

ORIGINAL ARTICLE

Comparing Alcohol Mortality in Tsarist and Contemporary Russia: Is the Current Situation Historically Unique?

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Abstract — Aims: This study compared the level of alcohol mortality in tsarist and contemporary Russia. **Methods:** Cross-sectional and annual time-series data from 1870 to 1894, 2008 and 2009 on the mortality rate from deaths due to ‘drunkenness’ were compared for men in the 50 provinces of tsarist ‘European Russia’: an area that today corresponds with the territory occupied by the Baltic countries, Belarus, Moldova, Ukraine and the Russian provinces to the west of the Ural Mountains. **Results:** In 1870–1894, the male death rate from ‘drunkenness’ in the Russian provinces (15.9 per 100,000) was much higher than in the non-Russian provinces. However, the rate recorded in Russia in the contemporary period was even higher—23.3. **Conclusions:** Russia has had high levels of alcohol mortality from at least the late 19th century onwards. While a dangerous drinking pattern and spirits consumption may underpin high alcohol mortality across time, the seemingly much higher levels in the contemporary period seem to be also driven by an unprecedented level of consumption, and also possibly, surrogate alcohol use. This study highlights the urgent need to reduce the level of alcohol consumption among the population in order to reduce high levels of alcohol mortality in contemporary Russia.

INTRODUCTION

Since the collapse of communism and the transition to a free market system, Russia has been experiencing a mortality crisis. The seriousness of this situation can be gauged by the fact that in 2009, life expectancy at birth was lower than it was in 1990 (Rosstat, 2010). It has been argued that alcohol is playing a central role in this rapid deterioration in population health (Leon *et al.*, 2009). Since the second half of the 1990s, its role has become increasingly apparent (Leon *et al.*, 1997). Recent research has suggested that alcohol may be responsible for >30% of all deaths in Russia (Nemtsov, 2005), with this figure being especially high for certain groups such as working-age men (up to age 54), where it has been estimated that between 43% and 59% of all deaths are due to alcohol (Leon *et al.*, 2007; Zaridze *et al.*, 2009a).

In terms of its negative consequences, it has recently been argued that ‘the present magnitude of the alcoholization of society goes far beyond comparison with the magnitude in historical times past’ (Zaigraev, 2010). These thoughts have also been echoed by the Russian authorities in a recent document which has suggested that the current alcohol situation is historically unique in terms of the high volume of alcohol being consumed, while highlighting the comparatively low levels of alcohol consumption in Russia in the past (Obshchestvennaya palata Rossiiskoi Federatsii, 2009). Support for this viewpoint comes from the fact that the current level of per capita alcohol consumption for the adult population aged 15+ is one of the highest in the world (15.7 l of pure alcohol in 2003–2005) (World Health Organization, 2011). Moreover, the current alcohol consumption figure does seem to exceed anything seen in the historical past as the highest recorded figure in tsarist Russia was 6.2 l of pure alcohol per person in the mid-1860s (Nemtsov, 2005).

Other evidence from both the historical and more recent past however, casts doubt on the uniqueness of the alcohol

situation in post-Soviet Russia. Even in the 1970s, rates of mortality from alcohol-specific causes of death such as alcohol poisoning were extreme in Russia in comparative terms (Stickley *et al.*, 2007), while Nemtsov has estimated that in 1984 (on the eve of the anti-alcohol campaign), 31.8% of all deaths (517,000 people) could be attributed to alcohol (Nemtsov, 2002). This high level of mortality also seems to have been underpinned by a high level of consumption as he has estimated that it was in excess of 14 l per capita at this time, i.e. as high as in post-Soviet Russia (Nemtsov, 2002). Historical data from much earlier periods also suggest that the current situation may not be unique. Not only were fluctuations in alcohol consumption in tsarist and Bolshevik Russia associated with rapid changes in mortality in much the same way as they have been in recent years (Stickley *et al.*, 2009), but other practices which may have been important for mortality fluctuations, such as the drinking of surrogate alcohols, also occurred in both the present and the past (Leon *et al.*, 2009; Stickley *et al.*, 2009).

