Portugal presents costs similar to Spain, showing a very important investment in this sector, given its population size, overall national public budget and the mean average salaries value.

[100]Average annual wages per full-time equivalent dependent employee are obtained by dividing the national-accounts-based total wage bill by the average number of employees in the total economy, which is then multiplied by the ratio of average usual weekly hours per full-time employee to average usually weekly hours for all employees. For more details, see: www.oecd.org/employment/outlook.
For further details on these estimates, please see http://www.oecd.org/dataoecd/32/50/43948033.pdf



4. Summary of the costs for drug control to the criminal justice system in Poland, Portugal and Spain

The costs of criminal justice systems for drug control were analysed and compared in three EU countries, Poland, Portugal and Spain. Estimates were obtained for costs of law enforcement personnel salaries, for costs of the judiciary salaries and for the cost of prison inmates. Estimates were normalized for GDP, per capita and PPP values, to better express the relation to investments in the criminal justice sector with the level of economic development and population size of the three countries.

Overall, differences among the countries were found in both the distribution and the quota of investment made in the three sectors.

In the summary of the estimated costs which follows, we present two scenarios:

Hypothesis 1: based on the costs of police and justice salaries in 2010 and the costs for prison inmates in 2011. In this scenario, Poland spends 44%, for the police sector, 42% for the justice sector and 14% for prisons. Portugal shows the most substantial expenditure for prisons (73%), followed by police costs (20%) and 7% for the justice sector. Spain's highest expenditure is for police (65%), followed by the costs for detention with 23% and by the costs for the justice sector (12%).

Hypothesis 2: based on the costs of police salaries in 2010, of overall justice sector in 2010 and the costs for prison inmates in 2011. In this scenario, Poland costs are higher for the justice system (70%), followed by police costs (23%) and prisons costs (7%); for Portugal, the most substantial expenditure is represented by prisons (60%), followed by the justice sector (24%) and the police (16%). Spain's highest expenditure is incurred in the police sector (49%), followed by the justice sector (33%) and the costs for detention (18%).

Spain is the country with the highest overall drug control cost for the criminal justice system, followed by Poland. Portugal spends significantly less than the other two countries.

In very general terms, the estimate was found to be consistent with the type of drug control legislation enacted in the three countries. Poland's zero tolerance approach might have been, at the time, responsible for the very high costs in the police and justice sector. These high costs, however are not matched in the prison sector, which may indicate that very few people arrested and processed for drug related offences are eventually sent to jail.

Spain shows a scenario similar to other countries in Europe, where depenalization is enacted of the personal use and possession of drugs, but this is still maintained within the realm of criminal justice. Here, the highest cost is for law enforcement, which is also justified by Spain's geographical position as a transit country, followed by prison costs, which may be related to the level of tolerance of the law enforcement authorities towards recording and prosecuting possession of drugs for personal use, but may also indicate the possible allocation of resources to expand harm reduction and treatment policies for drug users in prison.

In Portugal the highest costs are in the prison sector, and because the estimate was based on the cost per prisoner and not on staff salaries, this high investment may be suggestive of the country's efforts to ensure drug trafficking is punished, but also to ensure the necessary resources for drug related treatment and rehabilitation of drug users in jail within the health-focused approach of its drug legislative framework.

It should be stressed that the estimates presented need to be viewed with some degree of caution, as they cannot capture the relationship between the laws and their policy implementation and the consequences of these investments in the real world and in the life of the citizens. Further analysis may provide useful insights in what type of investments and allocation of resources are made within the three criminal justice sectors, how efficient these investments are in supporting the respective national drug control strategies as well as how effective they are in contributing to diminish the negative social and health impact of illicit drugs.

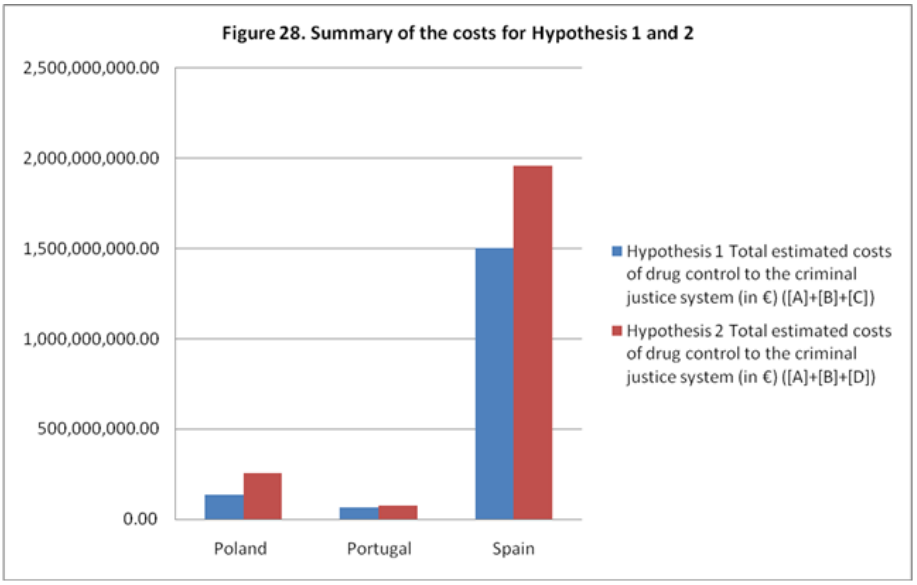
Table 20. Summary of the costs

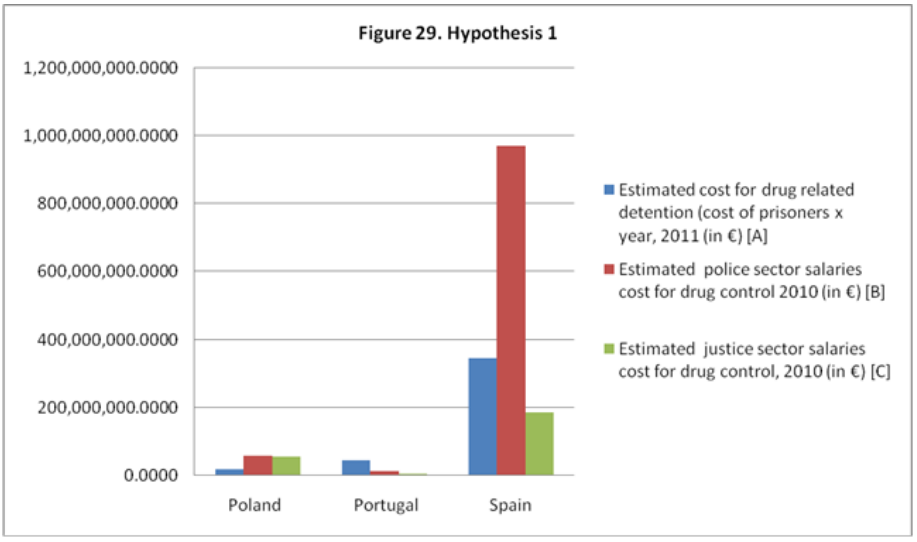
Country	Estimated cost for drug related detention (cost of prisoners x year, 2011 (in €) [A]	Estimated police sector salaries cost for drug control 2010 (in €) [B]	Estimated justice sector salaries cost for drug control, 2010 (in €) [C]	Estimated overall justice sector cost for drug control, 2010 (in €) [D]	**Total estimated costs of drug control to the criminal justice system (in €) ([A]+[B]+[C])** **Hypothesis 1**	**Total estimated costs of drug control to the criminal justice system (in €) ([A]+[B]+[D])** **Hypothesis 2**
Poland	18,191,344.4	59,750,682.1	56,236,256.0	177,395,888.0	134,178,282.5	255,337,914.5
Portugal	46,014,657.0	12,433,621.7	4,620,103.0	18,222,779.0	63,068,381.7	76,671,057.7
Spain	344,671,748.4	971,495,669.7	184,923,303.0	644,136,101.0	1,501,090,721.1	1,960,303,519.1

