

THE ECONOMIC BURDEN OF ALCOHOL CONSUMPTION IN THE CZECH REPUBLIC

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Introduction

Excessive use of alcohol is one of the main risk factors for population health worldwide. According to the World Health Organization (WHO), excessive alcohol consumption was responsible for about three million deaths (5.3% of all deaths) worldwide in 2016¹. Alcohol increases the risk of more than 200 diseases, leading to high associated costs, shorter life expectancy, and lower quality of patients' life. As it turns out, the health risk of alcohol usage is even higher than expected in the past, and no amount of consumed alcohol is safe². Not only that, alcohol impairs health, but it also affects a large number of other domains in everyday life, representing a significant economic burden to the whole society in the form of, e.g., traffic accidents, impaired work productivity, law enforcement or premature deaths.

The alcohol consumption in the Czech Republic (CZ) is among the highest in the European Union (EU) (Figure 1).

The average level of alcohol consumption is thus oscillating around 12 liters per capita over time, i.e., ≈32 grams of pure alcohol per capita per day, including infants and non-drinkers. Besides a considerable number of daily drinkers, the problem is also a one-time excessive consumption, i.e., "binge drinking", that can cause brain damage and generate other serious costs. Although excessive alcohol consumption is a severe societal problem in CZ, only one cost study³ has been published so far. Moreover, local scientific publications about alcohol health complications or other related issues are rather rare, and there is a serious lack of relevant data.

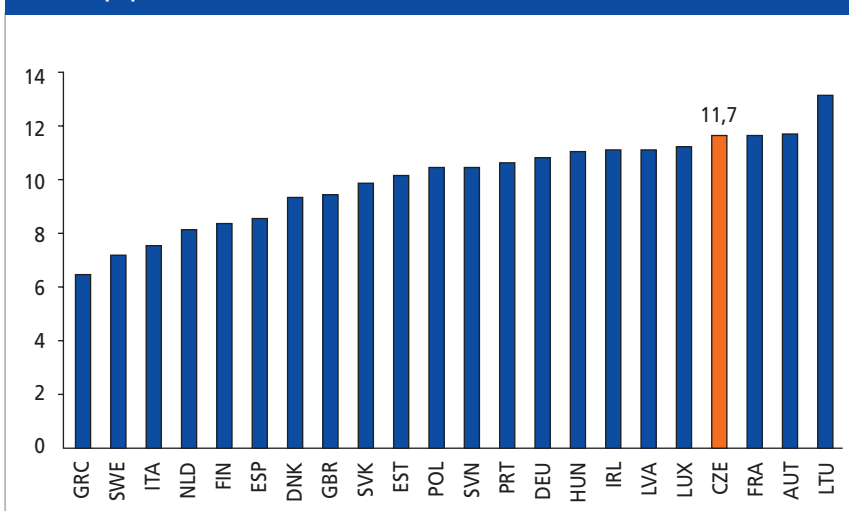
Table 1. Absolute value of estimated costs of alcohol consumption in CZ in 2016

Item	Estimated Costs
Alcohol consumption – total	€ 2 203 198 372
Direct costs	
1) Health costs	
Health costs – total	€ 499 910 653
Primary care	
Alcohol dependence syndrome	€ 62 369 403
Secondary care	
Nonspecific liver disease	€ 133 091 644
Hypertension	€ 52 609 545
Alcoholic liver disease	€ 50 158 722
Chronic pancreatitis	€ 45 840 560
Alcohol intoxication	€ 44 863 763
Colorectal cancer	€ 32 109 037
Alcohol related psychosis	€ 31 939 446
Breast cancer	€ 22 041 389
Alcohol-induced pancreatitis	€ 12 322 291
Supraventricular tachycardia	€ 3 149 047
Portal hypertension	€ 2 701 188
Alcoholic polyneuropathy	€ 1 939 405
Alcohol-related neurodegeneration	€ 1 462 629
Gastrointestinal bleeding	€ 887 351
Alcoholic gastritis	€ 705 028
Acute pancreatitis	€ 633 305
Oropharyngeal cancer	€ 621 630
Alcoholic cardiomyopathy	€ 280 489
Alcoholic myopathy	€ 83 972
Esophageal varices	€ 44 675
Liver cancer	€ 28 734
Alcohol effects on the fetus and newborn	€ 9 245
Esophageal cancer	€ 9 196
Fetal alcohol syndrome	€ 7 550
Laryngeal cancer	€ 1 408
2) Accidents	
Health injuries	€ 9 938 677
3) Criminal activity	
Criminal activity – total	€ 245 685 381
Material damages	€ 3 165 015
Law enforcement – imprisonment	€ 32 596 745
Law enforcement – police, justice	€ 209 923 621
4) Other costs	
Prevention of alcoholism	€ 28 777 876
Administration of consumption tax	€ 3 563 500
Administration of insured events	€ 1 718 210
Indirect costs	
1) Work productivity loss	
Work productivity loss – total	€ 947 595 369
Work productivity loss – at workplace	€ 913 139 037
Work productivity loss – imprisonment	€ 34 456 332
2) Premature deaths	
Premature death – total	€ 257 366 464
Criminal activity	€ 41 935 763
Premature deaths (general)	€ 215 781 210
Direct & Indirect costs	
Traffic accidents	€ 170 035 257
Fire losses	€ 38 256 476
Social transfers	
Social transfers – total	€ 10 978 225
Disability pension	€ 1 462 159
Sickness benefit	€ 3 789 115
Foster care	€ 5 726 951