As yet, however, there has been no systematic attempt to compare the impact of alcohol on mortality in the historical past and the present. Therefore, the current study had two specific aims. First, to examine the level of alcohol mortality in the more distant historical past, i.e. in tsarist Russia. Specifically, we wanted to explore if the situation was as favourable in terms of the alcohol environment as has been suggested in recent publications; and secondly, to compare alcohol mortality in the present and the past. In the ongoing debate about whether it is possible to introduce alcohol policy that will help mitigate the current health crisis in Russia (Khaltourina and Korotayev, 2008), understanding the impact of alcohol on health across time may be important for policy in the present—especially as it has been argued that previous attempts to control alcohol consumption and its negative effects on the population’s health in Russia over a

prolonged period of time, have ultimately all been unsuccessful (Levintova, 2007).

METHODS

Data

The data in the present study were drawn from the years 1870–1894 in the earlier period and from 2008 to 2009 in the contemporary period. Alcohol mortality data from tsarist Russia were obtained from four separate official state publications issued by the Central Statistical Committee of the Ministry of Internal Affairs (Ministerstvo Vnutrennikh Del - M.V.D.) between 1882 and 1897 (M.V.D., 1882; 1894; 1897a,b). These contained information on the number of deaths of men and women who had ‘died suddenly from drunkenness’ in 49 provinces of European Russia (an area that today coincides with Russia to the west of the Ural Mountains, Ukraine, Belarus, Moldova and the Baltic states). Data were available for 1213 out of 1225 province years ($1225 = 25 \text{ years} \times 49 \text{ provinces}$).

As no official information is available publically on the number of ‘drunken deaths’ in Russia (i.e. deaths from alcohol poisoning and other non-violent causes in a state of alcoholic intoxication), to compare ‘sudden deaths due to drunkenness’ across time, we used two different sources of data from the modern period. The first related to deaths where the deceased had been in a state of intoxication at the time of death—which we term deaths due to ‘drunkenness’. For this, it was necessary to obtain information on age and cause-specific deaths in a state of alcoholic intoxication for the Russian Federation and its regions. To do this, the authors made use of individual death records that are collected and archived by the Russian State Statistical Service (*Rosstat*). These data were tabulated and subsequently cross-tabulated so that information was available for use about the cause of death by age, sex, year, region, whether the death was certified following an autopsy and if the deceased had been in a state of alcoholic intoxication at the time of death. The same death records were used in a recent publication by Andreev and Zbarskaya (2009). There are no official published instructions concerning the concentration of alcohol in blood that is necessary for a forensic pathologist to determine that a death has occurred in a state of alcohol intoxication. Our consultations with a number of forensic doctors showed however, that this judgment commonly occurs if the concentration of alcohol corresponds to a moderate or heavier level of intoxication ($\geq 1.5\%$). Thus, deaths due to ‘drunkenness’ include all non-violent deaths where the blood ethanol level was likely to have been $\geq 1.5 \text{ mg g}^{-1}$ ethanol. These data were obtained for 2009.

As regards the other countries in the region, for Belarus and Ukraine, the number of ‘sudden deaths due to drunkenness’ was calculated based on information that came in the form of unpublished data from their national statistical offices. These data contain age–sex-specific numbers of ‘sudden deaths due to drunkenness’ from all causes combined and sex-cause specific numbers of ‘sudden deaths due to drunkenness’ for all ages. Apart from Belarus and Ukraine, it was not possible to find similar data for deaths due to ‘drunkenness’ in the other countries located in the geographical area that today comprises the former territory of

the European part of the Russian Empire. Instead, for the year 2008, for the Baltic countries and Moldova, data on the number of deaths by alcohol poisoning were obtained from the World Health Organization’s Mortality Database (WHO-MDB) (World Health Organization, 2010). We present the estimated standardized death rate (SDR) due to drunkenness in 2008 in Estonia, Lithuania, Latvia and Moldova based on their data concerning deaths from alcohol poisoning in 2008 using a linear regression model with a zero intercept calculated by using data on alcohol poisoning and drunkenness mortality in all of Russia’s regions in 2009. The corresponding coefficient of determination was 0.92, the *P*-value was <0.001 , while the slope was equal to 1.268 and its standard error was 0.057. In addition, for purposes of comparison we also obtained data on alcohol poisoning deaths for Finland and Poland in 2008 from the WHO-MDB.