Table 21. Summary of the costs per capita and GDP percentage

Country	Population on 1st January 2010	GDP - Current prices 2010 (in millions of €)	**Hypothesis 1**	Cost per capita, 2010	Percentage of GDP, 2010
Poland	38,167,329	354,616.1	134,178,283	3.52	0.072
Portugal	10,573,479	172,859.5	63,068,382	5.96	0.044
Spain	46,486,619	1,045,620.0	1,501,090,721	32.29	0.187

Country	Population on 1st January 2010	GDP - Current prices 2010 (in millions of €)	**Hypothesis 2**	Cost per capita, 2010	Percentage of GDP, 2010
Poland	38,167,329	354,616.1	255,337,914.5	6.69	0.038
Portugal	10,573,479	172,859.5	76,671,057.7	7.25	0.036
Spain	46,486,619	1,045,620.0	1,960,303,519.1	42.17	0.144





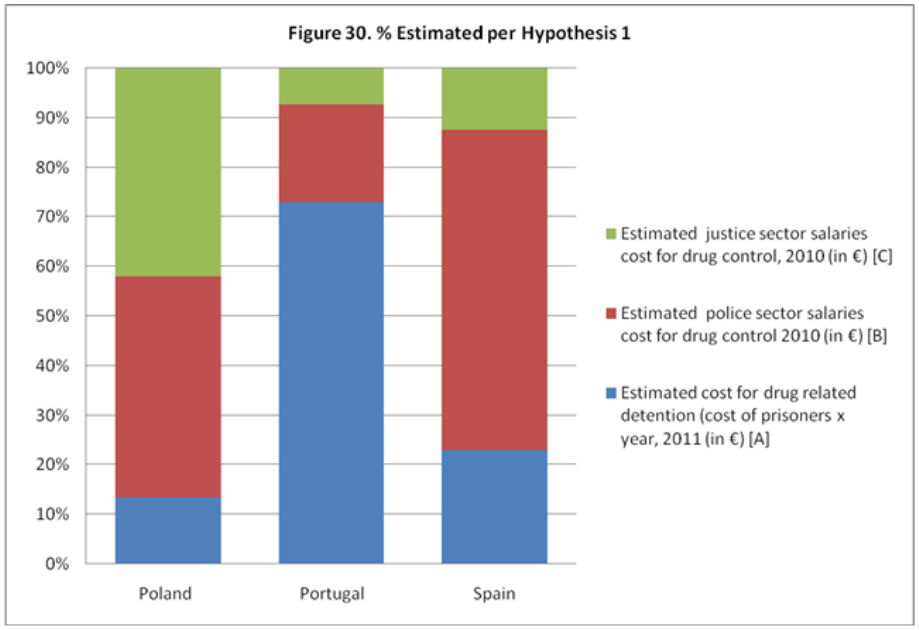


Figure 30. % Estimated per Hypothesis 1
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Poland
Portugal
Spain
Estimated justice sector salaries cost for drug control, 2010 (in €) [C]
Estimated police sector salaries cost for drug control 2010 (in €) [B]
Estimated cost for drug related detention (cost of prisoners x year, 2011 (in €) [A]

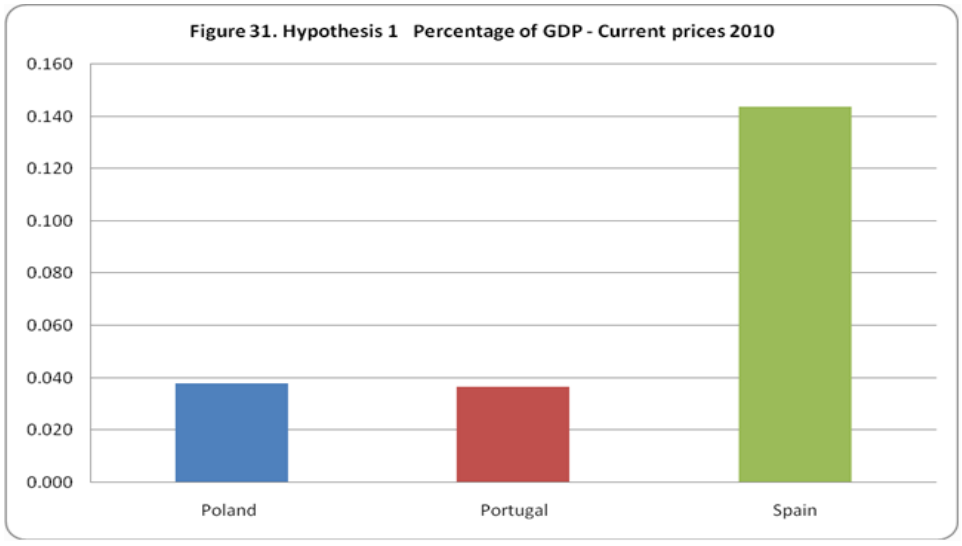


Figure 31. Hypothesis 1 Percentage of GDP - Current prices 2010
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
Poland
Portugal
Spain

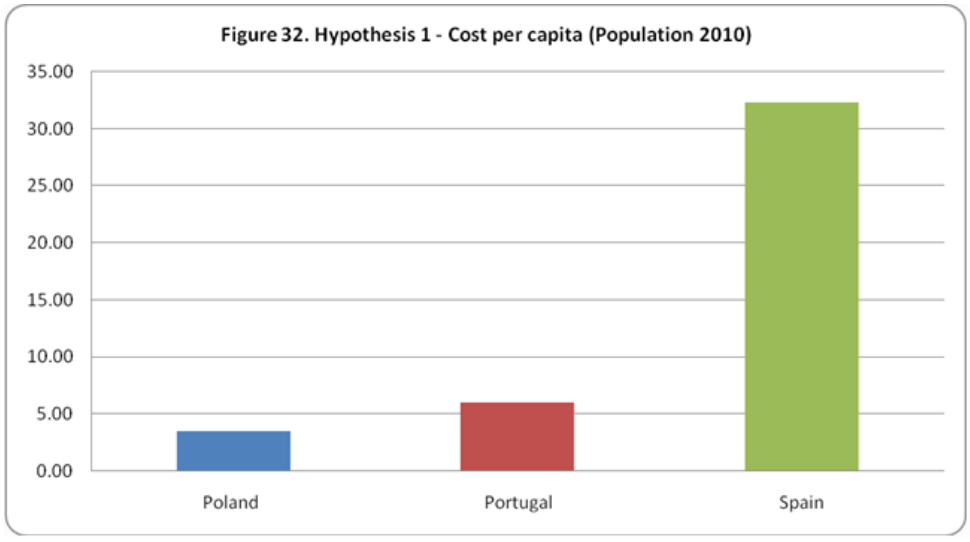


Figure 32. Hypothesis 1 - Cost per capita (Population 2010)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Poland
Portugal
Spain

