

Abstract

In this paper, our goal is both to introduce aims and scope of the new research project funded by the Czech Science Foundation (No. 18-17564S; 2018-2020), and to present select results obtained within the preliminary analysis of the Czech mortality data related to licit substance use (tobacco, alcohol).

As the Czech Republic belongs to the countries with high per capita consumption of alcohol and tobacco, and the level of substance use is considered to be influenced by both structural and environmental factors, the primary focus of the project is a detailed evaluation of socio-spatial inequalities of substance-use-related premature mortality of the Czech population.

Project methods

The analysis will be conducted with a detailed spatial resolution at the municipal level. Advanced statistical methods of spatial data analysis will be applied - Bayesian disease mapping (Auchincloss et al. 2012; Besag et al. 1991; Blangiardo et al. 2013; Elliott 2004). Two main data sources will be applied within the project – 1.) Population and Vital statistics and 2.) Population and Housing Census; both administered by the Czech Statistical Office. The project will focus on:

- 1.) mortality related to alcohol and tobacco;
- 2.) social composition of the population living in regions;
- 3.) gender specific differences;
- 4.) spatial-temporal changes after 2000.

The main goal of the project will be the identification of compact micro-regions with a significantly increased mortality risk. Subsequently, the project outcomes will serve for efficient planning of both socially and spatially targeted public health promotion strategies.

In this paper, we aimed to the analysis of temporal changes (1999-2016) of the Czech premature mortality data (age of 25-64) related to both tobacco and alcohol use. Both age-standardised rates and age-specific crude rates (25-64) for both males and females were computed.

Figure 1. The evolution of age-standardised premature mortality (age 25-64) attributable to a) smoking; b) alcohol. European standard population 2013 in the age of 25-64 (per 100,000), Czech Republic, 1999-2016