A second measure—deaths due to accidental poisoning by alcohol, was also used for across-time comparisons across the Russian provinces. This was necessary as our historical measure of alcohol mortality refers to deaths specifically due to drunkenness. However, the modern measure refers to any non-violent death where the deceased was classified as being intoxicated but where alcohol might not have been the cause of death. Thus, it is possible that our modern measure of drunken deaths may include a wider range of (non-) alcohol deaths than the earlier measure.

Analysis

To determine the number of deaths from drunkenness in the period from 1870 to 1894, it was necessary to have a population denominator. The Central Statistical Committee published population estimates for the years 1870, 1882, 1883, 1885, 1886 and 1894 (M.V.D. 1882; 1884; 1886a,b; 1890; 1897a). Data for missing years in this period were linearly interpolated using data from the 1897 Census (*Tsentral’nyi Statisticheskii Komitet, 1897–1905*). Comparison of the population estimates with the results from the 1897 Census suggests that after doing this, the population in the Russian provinces may be overestimated while the population for the ‘non-Russian’ provinces may be slightly underestimated.

For the period 1870–1894, it was only possible to calculate crude death rates for men and women. However, when trying to assess across-time differences in the alcohol-mortality relation, it is potentially problematic to compare historical and contemporary crude death rates because of differences in the age structure of the population. To overcome this problem, we used the male age structure from the 1897 Census to standardize the mortality data from the contemporary period. In addition, although it was much less culturally acceptable for women to drink than men in both time periods, there is now some evidence that rates of female alcohol consumption may have been rising in the countries of the former Soviet Union in recent years (Hinote *et al.*, 2009) as witnessed, for example, in Russia, by the falling ratio of male-to-female alcohol poisoning deaths from 1970 onwards (Stickley *et al.*, 2007). Thus, in order to avoid differences due to changes in cultural mores, the analysis was restricted to men in both time periods.

RESULTS

The number of male deaths due to drunkenness per 100,000 of the population in the European part of the Russian Empire in the period 1870–1894 is presented in Table 1. The crude death rate across the period was 10.4 per 100,000 but rates differed both across time and geographical space. Across the whole period, the rate in the Russian provinces (15.9) was roughly six times higher than that in the next highest regional territory, Ukraine. Moreover, while rates in Ukraine, Byelorussia (Belarus) and the ‘Other’ provinces remained unchanged across the period there was a noticeable fall in the Russian rate from 18.8 in 1870–1874 to 12.3 per 100,000 in 1890–1894.

Table 1. The rate of sudden male deaths due to drunkenness in the European part Russian Empire^a in 1870–1894 (per 100,000)

	49 provinces	Russian provinces	Ukrainian provinces	Byelorussian provinces	Other provinces
1870–1894	10.4	15.9	2.7	2.2	1.0
1870–1874	12.3	18.8	2.5	1.9	0.8
1875–1879	10.3	15.7	2.5	2.4	0.9
1880–1884	12.3	19.1	2.7	2.2	1.1
1885–1889	9.6	14.7	2.8	2.3	1.2
1890–1894	8.0	12.3	2.8	2.1	0.9

^aThe European part of the Russia Empire consisted of 50 provinces. Data for one region—the Don Oblast—were not available during this period.

To estimate how male mortality from drunkenness compares in the present and the past, in Fig. 1 male sudden deaths due to drunkenness in the 30 Russian provinces in the European part of the Russian Empire in 1870–1894 are compared with the male SDR from drunkenness and alcohol poisoning in the European part of Russia in 2009. In 2009 the SDR from drunkenness was 23.3 per 100,000 of the population. This rate is almost 50% higher than the average rate across the earlier period ($23.3 > 15.9$), while there were only two provinces whose average rate exceeded this in 1870–1894. However, the rate of drunken deaths in the 30 Russian provinces in 1870–1894 was identical to that of alcohol poisoning mortality in the provinces of the European part of the Russian Federation in the modern period—15.9 cases per 100,000 of the population.