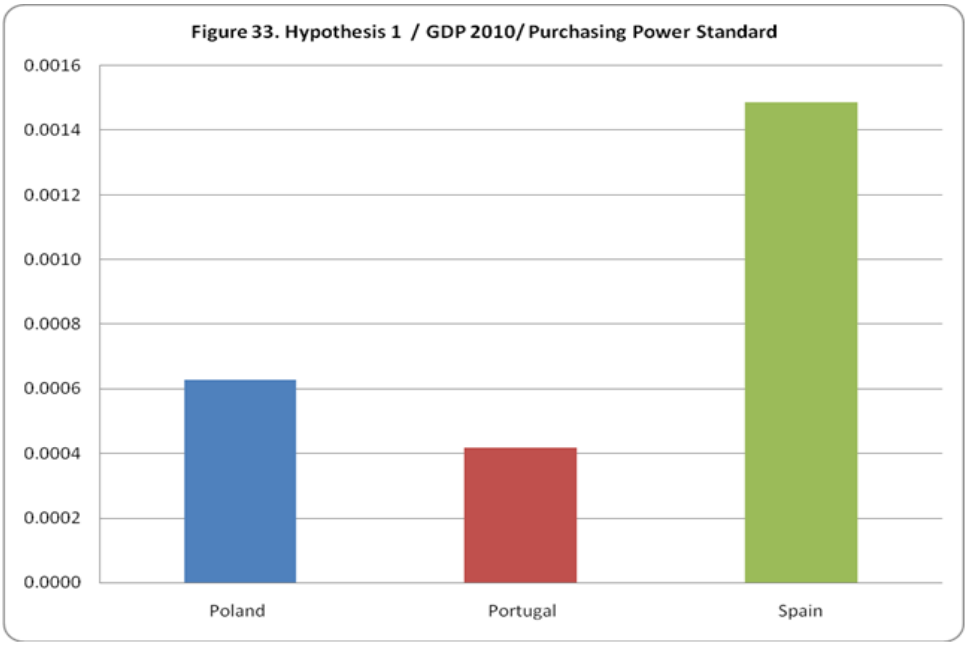


Figure 33. Hypothesis 1 / GDP 2010/ Purchasing Power Standard
0.0016
0.0014
0.0012
0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
Poland
Portugal
Spain

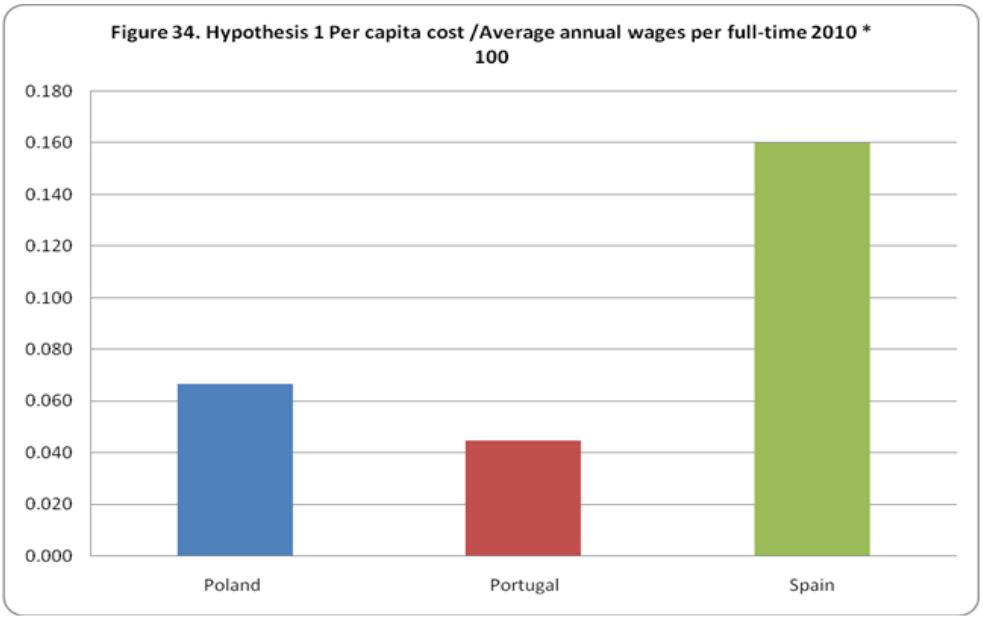


Figure 34. Hypothesis 1 Per capita cost /Average annual wages per full-time 2010 * 100
0.180
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
0.000
Poland
Portugal
Spain

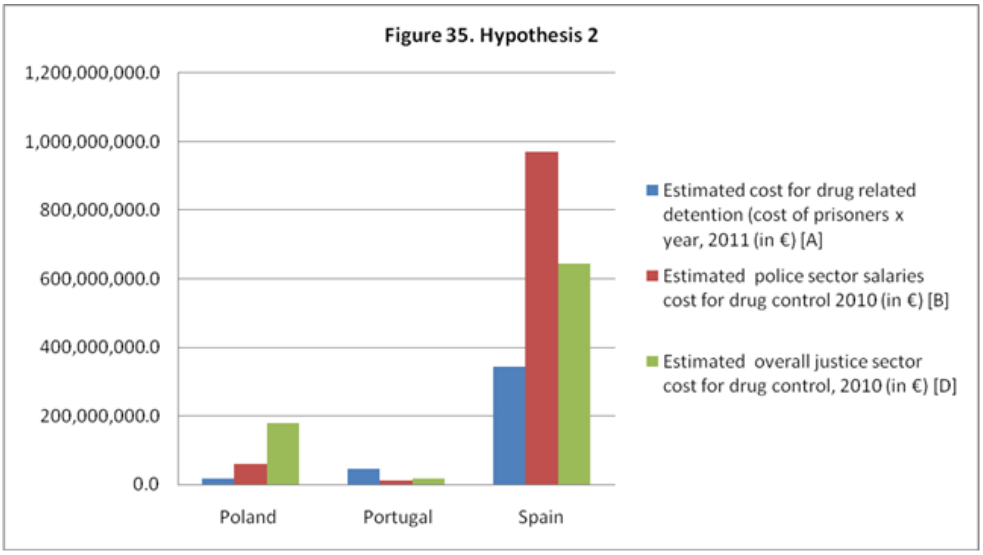


Figure 35. Hypothesis 2
1,200,000,000.0
1,000,000,000.0
800,000,000.0
600,000,000.0
400,000,000.0
200,000,000.0
0.0
Poland
Portugal
Spain
Estimated cost for drug related detention (cost of prisoners x year, 2011 (in €) [A]
Estimated police sector salaries cost for drug control 2010 (in €) [B]
Estimated overall justice sector cost for drug control, 2010 (in €) [D]

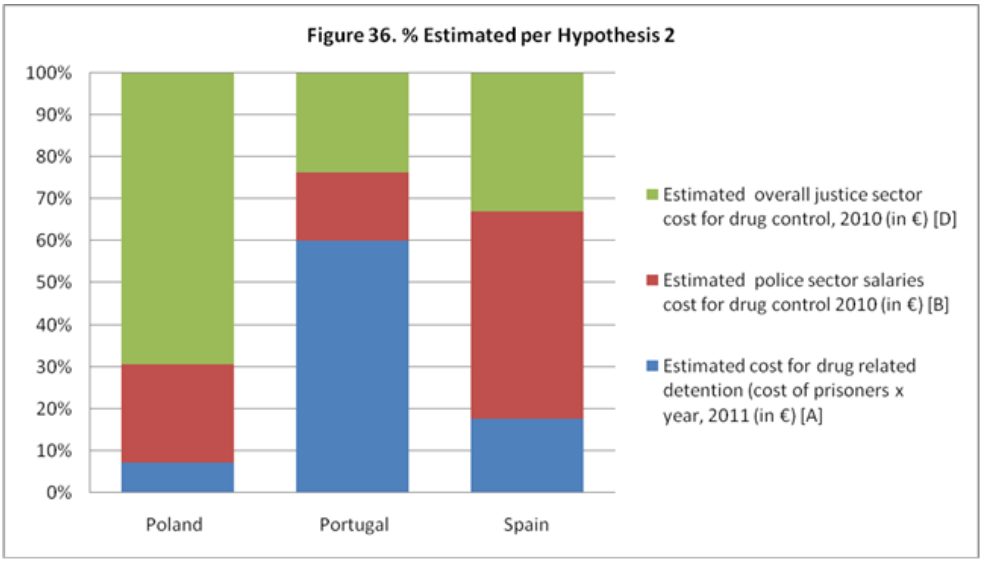


Figure 36. % Estimated per Hypothesis 2
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Poland
Portugal
Spain
Estimated overall justice sector cost for drug control, 2010 (in €) [D]
Estimated police sector salaries cost for drug control 2010 (in €) [B]
Estimated cost for drug related detention (cost of prisoners x year, 2011 (in €) [A]

