Social Context of Alcohol-Related Mortality in Czechia[1]

Extended abstract submitted to the EPC 2020

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Abstract

Background: Alcohol consumption in the Czech Republic is among the highest in Europe. Long-term tolerance to alcohol both in cultural and political environment resulted in unfavourable trend of increasing alcohol-related mortality in both sexes. Routine vital statistics capture the alcohol burden only partially, through the so-called direct effects of alcohol. Epidemiological studies however pointed at indirect effects of alcohol in many other medical conditions (accidents, violence, hypertension, ischemic heart disease, neoplasms). Alcohol-related harm is also unequally distributed, with disadvantaged population groups (low educated, non-married, rural) being at highest risk. **Aims**: We aim at detecting alcohol-related deaths using the extended information from the multiple causes of death. This estimate of alcohol related harm is then subject to analysis of socioeconomic differentials. **Data:** We are using 1-year follow-up of individual death records linked to Census 2011 and area-based deprivation indices derived from various information sources. **Methods:** Mortality rate ratios for alcohol related deaths are estimated using a Poisson regression model. We are measuring the effects of both individual and area-based deprivation. **Discussion:** The results represent the first estimates of alcohol-related mortality differentials in Czechia based on validated information about education and making advantage of multiple causes of death.

Introduction

The alcohol consumption in the Czech Republic is among the highest in Europe, ranging from 10 to 15 litres (of pure ethanol) per capita yearly (depending on the unknown volume of unrecorded sales). At the same time, alcohol consumption is rather well supported by political authorities: alcohol is being largely advertised in media, excise taxes are among the lowest in Europe, alcohol is easily available for adolescents, etc. With the exception of a short-lived anti-alcohol campaign in the late 1980s, inspired by the ongoing Gorbachev anti-alcohol campaign in Russia (Kubička et al. 1998), very few public health efforts were adopted to control the alcohol-related attitudes. Alcohol consumption has increased steadily since 1960s, peaked in 2007 and decreased since then for beer and spirits. Since 2004, when the Czech Republic joined the European Union and abolished import taxes on alcohol, consumption increased significantly for wine, supported by better availability of cheaper foreign wine. As a result of favorable cultural and political attitudes to alcohol and long-term increasing trends in consumption, the Czech Republic is currently experiencing an increasing trend in alcohol-related mortality. This increase contrasts with the general view of mortality as uniformly improving process, and represents a serious public health issue. International trends in mortality from two major alcohol-related disorders are presented in Figure 1.

Figure 1. Age-standardized death rates per 100,000 from major alcohol-related disorders in 16 countries, both sexes combined

Age-standardized death rates per 1,000,000. EUROSTAT standard population 2013
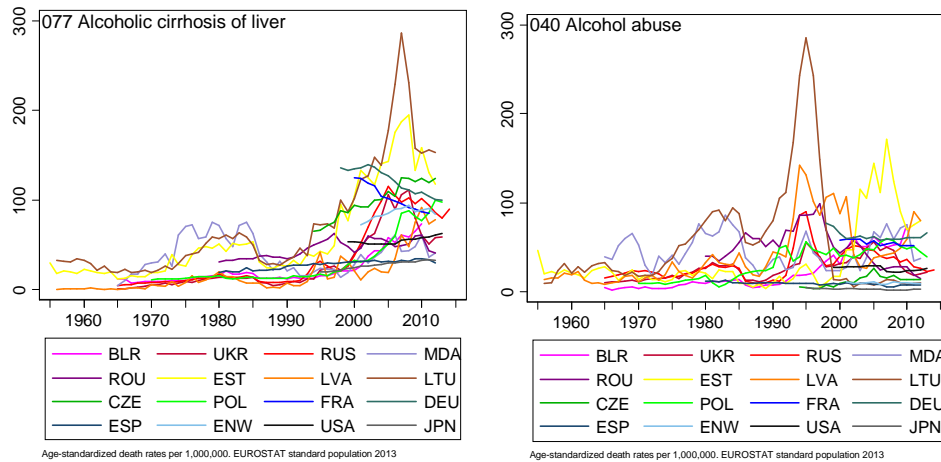
Source: Human cause of death database (www.causeofdeath.org)

Alcohol is a well acknowledged risk factor in the aetiology of numerous medical conditions. Alcohol effects on health can be roughly categorized as acute/chronic, or direct/indirect. Alcoholic poisoning is the most prominent acute direct cause, while acute indirect effects include traffic accidents, falls, drowning, violence and suicides (Rehm et al. 2004). A major direct chronic effect of long-term alcohol consumption is the onset of liver cirrhosis, with a 10-20 years needed to develop into a fatal stage. Strong indirect links were found for circulatory diseases: ischemic heart disease, cardiomyopathy, hypertension and cerebrovascular diseases (Lucas et al. 2005). Chronic abuse of alcohol also increases mortality in several cancer types (cancer of oral cavity, cancer of oesophagus, breast cancer, colorectal cancer, liver cancer) (Allen et al. 2009, Nelson et al. 2013).