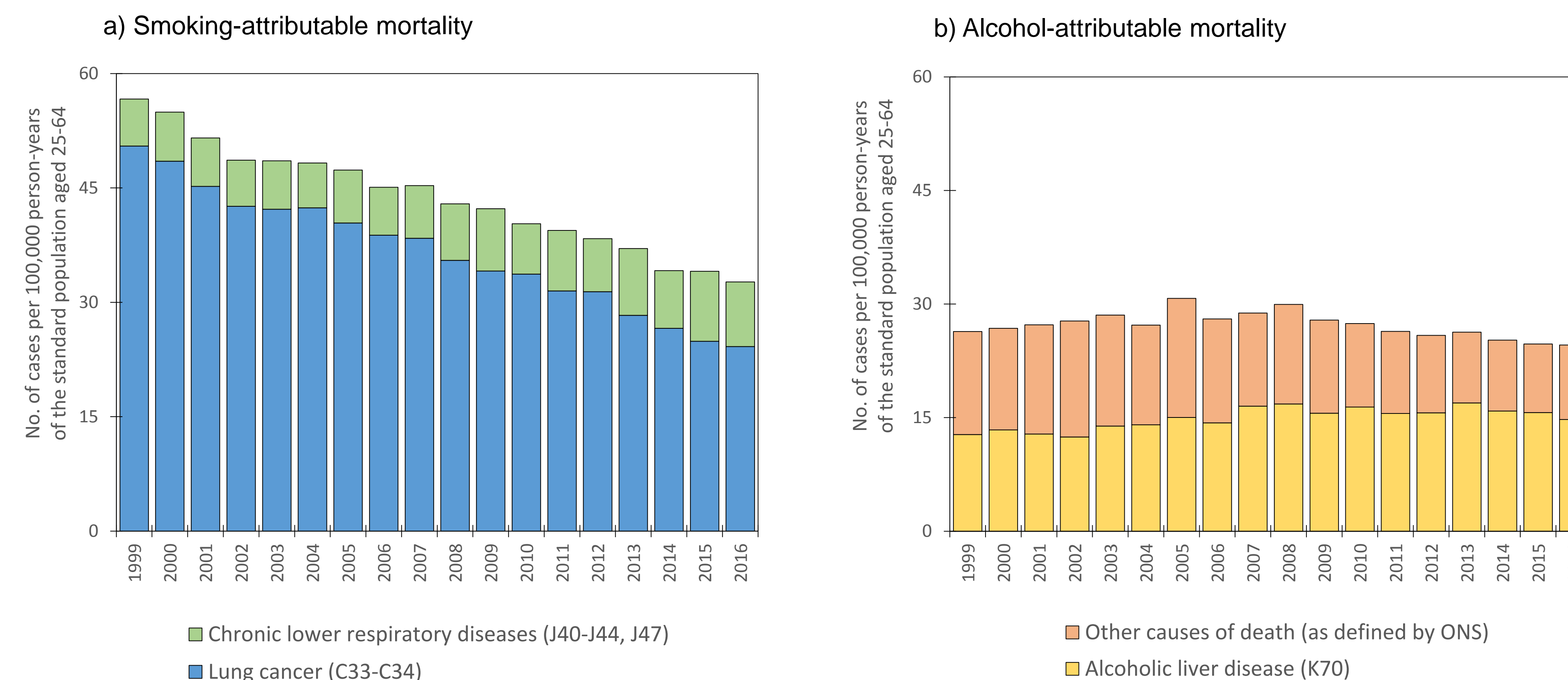
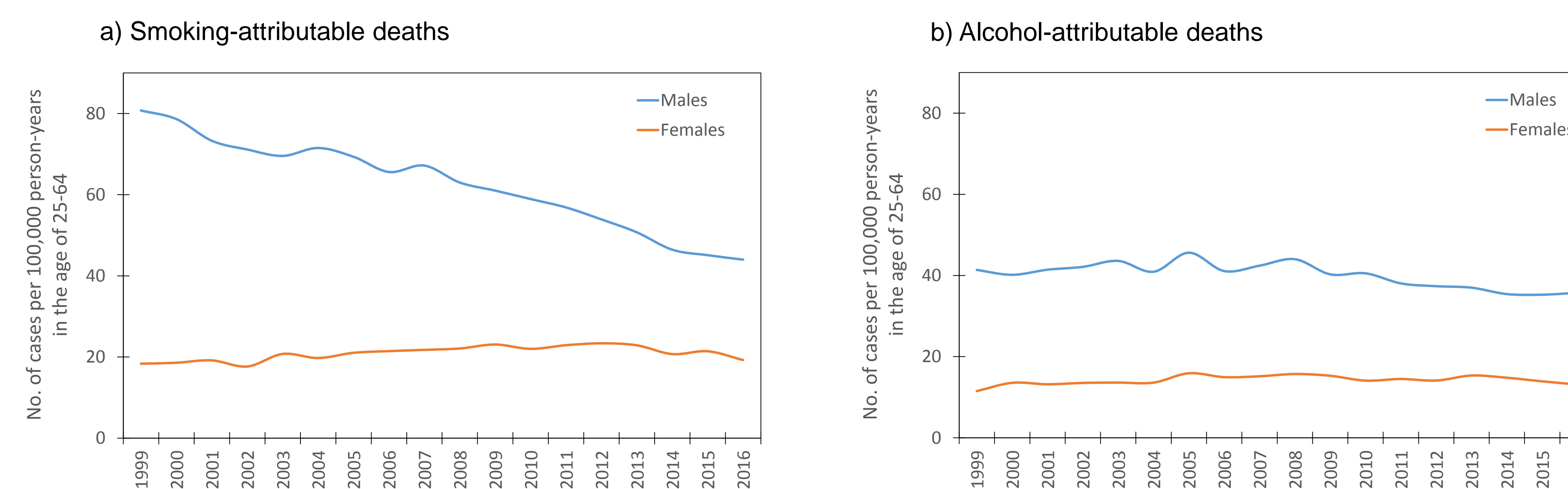


Figure 2. The evolution of premature mortality (age 25-64) attributable to a) smoking; b) alcohol, by gender. Crude rates (per 100,000 in the age of 25-64), Czech Republic, 1999-2016