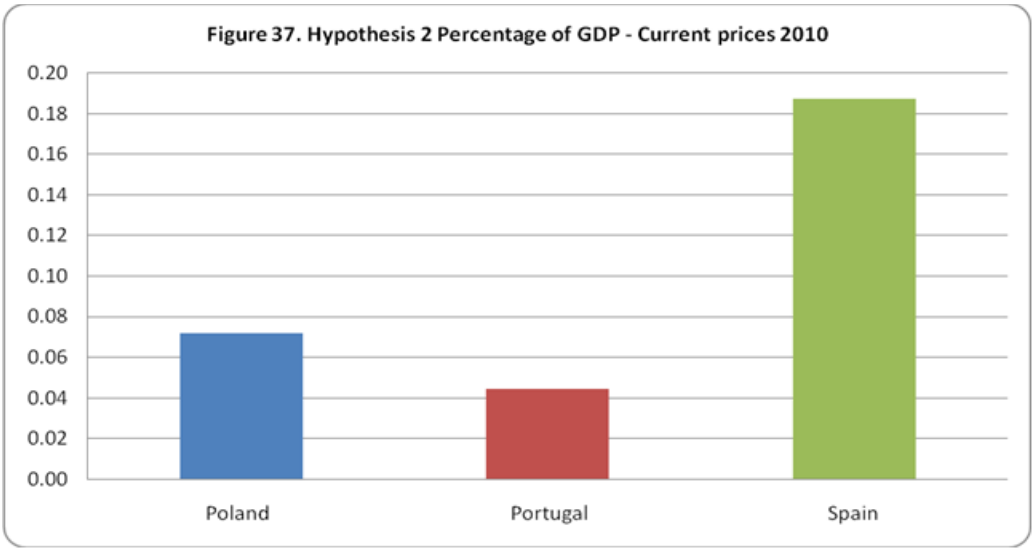


Figure 37. Hypothesis 2 Percentage of GDP - Current prices 2010
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Poland
Portugal
Spain

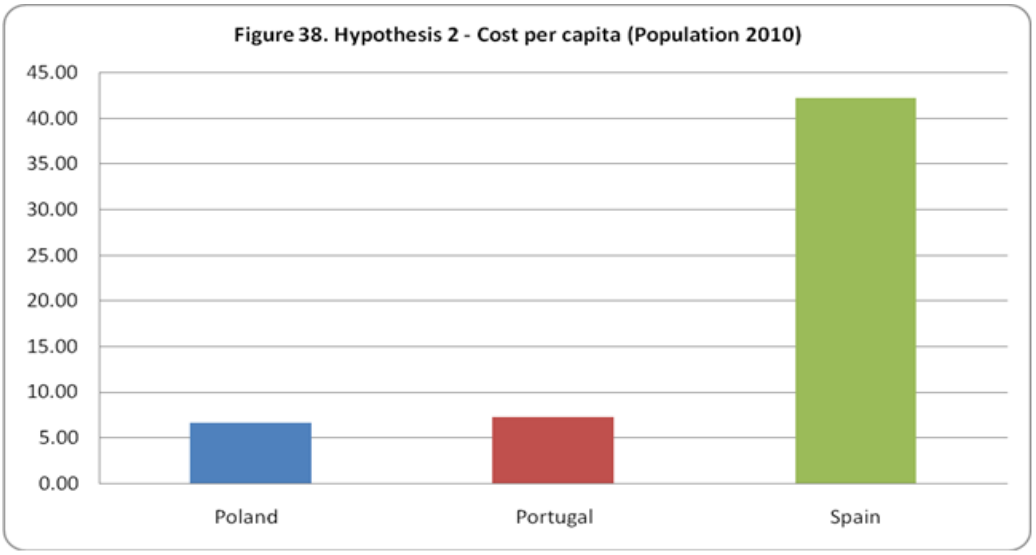


Figure 38. Hypothesis 2 - Cost per capita (Population 2010)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Poland
Portugal
Spain

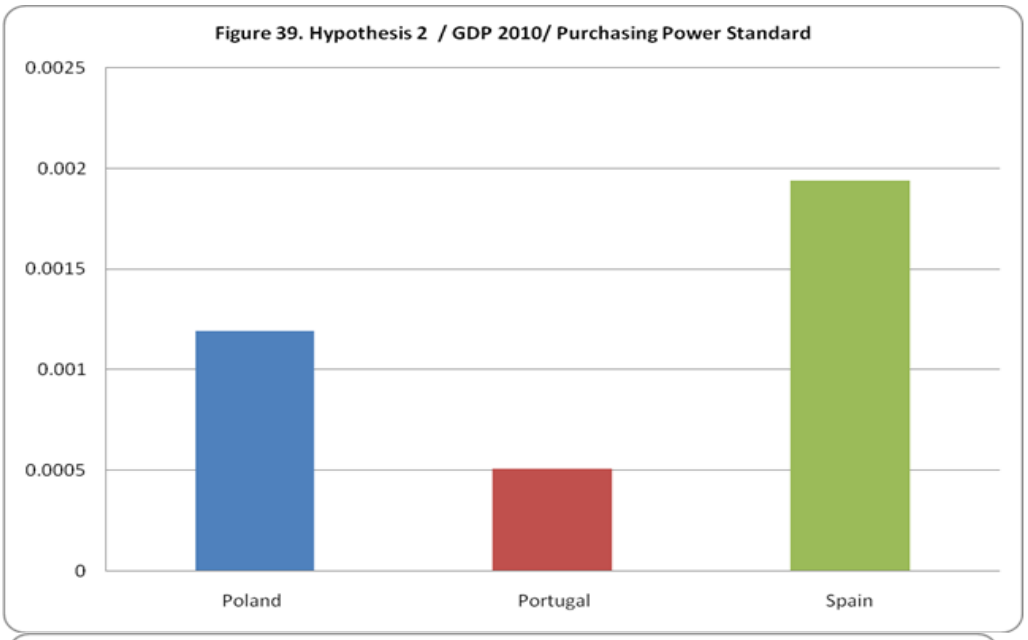


Figure 39. Hypothesis 2 / GDP 2010/ Purchasing Power Standard
0.0025
0.002
0.0015
0.001
0.0005
0
Poland
Portugal
Spain