As alcohol is implicated both in chronic and acute mortality risk, mortality trends in alcohol-related causes reflect both the episodes of socioeconomic crises (accompanied usually by worsening situation of previously disadvantaged population groups with higher prevalence of heavy drinking [Herttua et al. 2007]), and the long-term consumption patterns. In countries where heavy episodic drinking is highly prevalent (typically central and eastern Europe), alcohol-related mortality is highly sensitive to period conditions (economic situation, prohibition etc.). Most of the evidence of period alcohol mortality fluctuations comes from Russia (Leon et al. 1997, 2009, McKee et al. 2001), but strong increase in alcohol-related was mortality also observed in Eastern Germany at the time of reunification, possibly as an immediate reaction to political uncertainty and better availability of alcohol (Grigoriev and Pechholdová, 2017). Recent increase in alcoholic liver cirrhosis has been however observed in many western countries where the consumption patterns are rather moderate (Baker and Rooney 2003). Some (few) of the studies have extended the analysis on multiple (contributory) causes of death (Herttua et al. 2007) as a more complex estimate of the overall burden.

Socioeconomic gradient is particularly pronounced in alcohol-related mortality (Probst et al. 2014), accounting for up to 10% of the overall disparities (Mackenbach et al. 2015). Alcohol is consumed in larger quantities among adult males, among lower educated and non-married, and among rural population. According to Mackenbach at al. (2015), the largest socioeconomic inequalities are currently observed in Eastern Europe and in Nordic countries and tend to increase in time, especially for women (Budhiraja and Landberg 2016). The excess alcohol-related mortality in lower socioeconomic groups is

also the main factor of the recent increase in the inequalities (Mackenbach et al. 2015, Herttua et al. 2007).

Using new data resources, this paper aims at assessing the extent of alcohol-related mortality in Czechia through multiple causes of death and at measuring the socioeconomic gradient and context based on individual census-linked data combined with contextual information at local level.

Data
The dataset is based on individual records from the 2011 Census (10,490,609 records in total) and individual death certificates for one year of follow-up after the Census (107,583 deaths observed within one year after the census). In order to match deaths to census records, a probabilistic record linkage was conducted using a set of seven identifying variables: year of birth, sex, age at census, and citizenship as "and-blocking" variables, and territorial unit (a total of approx. 22,000), adress number and marital status[2] as "or-blocking" variables.[3] The direct linkage based on these seven variables (performed in Stata software) led to 85% of matched death records. Additional rules were applied to deal with data errors such as typographic errors in address numbers and applicable changes in variables (change in marital status, change of address etc.). As a final result, 91.9% of death certificates were linked to the Census. The linkage rate was the highest amongst Czech citizens (92%), while it was considerably lower for foreigners (67%); foreign citizens however only constitute 0.4% of the overall deaths. Regarding age and sex, higher than average shares of unlinked records were observed for male deaths at age 20-60. In case of females, no specific pattern was observed for distribution of unlinked records. Both Census and death records contain four categories of marital status (never-married, married, divorced, widowed). Regarding education, death certificates include 5 categories of education (no education/unknown, primary, vocational, secondary, and tertiary). In Census, education is classified in 16 detailed categories (transposable into death record categories).

For each death certificate, multiple causes of death were available. The alcohol-related deaths were extracted from multiple causes of death as death where alcohol was reported at any stage of the morbid chain or as contributory disease in Part II of the death certificate (i.e. not directly contributing to the death). This approach enables for a better detection of alcohol related harm and also eliminates potential problems with coding practices across regions or social classes.

Contextual indicators of deprivation are then merged to the individual data. As there is no area-deprivation index provided formally, several combinations of deprivation indicators will be tested using multivariate statistical methods.