These two differing markers of alcohol mortality in contemporary Russia suggest that alcohol mortality in the modern period is at least as high if not higher than alcohol mortality in the past. However, by using morality estimates from 2009, we might nevertheless be distorting the picture somewhat. This becomes clearer when the time series of the standardized mortality rates of deaths due to drunkenness and alcohol poisoning in the whole of Russia in the period 1988–2009 are presented (Fig. 2). Two things are immediately evident. First, alcohol mortality has fluctuated sharply across the post-Soviet period. Secondly, by using deaths due to drunkenness in Russia’s regions in 2009 (the only data we had available—see below) and comparable data for alcohol

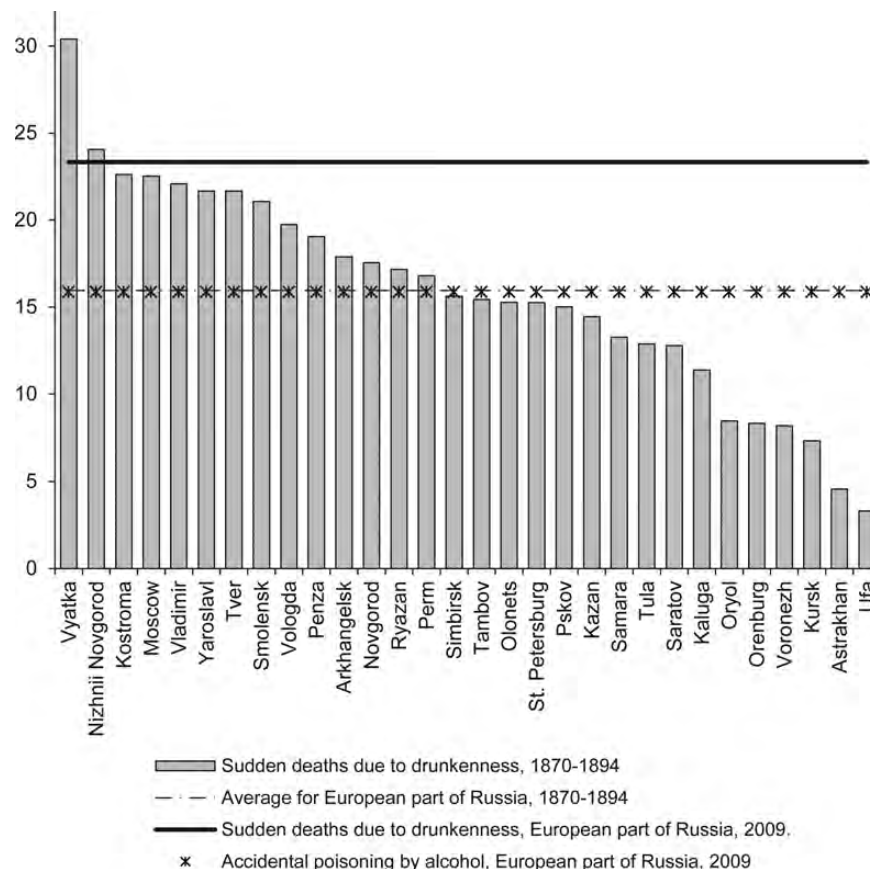


Fig. 1. The rate of sudden male deaths due to drunkenness in the Russian provinces in 1870–1894 and sudden deaths due to drunkenness and from alcohol poisoning in the European part of Russia in 2009 (per 100,000)