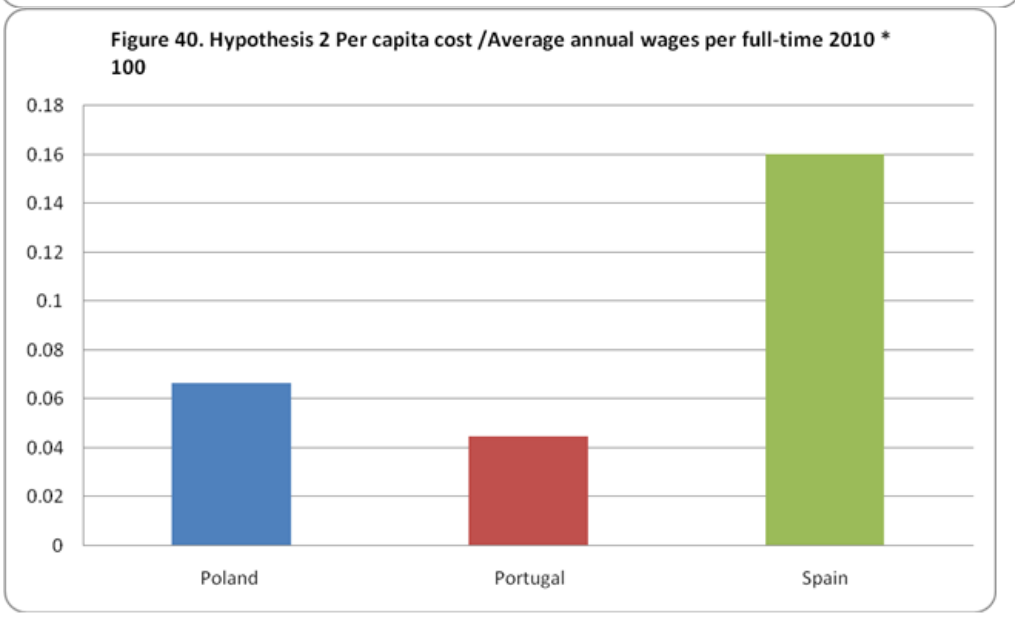


Figure 40. Hypothesis 2 Per capita cost /Average annual wages per full-time 2010 * 100
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Poland
Portugal
Spain

5. Conclusions and recommendations for further research

The results of the study show that the overall investments in the criminal justice systems of the three countries appear to be in line with the type of drug control legislation enacted.

The study also shows that the three countries differ in both the distribution of the investments made in the three sectors and in the quotas they allocate for each sector. Poland's drug control expenditure is higher in the police sector, followed by the justice sector and having a smaller percentage for prisons. Portugal shows the most substantial expenditure for prisons, followed by police and justice costs. Spain's drug control highest expenditure is for police, followed by the costs for detention and for the justice sector. Overall, Spain, which is the richest country, is also the country with the highest drug control cost bearing upon its criminal justice system, followed by Poland. Portugal spends significantly less than the other two countries, even if the estimated very high burden on the prison system deserves further investigation.

When the total expenditure for the justice sector is considered, both in absolute numbers and relative to GDP and population, Poland is the country with the highest expenditure for the justice sector and the law enforcement and the lowest expenditure for prisons, followed by Spain which presents a similar scenario. Portugal confirms its high drug related prison costs, followed by justice and police sector costs.

Even if the overall picture seems to shows a relationship between the types of drug laws and the costs for the criminal justice system in the three countries, further analysis could provide useful insights in the types and size of investments those countries make within the three criminal justice sectors and whether these investment priorities are efficiently supporting their national drug control strategies and the effective implementation and delivery of policies and services.

This additional research might be useful to understand the apparent discrepancy between the high investments in the law enforcement and justice sectors in Poland and Spain, which are accompanied by a low investment in the prison sector, as well as the high costs for detention in Portugal, compared to the lower investment in the other two sectors analysed.

In the case of Portugal, it may be revealing to verify more in depth as to whether the different allocation of resources could be interpreted only as the result of its harsh policy towards drug trafficking, or whether Portugal has been making efforts to make its criminal justice system more conducive to health, in line with its health-oriented drug legislation requirements. It is important to underline the fact that Portugal, among the three countries, is the only one which has implemented legislation mandating the transfer of responsibility for the health of prisoners from the Ministry of justice to the health Ministry. These considerations, however, need to be made with caution, given the overall difficult conditions of prisons and of drug offenders in prison that are reported for Portugal.

All in all and compared to the other two countries, Portugal's legislative approach seems to be motivated by practical considerations. When changes in drug policy towards decriminalization of possession and use were considered and eventually implemented in Portugal, the country was facing one the highest incidence of drug related mortality and infectious diseases in Europe. In a 2002 EMCDDA study, investigating the incidence of HBV, HCV and HIV on the overall health costs, Portugal was second only to Spain with regard to the highest EU incidence for these costs on its total health care budget, followed by Italy (EMCCDA 2002)[101].

[101]The EMCDDA study showed that the overall EU cost amounted to Euros 1.89 billions. HIV represented the main expenditure item, with 59%, followed by HCV with 39% and HBV with 2%. Lifetime costs for HIV went from €42,500 millions in the UK to €90,800 millions in France. When drug related infectious diseases costs were seen also in relation to the national health expenditure and expressed in percentages, Spain and Portugal showed the highest incidence for the costs of these infections on the total health expenditure with respectively 2% and 1,8%, followed by Italy with 0,7% (EMCCDA 2002).

Portugal's decision to decriminalize personal use and possession for all drugs should be interpreted in the framework of the country's effort to find a quick and effective response to its drug epidemics, which had almost immediate repercussions in the social and health sectors, but eventually influenced positive structural changes also in the criminal justice sector (Hughes 2006)[102]. Rather than considering the peculiarity of the Portuguese reform only through the lenses of decriminalization, it would be more important to highlight the close connection between the overall legislative reform and its practical implementation, through a clearly defined national drug policy strategy, which offered the opportunity to raise the investments in prevention, harm reduction, treatment and social reintegration and drastically lower the burden on the criminal justice system (Hughes and Stevens, 2010).

Consistently with the results of this study, following the reform, Portugal saw a drastic reduction in the number of drug offences recorded and prosecuted. According to the National Drug Addiction Agency[103], the number of persons arrested for drug offences decreased from 14,000 in 2000 to approx. 5,000 in 2008, with no net-widening effects. According to its then Director, the National Antidrug Agency principal challenge before decriminalization was represented by the addict's fear of seeking treatment at public health agencies, because of the fear of being arrested and prosecuted. The main drive of the reform was centred on exactly the need to remove the stigma and fear associated with being an addict and to facilitate access to treatment.

It might be assumed that police resources were more efficiently diverted to detecting and investigating more serious crimes, such as drug trafficking and organized crime, and to refine supply reduction strategies, also through the strengthening of international collaborations with producing and transit countries[104]. Courts became also less burdened, having to deal less with cases related to minor drug offenders. For the prison system, the National Agency cites a reduction from 44% to 21% over a ten year period in the proportion of drug offenders, with a concomitant reduction in prison density. Although drug use prevalence was not subject to dramatic changes, drug related mortality and morbidity were reported to have fallen significantly over the same period, with a substantial decrease especially for HIV prevalence. In conclusion, it is important to stress the commitment of Portugal to address its drug policy reform from a human rights perspective, by making the protection of a vulnerable population the centerpiece of its policy implementation. The conceptual importance of Portugal decriminalization stands in the removal of drug use from the realm of criminal justice and in its placement within the dominion of public health. In principle, decriminalization was not meant to condone drug use, which is still considered a violation of the law, but that violation would be more efficiently dealt with at the administrative level, rather than as a criminal offence. In this perspective, Portugal's decriminalization was also compliant with the international treaties, mandating national laws to prohibit drug use[105]. Drug trafficking is still considered and treated as a crime[106].