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Figure 1. Total alcohol consumption per capita in EU (2016, in liters), population 15+¹⁵



Objectives

The objective of the study was to assess **the societal cost of alcohol consumption** in the Czech Republic in 2016 and open the public debate about alcohol harmfulness and its costs. Although alcohol is readily available and widely tolerated in the CZ, society is not able to resolve all the negative consequences of consumption and fulfill unmet needs in the treatment of alcohol-dependent patients.

Therefore, all the main cost components were identified and estimated using the established methodology for cost studies⁴. On the other hand, alcohol consumption and production bring several benefits to society, as it is a productive activity and an important economic sector. Nevertheless, assessing the benefits was not the purpose of our study.

Methods

• Due to data availability, the base year of our analysis was set to 2016. In order to quantify all costs that are associated with alcohol use, they were classified into two major classes, i) direct and ii) indirect (mainly productivity losses). In each category, we identified the main cost items and consequently searched for and collected local data from public sources. In case of missing publicly available data, we either requested non-public data sources or obtained estimates from published international peer-reviewed studies. We used one of two standard approaches to the cost estimation ("top-down" or "bottom-up")⁴, considering the nature of data sources. Productivity loss of alcohol consumption was estimated using the human capital approach (HCA)⁴ and approximated by super-gross wage (i.e., wage including all payable taxes and insurance premiums) as it reflects the real cost of work.

• Concerning health costs, in total, the top 26 alcohol-related diagnoses were identified⁵ and matched with unique local cost data provided by the second-largest health insurance fund (1,307,000 insured clients, i.e., 12.5 % of the population in the CZ). Consequently, cost data were adjusted according to the respective alcohol-attributable fractions (AAF) that were found in the literature^{5,6}. In order to prevent double counting of reported health care, the estimates were adjusted for the standardly provided treatment by deducing the average costs of an insured patient.

• The National Health Information System (UZIS) registers the total number of health injuries (e.g., a broken leg). The ratio of alcohol-related injuries was established based on Czech research⁷ of the National Institute of Public Health (SZU). The costs of injuries were calculated using the official list of reimbursed procedures published by the General health insurance fund (VZP).

• Data on alcohol-related traffic accidents were taken from the official CZ police statistics and stratified into four categories: accidents with i) material damage only, ii) light injury, iii) serious injury, and iv) fatality. Societal costs of events in each category were evaluated based on the combination of average reported material damage and productivity losses by HCA. Fire losses were assessed using the same methodology, using occurrence statistics from the Czech Fire Brigade.

• Direct costs of criminal activity induced by alcohol consumption consist of reported material damage and costs on law enforcement (including imprisonment costs and police and justice operation). The latter was estimated using the ratio of criminal acts that were committed under the influence of alcohol as AAF.

• One of the main indirect costs is impaired work productivity induced by alcohol, which can be further classified as absenteeism and presenteeism. First, the number of workers with hazardous or harmful consumption was identified based on the Czech Statistical Office (CZSO) data. Second, the attributable productivity loss was estimated based on Odlaug (2016)⁸, best practices recommended by WHO⁹ and HCA methodology⁴. Costs of lost work productivity due to imprisonment were also taken into account.

• The number of premature deaths invoked by alcohol usage was established based on the CSO and WHO data. The probability of premature death was estimated based on German study¹⁰ (similar, slightly lower alcohol consumption) and adjusted to higher Czech general mortality; excessive alcohol consumption led to 6.8 (men) and 7.0 years (women) shorter life expectancy. The respective costs were estimated by following the Supreme Court of the Czech Republic methodology. The indirect costs of violent crimes leading to health impairment and deaths were calculated similarly, assuming that the society appreciates a human life equally, no matter whether a person is in a productive age or not.