Smoking-attributable premature deaths (age 25-64), Czech Republic, 1999-2016			Alcohol-attributable premature deaths (age 25-64), Czech Republic, 1999-2016							
Period	Lung cancer (C33-C34)	Chronic lower respiratory diseases (J40-J44, J47)	Total smoking attributable deaths	Period	Alcoholic liver disease (K70)	Chronic hepatitis, fibrosis, cirrhosis of liver (K73, K74 excl. K74.3-K74.5)	Accidental/intentional poisoning by alcohol (X45, X65, Y15)	Mental and behavioural disorders due to use of alcohol (F10)	Other causes of death (G31.2, G62.1, I42.6, K29.2, K86.0)	Total alcohol-attributable deaths
	(1)	(2)	(3) = (1) + (2)		(1)	(2)	(3)	(4)	(5)	(6) = Sum [(1) – (5)]
1999	2 439	289	2 728	1999	705	537	103	53	58	1 456
2000	2 405	312	2 717	2000	750	497	130	71	54	1 502
2001	2 295	315	2 610	2001	726	552	118	78	68	1 542
2002	2 222	311	2 533	2002	712	579	135	92	70	1 588
2003	2 269	341	2 610	2003	804	557	134	132	26	1 653
2004	2 344	324	2 668	2004	823	459	149	142	21	1 594
2005	2 280	392	2 672	2005	889	520	159	219	32	1 819
2006	2 233	361	2 594	2006	853	502	140	158	17	1 670
2007	2 264	410	2 674	2007	992	414	136	159	30	1 731
2008	2 143	446	2 589	2008	1 020	433	149	180	35	1 817
2009	2 072	499	2 571	2009	950	391	202	125	31	1 699
2010	2 069	408	2 477	2010	1 000	363	168	111	30	1 672
2011	1 937	490	2 427	2011	942	340	176	100	41	1 599
2012	1 915	426	2 341	2012	943	278	212	95	32	1 560
2013	1 693	524	2 217	2013	1 016	244	180	92	45	1 577
2014	1 567	449	2 016	2014	949	246	180	88	45	1 508
2015	1 451	539	1 990	2015	933	231	171	98	40	1 473
2016	1 399	489	1 888	2016	876	223	234	86	41	1 460

Source: Czech Statistical Office, own calculations

Source: Czech Statistical Office, own calculations. Alcohol-attributable causes of death as defined by the UK Office for National Statistics

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Preliminary results

As presented in Figure 1a), there were dynamic changes in the rates of smoking-attributable premature mortality since the early 2000s. Age-standardised rates decreased from 56.7×10^{-5} in 1999 to 32.6×10^{-5} in 2016. The decrease was mainly due to a significant drop of mortality on lung cancers (C33-C34; 50.5×10^{-5} in 1999, 24.2×10^{-5} in 2016, i.e. drop by half). Mortality rates on chronic lower respiratory diseases (J40-J44, J47), however, did not drop. There were significant inequalities in smoking-attributable mortality with respect to gender. As the decline of mortality in recent decades was pronounced mainly among males, the between-genders inequalities declined as well. The mortality among males is, however, still more than twice as high as among females (43.9×10^{-5} vs. 19.3×10^{-5} in 2016).

As regards mortality attributable to alcohol, there were no major changes in 2000s; Figure 1b). Due to significant drop of smoking-attributable mortality in recent decades, age-standardised rates of alcohol-attributable premature mortality are now comparable to those attributable to smoking. With respect to gender, rates of alcohol-related deaths are about 2.5 times higher among males as compared to females (35.7×10^{-5} vs. 13.1×10^{-5} in 2016).

Key points

- Project aims:
 - detailed evaluation of socio-spatial inequalities in premature mortality related to alcohol and tobacco use after the year 2000;
 - identification of micro-regions with a significantly higher risk of premature death at the Czech municipal level;
 - making recommendations for prevention.
- Preliminary data analysis:
 - significant improvement of smoking-attributable premature death rates during 1999-2016, particularly among males;
 - relatively stable rates of premature mortality attributable to alcohol in the last decade;
 - significant between-gender inequalities in premature deaths attributable to both tobacco smoking and alcohol use.

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