[102] C. E. Hughes, "Overcoming obstacles to reform? Making and shaping drug policy in contemporary Portugal and Australia" Dept. of Criminology, PhD Thesis, University of Melbourne, 2006

[103] Annual Report 2009, Instituto de Droga y de Toxicodependencia

[104] See footnote n.35

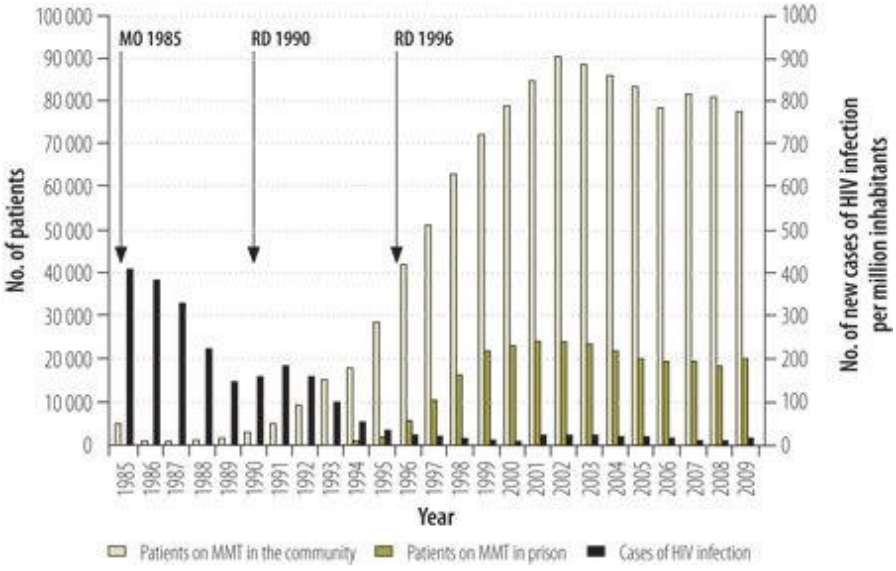
[105] "The International Narcotics Control Board was initially apprehensive when Portugal changed its law in 2001, but after a mission to Portugal in 2004, it noted that the acquisition, possession and abuse of drugs had remained prohibited" and said the practice of exempting small quantities of drugs from criminal prosecution is consistent with the international drug control treaties" World Drug Report for 2009, UNODC, 2009.

[106] In the words of the then Agency's Director: "this law reinforces the resources in the context of demand reduction by sending to treatment drug addicts and [includes] those that are not addicts but need a specialized intervention. With this Law, we expect to contribute to the resolution of the problem in an integrated and constructive way, looking at the drug addict as a sick person, who nevertheless must be responsible for a behavior that is still considered an offense in Portugal". For an extensive description of the Portugal law and its mandated policy implementation, see G. Greenwald "Drug decriminalization in Portugal: lessons for creating fair and successful drug policies", Cato Institute, 2009 and M. Van het Loo, I. Van Beusekom and J. Kahan "Decriminalisation of Drug Use in Portugal:
The Development of a Policy" (2002) 582 The Annals of the American Academy of Political and Social Science.

With regard to Spain, the results of the study show an overall very high burden upon the criminal justice system for the country's drug control policy, which has become progressively restrictive, with high priority investments in the law enforcement and prison sectors. Due to its geographical location, Spain is at the forefront of the fight against drug trafficking, being first among EU countries as a gateway and as a transit country for the drugs coming from the South Western trafficking routes. This might certainly explain the high costs for law enforcement. High prison costs might be related to the level of tolerance law enforcement authorities apply towards recording and prosecuting possession of drugs for personal use, but might also depend on the higher daily cost for prisoners, as well as to the level of resources Spain actually allocates for harm reduction and treatment policies for drug users in prison.

Like Portugal, Spain experienced, at the end of the 90's, high prevalence of injecting drug use and related infectious diseases. The response was to increase law enforcement operations and expand treatment and rehabilitation offers for drug addicts[107] (see figure below), without however, making enough efforts to change the consideration of the drug users outside a criminal justice perspective. Similar to other countries in Europe, Spain maintains a depenalization regime that treats personal use and possession of drugs as a criminal offence, but imposes light sanctions (fines, police record, probation) and imprisonment for drug trafficking. In Spain, a drug consumer will still be judged by a criminal court, although rarely a judge would sentence somebody for drug consumption alone." Interestingly, Spain's drug law still maintains a gap between private and public drug consumption, with the last being prohibited and heavily sanctioned.

Figure 41. Changes in HIV prevalence following changes in Spanish legislation, mandating for broadening access to methadone programmes and harm reduction in the community and in prison



Source: Bulletin of the World Health Organization, 2013:91:136-141
MO: Ministerial Order; RD: Royal Decree

In Poland, use of drugs was not criminalized until 1997, when an amendment to the Act on Counteracting Drug Addiction criminalized drug possession except for the use and personal possession of small quantities. In 2000, with an additional amendment, Poland prohibited possession of any drugs for personal use and sanctioned it as a criminal offence. The immediate result was a major increase in criminal cases for drug possession, with increasing levels (2003 offenses reached 985% of the year 1999) (Table 22).

[107] M. Torres, F. Fonseca, C. Castillo, A. Domingo-Salvany "Methadone maintenance treatment in Spain: the success of a harm reduction approach" Bulletin of the World Health Organization, 2013:91:136-141

Table 22: Offences of drug dealing (1) and possession (2) detected in 1997-2002

Year	Drug dealing (1)	Drug possession (2)	Legal regulation in force
1997	3507	32	AOCDA 1985 / AOCDA 1997
1998	10762	1380	AOCDA 1997
1999	10305	1896	AOCDA 1997
2000	13278	2815	AOCDA 1997
2001	18873	6651	AOCDA 1997 amend.
2002	20482	11960	AOCDA 1997 amend. October 2000
2003		18681	AOCDA 1997 amend. October 2000

Chief Police Headquarters, Warsaw, in: Rapid Policy Assessment and Response: Szczecin

The 2000 amendment aimed to deter new users and facilitate current users to enter treatment. However, a Policy Assessment and Response, carried out in the city of Szczecin and its surrounding in 2006, showed that the stringent criminal sanctions, while, on paper, aimed to deter drug use and be conducive to treatment, in practice did not diminish drug use; instead, they increased the number of people processed through the criminal justice system and created barriers to treatment and harm reduction measures, by allocating insufficient resources for health and social care and by unintentionally increasing the stigma, social isolation and unwillingness to seek treatment, traditionally associated with consideration of drug users as offenders[108].

Interestingly enough, following the 2000 amendment, the dramatic rise in the number of police arrests did not fully match with the number of final convictions, suggesting on the one side a crack-down on drug dealing, but also that the majority of those arrested for possession were not ultimately convicted (Table 23). The report also compares the deprivation of liberty penalties (article 48, paragraph 1,2,3) with the suspended and absolute penalties, showing that most of the people sentenced to prison, even for possession of large amounts, were eventually given suspended sentences. The report also underlies that people with a suspended sentence would be likely to be arrested again, especially in the case of active users and not just dealers. Actual imprisonment would therefore more likely involve small drug users than dealers, i.e. the most vulnerable ones, having an addiction problem and supporting their addiction with small dealings (Table 24).

Table 23. Comparison of registered drug possession offences with valid convictions in 2000-2002.

Year	Registered drug possession offences	Valid convictions for drug possession	Percentage [%] of convictions
2000	2815	598	21,24
2001	6651	1412	21,23
2002	11960	2818	23,56

Chief Police Headquarters, Warsaw and Ministry of Justice, Department of Statistics. In: Rapid Policy Assessment and Response: Szczecin

[108]DrugLaw, DrugUse and Health in Szczecin and West Pomerania, Poland- Rapid Policy Assessment and Response Final Report and Recommendations: Bridging the Gaps Between Needs and Services in the Health and Criminal Justice Systems, 2006 - Rapid Policy Assessment and Response in the Former Soviet Union and Central and Eastern Europefunded by the U.S. National Institute of Drug Abuse.

Table 24: Comparison of deprivation of liberty penalties (article 48, paragraph 1,2,3) with the suspended and absolute penalties.