• The costs related to alcoholism prevention were estimated as AAF from the whole anti-drug prevention policy. Finally, costs of Customs Administration on alcohol consumption tax and administrative costs of insurance companies on insured event coverage were calculated using local publicly available data.

• Selected transfer payments were calculated from the Czech Social Care Administration (CSSZ) data (disability pensions, sickness benefits) and local research¹¹ combined with the Ministry of Education, Youth and Sports data (foster care). Transfer payments, in line with cost study methodology⁴, were not counted in total costs.

Results

The total societal costs of alcohol consumption were calculated to be **€2,203 million in 2016**, i.e., 1.2% gross domestic product (GDP), and their structure is reflected in **Figure 2**.

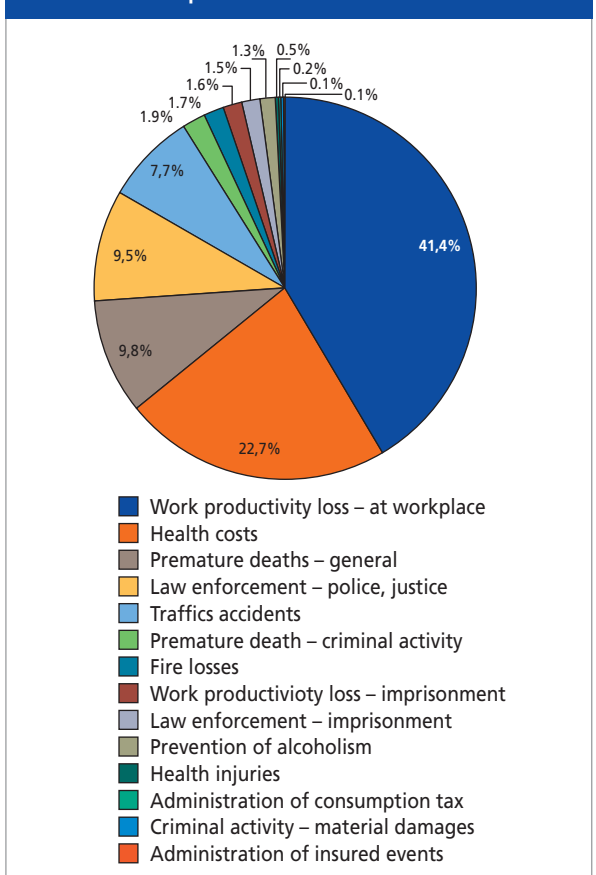
- The main cost item was productivity loss (absenteeism, presenteeism) at the workplace, which was estimated to **€948 million**, reflecting 41.4% of the overall costs.
- The second-largest item were health-related costs attributable to alcohol. These were calculated to **€500 million** (i.e., 22.7%), driven mainly by liver disease and alcohol dependence syndrome but also by high blood pressure or breast cancer.
- Premature deaths brought an economic burden of **€216 million** (9.8%), which is comparable to the costs of law enforcement at the level of **€210 million** (9.6%).
- Other significant costs of alcohol use represented by traffic accidents were estimated to be worth **€170 million** (7.7%).

On the other hand, the other cost items were comparatively minor. Indirect costs of health impairment due to the criminal activity were estimated to €42 million (1.9%), and fire losses amounted to €38 million (1.7%). Productivity loss due to imprisonment was estimated to €34 million, reflecting 1.6% of the overall costs, while the costs of imprisonment itself were €33 million (1.5%). The costs of alcoholism prevention were about €29 million (1.3%), and the costs of injuries amounted to €10 million (0.5%). Administration of alcohol consumption tax cost €4 million (0.2%), material losses due to the criminal activity were estimated to €3 million (0.1%), and the administration of insured events cost €2 million (0.1%).

Selected social transfer payments were estimated to €11 million in total, i.e., i) €1.5 million (disability pensions), ii) €3.8 million (sickness benefits), and iii) €5.7 million (foster care).

The **full report** of this study, including detailed results, was published online¹².

Figure 2. Distribution of estimated costs of alcohol consumption in CZ in 2016



Conclusions

Alcohol consumption in CZ constitutes a significant economic burden to the whole society as the overall costs in 2016 were estimated to €2,203 million (1.2% GDP), which is in line with other published studies^{5,13,14}. **The highest costs were work productivity losses, health-related costs, premature deaths, and law enforcement costs.** Nevertheless, there are still a considerable number of other cost items that could not be included in the calculation, as the relevant data sources virtually do not exist. Therefore, the estimated costs should be interpreted with appropriate discussion, representing an estimate or interval range instead of the exact result. As a consequence, the total **economic burden will be likely higher** as there was still a lot of missing data. Importantly, the study might serve as solid evidence for health policy making and contribute to the public discussion about the harmfulness of addictive substances.

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