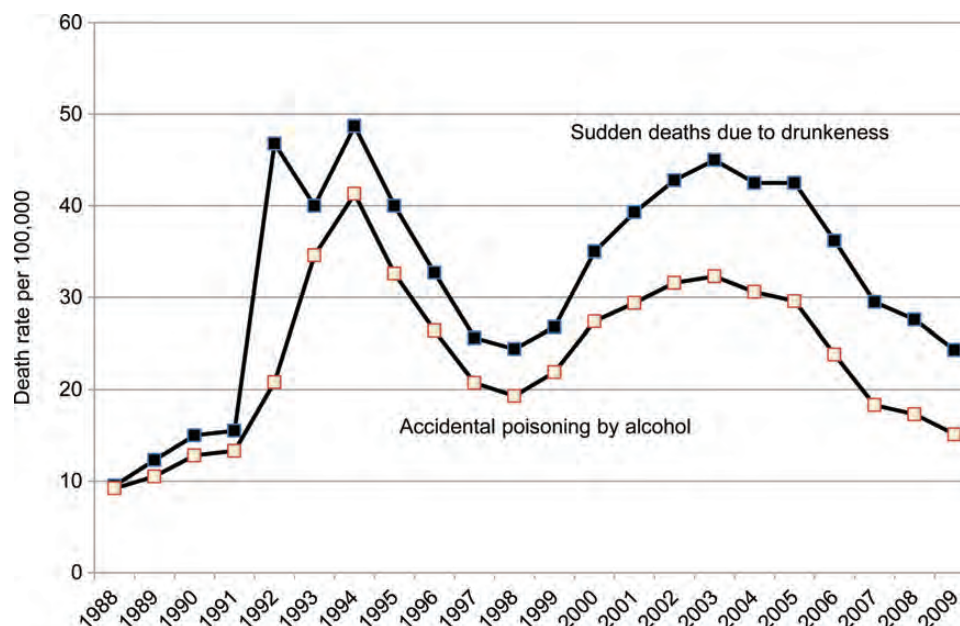


Fig. 2. The rate of sudden male deaths due to drunkenness and alcohol poisoning in the Russian Federation in 1988–2009 (per 100,000)

poisoning deaths, we have chosen one of the lower alcohol mortality points since 1990. Had it been possible to use the average provincial figure for the entire regional time series, then the difference would have been even greater. Thus, when using the 1897 population as the standardizing population, the male alcohol poisoning mortality SDR in the 30 Russian provinces in 1988–2009 was 25.0 per 100,000—well above the figure from 1870 to 1894 (data not shown).

Comparing the data that are presented in Table 1 with the data in Supplementary Table S1 and S2 (i.e. provincial data on alcohol deaths for the territory of tsarist European Russia across both time points), it is immediately evident that the other Slavic countries have either caught up with (Ukraine) or overtaken (Belarus) Russia in terms of their drunken mortality—but that a large difference exists between the Slavic and non-Slavic countries.

In terms of examining the differences in Russia's regions across time, it should be noted that during the 20th century, the administrative division of Russia's territory changed dramatically. However, for the 30 Great Russian provinces in tsarist Russia it is possible to specify the modern region that corresponds approximately with the territory of the former province, has the same capital and in 25 cases of 30 has the same name. Moscow province corresponds with Moscow city and oblast combined, while St. Petersburg province corresponds with St. Petersburg city and Leningrad oblast combined. For these 30 regions Spearman's rank correlation coefficient between crude death rates due to 'drunkenness' in 1870–1894 and SDRs due to 'drunkenness' in 2009 is 0.336 ($P < 0.01$ (2-tailed)). If Moscow is excluded from the calculation, which seems reasonable given the unbelievably low death rate from drunkenness in Moscow city in 2009 (1.8 per 100,000) and reports of the probable misclassification of deaths there (Gavrilova *et al.*, 2008), then Spearman's rank correlation coefficient rises to 0.407. At both time points, deaths are comparatively higher in provinces in the centre and the north and reduce in the south and west. Although

mortality rates fell in several of the provinces (Moscow, Kazan, Kursk, Pskov, Ryazan, St. Petersburg), in the vast majority they rose—in most, quite sharply, with rates in Vladimir and Tula increasing by over five and six times, respectively (Supplementary Table S1). Similarly, for alcohol-poisoning deaths, although rates were lower in eight provinces than those from drunken deaths, with the exception of Moscow and Tatarstan (Kazan) these differences were quite small, whereas much higher rates of mortality from alcohol poisoning were recorded in Arkhangelsk, Kaluga, Oryol, Tver and Yaroslavl compared with their level of drunken deaths in 1870–1894.

DISCUSSION

This study of alcohol mortality in 'European Russia' in the past and present has highlighted how in the late tsarist period, levels of male mortality from drunkenness were high in Russia, while the effects of harmful alcohol use seem to have spread to the other countries in the region across time—especially the Slavic ones. Importantly, by using comparable across-time data from 30 Russian provinces, we have shown that against a background of a moderate degree of continuity in alcohol deaths in the Russian provinces, the overall level of alcohol mortality in the contemporary period is at the very least as high, but probably much higher than it was in the past. Indeed, the fact that we used data from one of the more 'benign' years in the post-Soviet period in terms of alcohol mortality—2009—suggests that alcohol deaths may have been much greater in post-Soviet Russia. The true extent of the excess mortality in the modern period can perhaps be gauged from Fig. 2: only in the years up to 1991 do the levels of drunken mortality accord with that in the period from 1870 to 1894—while for alcohol poisoning, the figures are similar until 1991 and from 2007 onwards. In many of the years however, alcohol poisoning and

drunkenness mortality rates were between two and three times higher than mortality from drunkenness in the 1870–1894 period.