Legal qualification	Total number of imprisonment penalties	Suspended penalties	Percentage of liberty deprivation penalties suspended [%]
Year 1999			
Art. 48 paragraph 1	178	156	87.6
Art. 48 paragraph 2	23	22 9	95.7
Art. 48 paragraph 3	47	30	63.8
Year 2000			
Art. 48 paragraph 1	338	295	87.3
Art. 48 paragraph 2	45	40	88.9
Art. 48 paragraph 3	97	76	78.4
Year 2001			
Art. 48 paragraph 1	855	749	87.6
Art. 48 paragraph 2	120	110	91.7
Art. 48 paragraph 3	152	95	62.5
Art. 48 paragraph 1: Basic possession	Art. 48 paragraph 2: small amounts	Art. 48 paragraph 3: Large amounts	

Ministry of Justice, Department of Statistics Rapid Policy Assessment and Response: Szczecin

In conclusion, the discrepancy noted in the Szczecin report, between the high burden of drug related arrests and criminal proceedings resulting in low rates of convictions is similar to the results of our estimates, where the costs for police and justice are much higher than those for prisons. Poland's "zero tolerance" approach to drug use, even if supported by the promise for treatment instead of prison, appears to result in a high number of drug users being processed through the criminal justice system, with very few actually going to jail or being able to access treatment. These results could be interpreted in light of the additional findings of the Szczecin Report, illustrated below.

Szczecin offers an interesting example, in this context, being the largest industrial and shipping port in the Baltic Sea, with more than 400,000 inhabitants and known for having one of the highest unemployment rates in Poland at 25.6%, much higher than the national 17.6% average.

The rapid assessment was meant to understand the practical policy implementation of the legislative framework in a metropolitan and rural environment. The research team found a serious epidemic of intravenous amphetamine use among young people and increased rates of HIV and HCV infections. Rural drug use posed even more challenges, due to very limited access to harm reduction and medical facilities and to the barriers to treatment posed by the need to be resident in the city. Paradoxically, being apprehended for a drug offence turned out to be a barrier to accessing treatment. Although the Act specifically included provisions for suspension of proceedings or penalties for drug users willing to undergo treatment, in reality, judges and prosecutors were found to rarely apply the alternative measures and together with the law enforcement authorities, they were not aware of the treatment options available in their territory. Insufficient knowledge of the scale of the drug problem in their territory and of the medical and social support facilities available, little knowledge of drug use and addiction issues and no access to experts to aid them in handling cases, as well as limited and under-resourced therapy options were some of the factors influencing decisions of the courts and prosecutors in diverting drug users to treatment. Other issues were related to the need to quickly close proceedings, unwillingness to take responsibility for an offender ability to succeed in treatment and misconception about prison as a place for promoting abstinence.

As regard to the prison system, drug dealing was reported to be common, with relatives and friends providing supplies during visits. Prisons were also places of drug career initiations, with many persons

actually becoming addicted while in prison. Drug treatment offer was very limited and the time for enrollment could be very long. Harm reduction tools were not available in prison settings, and discussion on risky behaviours was taboo among inmates. Junkies are low in the prison hierarchy and disclosing an HIV positive status may expose to violence and isolation.

With regard to access to justice, the report found that defendants in drug possession cases did not have the necessary level of representation to which they were entitled by public attorneys and in fact sometimes they complained about the fact that public defence attorneys were making their cases worse or not providing effective legal advice.

The report makes a number of recommendations in order to increase consistency between the provisions of the law and the actual policy implementations in Poland, among them, of particular interest for our study are:

a. The need to train judges, prosecutors and defense attorneys, explaining the drug problem and detailing the various options and expert advice that can be put at their disposal during proceedings;
b. Create more synergies between the criminal justice system, public health staff and civil society organizations, in order to increase access to treatment and harm minimization tools, create employment opportunities and social rehabilitation for drug users, especially for those serving sentences and increase public debate on drug addiction as a means to raise awareness among the public;
c. Create a database of health, social and drug treatment services to facilitate police and judicial and prosecutorial referrals;
d. Increase access to effective free legal advice and representation.

An amendment to the Act in 2011 introduced wider discretionary powers for prosecutors and judges, to close or not initiate criminal proceedings against those found in possession of small amount of illicit drugs for personal use, if the punishment would be not commensurate to the harmless nature of the offence. Because the results of this report refer to data from 2010-2011, it will be interesting to verify whether the 2011 amendment will produce changes in the distribution of the costs to the criminal justice system, and actually lower the current burden upon the criminal justice system, due to the possible increase in the number of drug users diverted to the healthcare and treatment systems.

Following requests from various international institutions and the support from the European Commission, Poland has, in recent years engaged in important steps toward justice reform, to ameliorate access to justice, diminish the length of legal proceedings, including the length of pre-trial incarceration, as well as to ameliorate prison conditions and overcrowding and increase access to alternatives to prison[109].

In conclusion, the city of Szczecin shows how policy implementation can produce very different results from those provided in laws and regulations and that countries should always carefully consider the unintended consequences of laws and regulations and clearly mandate and directly allocate the necessary resources for the effective harmonization and coordination of public health, law enforcement and social development measures, especially when dealing with vulnerable populations.

[109]Poland has also recently established a National School for prosecutors and judges with a separate budget from the national budget for the criminal justice system. It would be interesting to investigate whether this new institution is offering drug addiction related curricula.

6. Financial crisis, drug and alcohol-related social costs and public expenditure

Economic evaluations have become increasingly important for policy makers and budgetary implications weigh more and more in politicians' policy choices (Horverak 2010). This might particularly be the case in a Europe ridden by financial crisis and tough austerity measures.

It is important to note, however, that policies should be evaluated not only with regard to their costs or cost-benefits, but also to their overall impact on society, in relation to their human rights, public health and overall social implications. The best policy would then be one that not only reduces economic costs, but also other costs such as human rights costs and public health costs, and which reduces social marginalization and inequality.

This report looks into the relation between economic costs to criminal justice systems and the drug policies and interventions in European countries. Its aim is to take a step beyond merely economic and budgetary considerations in order to look at such issues in a holistic, societal perspective.

The financial crisis has a proven impact on the worsening of mental health including depression and suicides, and often results in more harmful use of alcohol and illegal drugs. Evidence from the US suggests that overall alcohol consumption declines during recession, however, financial crises are expected to lead to higher levels of harmful alcohol consumption and more frequent binge drinking (Bor*et al*. 2013, Wahlbeck&Awolin 2009). Alcohol consumption is in turn negatively associated with population mental health in most parts of Europe, and also an important factor for increasing suicide rates (WHO 2011, Christodoulou & Christodoulou 2013). The financial crisis seems to also have had negative impacts on illicit drug use in Europe. On the one hand, there has been a shift in patterns of drug use which sometimes results in higher risk of harm, and, on the other, the likelihood of unsafe injection practices and subsequent infection of HIV and hepatitis C has increased due to a reduction of coverage of harm reduction services (UNODC 2014: x). A European study from 2013 mandated by the European Commission, assesses that more young people are expected to sell or produce drugs to make money[110]. In general, economic crises tend to exacerbate social exclusion of the most vulnerable groups (WHO 2011).