The regression model
The main analytical tool will be fitting of a Poisson regression model with the following initial design:

$$\ln\left(\mu_i\right) = \ln(E_i) + \beta_0 + \beta_1 age_i + \beta_2(edu/ms)_i + \beta_3(deprivation)_{i,j} \,,$$

Where μ_i are the expected alcohol-related death counts, E_i are population weights, and β_n are regression coefficients for of age, marital status and education of individual *i* and contextual indicator of local deprivation in area *j* where individual *i* lives. The aim of this analysis is to separate the effect of

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[2] Marital status on death certificate matches marital status in Census in 97% of the cases.
[3] The combination of the seven listed variables uniquely indentified 9,702,661 (92.5%) census records and 106,177 (98.7 %) death records.

individual deprivation (represented in the worst combination by being never-married and uneducated) from the potentially residual effect of area deprivation.

References

Allen N.E., Beral V., Casabonne D., Kan S.W., Reeves G.K., Brown A., Green J. (2009) Moderate alcohol intake and cancer incidence in women. Journal of the National Cancer Institute 101 296-305.

Budhiraja M., Landberg J. (2016). Socioeconomic Disparities in Alcohol-Related Mortality in Sweden, 1991-2006: A Register-Based Follow-Up Study. Alcohol Alcohol. 2016, 51(3):307-14.

Grigoriev P., Pechholdová, M. (2017). Health convergence between East and West Germany as reflected in long-term cause-specific mortality trends: To what extent was it due to reunification? European Journal of population.

Herttua, K., Mäkelä, P., Martikainen, P. (2007). Differential trends in alcohol-related mortality: a register-based follow-up study in Finland in 1987–2003. Alcohol Alcohol, 42 (5): 456-464.

Kubička L., Csémy L., Duplinský J., Kozený J. (1998). Czech men's drinking in changing political climates 1983-93: a three-wave longitudinal study. Addiction. 93(8):1219-30.

Leon D.A. (2001). Alcohol - The changing face of a perennial problem (editorial). Int J Epidemiol 30: 653-654.

Leon D.A., Chenet L., Shkolnikov V.M., Zakharov S., Shapiro J., Rakhmanova G., Vassin S., McKee M. (1997). Huge variation in Russian mortality rates 1984-94: artefact, alcohol, or what? The Lancet 350:383-388.

Leon D.A., Shkolnikov V.M., McKee M. (2009). Alcohol and Russian mortality: a continuing crisis. Addiction, 104: 1630-1636

Lucas D.L., Brown, R.A., Wassef, M., Giles, T.D. (2005). Alcohol and the Cardiovascular System: Research Challenges and Opportunities. Journal of the American College of Cardiology. 45(12):1916–1924.

Mackenbach J.P., Stirbu I., Roskam A.-J. R., Schaap M. M., Menvielle G., Leinsalu M., Kunst A. E. (2008). Socioeconomic inequalities in health in 22 European countries. The New England Journal of Medicine, 358(23):2468-2481.

Mackenbach J.P., Kulhánová I., Bopp M., Borrell C., Deboosere P., Kovács K., et al. (2015) Inequalities in Alcohol-Related Mortality in 17 European Countries: A Retrospective Analysis of Mortality Registers. PLoS Med 12(12).

Moore R.M. (1904). On the comparative mortality among lives of abstainers and non-abstainers from alcoholic beverages. Journal of Institute of Actuaries 38: 213-276.

Nelson D.E., Jarman D.W., Rehm J., et al. (2013). Alcohol-Attributable Cancer Deaths and Years of Potential Life Lost in the United States. American Journal of Public Health. 2013;103(4):641-648.Probst C., Roerecke M., Behrendt S., Rehm J. (2014). Socioeconomic differences in alcohol-attributable mortality compared with all-cause mortality: a systematic review and meta-analysis. International Journal of Epidemiology. 2014;43(4):1314-1327.

Rehm J., Room R., Monteiro M., Gmel G., Graham K., Rehn N., Sempos C.T., Frick U., Jernigan D. (2004). Alcohol Use. In Comparative Quantification of Health Risks Global and Regional Burden of Disease Attributable to Selected Major Risk Factors - Volume 1, pp. 959-1109. Eds M Ezzati, AD Lopez, A Rodgers & CJL Murray. Geneva: World Health Organisation. World Health Organization (2004). Global status report: Health policy. Department of Mental Health and Substance Abuse. Geneva.