At the same time as the situation of drug and alcohol use worsens, financial crisis and austerity measures lead to cuts in drug policy budgets. In 2011 EMCDDA reported that out of the 19 countries which had provided information through the Reitox national focal points, 15 reported reductions in drug policy budgets since 2008, with reductions ranging from 2% to 44% (EMCDDA 2011a: 22). For labeled expenditure the most severe cuts were related to research, prevention, social reintegration and organizational activities, while unlabeled expenditure was unavailable for most countries. In 2012 EMCDDA reported cuts in labeled expenditure in six countries; UK (5% reduction in 2010/11 from the previous year), Estonia (3% reduction from 2009 to 2010 and 54% compared with 2008), Ireland (3% reduction from 2009 to 2010), Hungary (25% reduction from 2009 to 2010), Croatia (10% reduction from 2009 to 2010) and the Czech Republic (reduction in funds for treatment and harm reduction despite overall increase in expenditure in 2010) (EMCDDA 2012: 24). The EMCDDA concluded that the nature and severity of the impact of the financial crisis on drug budgets varied considerably by country. While EMCDDA in 2013 reported Latvia, Lithuania and Estonia to be the countries with largest reductions in public expenditure on drugs (EMCDDA 2013: 63), in 2014 it noted an overall reduction in drug-related expenditures. Although supply reduction makes out a generally larger share of drug-related expenditure than demand reduction, and cuts in expenditures were experienced by both 'sectors', greater overall reductions were observed in the health sector than in the justice sector between 2009 and 2011 (EMCDDA 2014b: 70). Cuts were also reported for drug-related programmes and services, prevention and research. According to EMCDDA, the attempts at ring-fencing the financing of drug treatment was not always successful (Ibid.).

[110] http://europa.eu/rapid/press-release_IP-13-220_en.htm

As regards the countries which were object of this study, the economic crisis has posed a number of challenges to the full implementation of the reform in Portugal, where the Commissions for the Dissuasion from Drug Addiction, which were the policy key strategic elements ensuring the diversion of drug addicts from the criminal justice to the treatment systems were reported to be from underfunded to being non operational for different periods of times (instituto da Droga e da Toxodependencia, 2009); the positive trend of decreasing prison population was substituted, after 2008, by a growing trend which is currently set at 20% prison overcapacity (Prison Observatory, 2014). On a positive note, notwithstanding a steady reduction in medical personnel and health and treatment offers, Portugal has nonetheless continued to transfer responsibility for prison healthcare from the penitentiary system to the national health system.

The economic crisis in 2008 affected the Polish criminal justice system especially with regard to the prison sector. Over the years 2008 - 2012 the prison population decreased from 85.920 inmates to 84.399, with however an increase in recorded prison capacity. The economic crisis affected primarily allocation of resources aimed to improving the living conditions of prisoners. Some of the investments were delayed or even canceled, with cuts by 175 million euros, between 2008 and 2012. Significant reductions were recorded in post-penitentiary assistance, with budgets falling from over 3.8 million euro to only 1.95 million in 2012. As a consequence, the number of employed prisoners decreased by more than half in the same period (from 20.083 in 2008 to 9.426 in 2012).

The economic crisis is heavily influencing also the Spanish criminal justice system, with cuts in the availability of treatment options for prisoners and increasing sentences providing for the immediate expulsion of foreign citizens charged with drug offences and suspensions of the execution of penalties.

These negative prospects lead us to the important question of how the right to highest attainable standard of physical and mental health can be safeguarded and protected during economic recession. Times of crisis might make policy-makers particularly prone to economic analyses of costs and expenditures, and could make cost-benefit studies a principal driver for resource allocation. This study, which samples specific costs in the criminal justice chain, aims to provide policy makers with knowledge and tools on how economic costs and public expenditure could be reduced at the same time as fundamental human rights are safeguarded.

7. Final recommendations for drug policies which could reduce criminal justice costs

The impact of drug use cannot be circumscribed only to the individual user and the consequences of licit and illicit drug use have repercussions at all levels of society, in terms of social, health and criminal justice costs. These costs cannot be easily quantified nor compared, due to the differences in the level of the countries' social development and economic wealth. In addition, different types of costs should be included in a more thorough analysis. These include direct but also indirect costs, such as tax revenues which are invested to support treatment of drug use within national health systems, or to fight drug related crimes against public property, which are included within non-earmarked policing costs.

One of the most relevant costs connected to illegal drug use is represented by supply reduction operations and the fight against organized crime drug trafficking. This aspect is also not easily quantifiable. Illicit drug markets represent a cost not only in terms of public security and social and economic development, but also in terms of the health and social costs paid by governments for the care and rehabilitation of people who use drugs and the resources invested in prevention and social assistance. The immense financial resources from the illicit drug trafficking, which are laundered into the legal and illegal economic systems and frequently invested in other criminal activities, are managed completely separate from the fiscal system of States and represent a dark economy playing a significant role in the political instability, social

violence and underdevelopment of large regions of the world, including the direct relationship established between drug trafficking and the fueling of insurgent and terrorist groups[111].

More and more countries recognize the importance of increasing access to health services and treatment for drug users, and the United Nations and its specialized agencies have been very active in advocating the need to adopt measures to avoid processing drug users through the criminal justice system[112] and support interventions to decrease the impact of such processing on the health and safety of drug users and to reduce the social stigma connected to it[113]. The integration of harm reduction and drug treatment programmes into the criminal justice systems have also been advocated, as well as the need to shift responsibility for prisoners' health care from the criminal justice environment, to the national health systems. Prevention and treatment on the one side and reducing the health and social consequences of drug use on the other has also been extensively advocated through the United Nations and its specialized agencies to its Member States[114].

According to a NIDA study (2006), pharmacological treatment of drug users can reduce substance use and related criminal activity by 40-60% and increase employment opportunities by 40%. Treatment of drug dependence can dramatically reduce health and social costs and has been found to be far less expensive than criminal justice interventions. In the US, the average cost for a one year methadone treatment was calculated to be $4,700 per patient, as opposed to a one year imprisonment cost which amount to $18,400. According to NIDA, for each dollar invested in treatment, there is a saving of 7 dollars, mostly saved in drug-related crime prevention and control.

EU Member states have addressed their drug policy in different ways, but the main point of the debate remains how to deal with personal consumption. While the prevailing approach is still to place drug use inside a criminal justice perspective, some States are increasingly moving towards a heath oriented view of their drug policies, especially in the case of cannabis: "a general trend in Europe has been to move away from criminal justice responses to the possession and use of small amounts of cannabis and towards approaches oriented towards prevention or treatment."[115] This trend, however, should not be considered as a sign of relaxation of the drug laws in Europe, but rather as an effort towards the formulation of good policies and practices to diminish the weight of the sanctions around personal use, and not to legalize it.

Within this framework, the apparently controversial debate between prevention and treatment on the one hand, and reducing the health and social consequences of drug use on the other has been overcome by the approach that sees "harm reduction as a part of a comprehensive package of demand reduction measures, that has become explicit in many EU Member states, with the adoption and broadening of opioid substitution programmes and needle and syringe exchange programmes"[116].

Article 25 of the *Universal Declaration on Human Rights*, includes health as a basic human right. Also in drug control, protection of human rights has to remain at the forefront of the governments' agenda. Governments that are parties to the UN Drug Conventions have a responsibility to ensure that their

[111]UNODC, *Transnational organized crime in Central America and the Caribbean. A threat assessment*, September 2012;

[112]UNODC, *Making drug control 'fit for purpose': Building on the UNGASS decade.* Report by the Executive Director of the United Nations Office on Drugs and Crime as a contribution to the review of the twentieth special session of the General Assembly, 7 March 2008

[113]UNODC/WHO, *Principles of drug dependence treatment.* Discussion paper, March 2008, UNODC, From coercion to cohesion: treating drug dependence through health care, not punishment, Discussion Paper, 2009

[114]UNODC, *Reducing the adverse health and social consequences of drug abuse: a comprehensive approach*. Discussion paper, November 2009; UNODC, *Turning the HIV tide for people who use drugs. Exclusion is not an option*, February 2013;

[115] Annual ReportEMCDDA, 2007

[116]Ibid.

legislative instruments and their policy implementation remain enshrined in a human rights framework and should never forfeit their obligation to protect the health and well being of their citizens, through proper funding of services and regular evaluation of the results of policy implementation.

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