Before discussing the findings of this study it is necessary to discuss its potential limitations. First, as Fig. 2 demonstrates, sharp swings have occurred in alcohol mortality in Russia in recent years caused by events such as the ending of the state monopoly on alcohol sales in the early 1990s. It would have thus been desirable to examine a much longer time series of provincial data as the average death rate due to drunkenness for the whole of the Russian Federation in 1988–2009 was 32.1—double the figure for 1870–1894. However, nationwide individual death records from forensic autopsies were only available for us to use for the most recent period. Secondly, there are also data quality issues. Data from the earlier period consisted of deaths from ‘drunkenness’ which were part of the category ‘sudden and unexpected deaths’. In relation to this, one of the reasons we used both deaths from ‘drunkenness’ and alcohol poisoning for comparison in the modern period was because we were unable to obtain—despite undertaking extensive research—more detailed information about sudden deaths from ‘drunkenness’ in the earlier period, i.e. whether this was a specific classification rubric and whether all alcohol deaths were recorded in it. It is possible that this categorization may have been in accordance with ‘sudden death by intemperance’, which was used in the cause of death classification in England in the second half of the 19th century (Williams, 1996). However, the situation was undoubtedly complex. In much the same way as the cause of death register was evolving in terms of alcohol mortality in England during this period (Williams, 1996) our own research suggests that alcohol deaths were presented using different terms in different publications relating to different locations in late 19th century tsarist Russia (Stickley *et al.*, 2009). Another issue relates to the completeness of alcohol-mortality data from the 19th century. Although all sudden deaths were supposedly subject to autopsy, there is evidence which suggests that far from all alcohol deaths were autopsied (M.V.D., 1891; Rozov, 1869), in part, possibly, because of the low number of doctors (Stickley *et al.*, 2009). This being said, the data we used were from the Central Statistical Committee, which despite their problems, were nevertheless the most comprehensive during this period (Mäkinen, 2006). Moreover, there was a remarkable correspondence between changes in alcohol consumption (sales) and changes in alcohol mortality across the 1870–1894 period (Dmitriev, 1911), which lends some credence to the validity of the earlier data.

It is possible however, that there may also be problems with data from the modern period, as it has been suggested that acute alcohol deaths in Russia are probably being misclassified (Zaridze *et al.*, 2009b). It should also be noted that the regional number of deaths from drunkenness in 2009 was relatively small: in half of the regions the figure was <240. It is thus possible that some part of the interregional difference can be explained simply by random fluctuation. If the number of observations is small, then some peculiarity in the work of a regional forensic bureau (relating for example, to equipment and/or the work experience of experts) might have influenced the results—especially against a backdrop where formal instructions concerning what constitutes a state of alcohol intoxication are absent. Finally, it is also

important to mention that there are a multitude of factors that could have influenced levels of alcohol mortality across the two time points that we had no way of examining. For example, better medical services in the modern period might have helped to reduce the number of alcohol deaths, while a more extensive system of medical registration might have led to more deaths now being registered than in the past. Keeping all of these matters in mind, we would argue that although these data are not unproblematic, they do allow us to gauge the alcohol situation in Russia across the two periods—although this research should be regarded as exploratory in nature, with further research on historical data sources needed—especially as regards elucidating the classification of different forms of alcohol mortality in late 19th century Russia.

The first task of this study was to examine the alcohol situation in late tsarist Russia. In terms of the data presented, a central question becomes, how can the mortality level due to drunkenness in the end of the 19th century in the territory that corresponds with that of the contemporary Russian Federation be evaluated from a modern point of view? Although the rate is 32% lower than deaths from drunkenness in the same area in 2009, a better indicator of the comparative extent of its height can perhaps be gauged by the fact that the average level of 1870–1894 is actually higher than the current rate of drunken deaths in Latvia (by two times), Estonia (by 1.25 times) and is only slightly lower than in Lithuania. Moreover, using comparative alcohol poisoning mortality data from two European countries where vodka is popular and where drunkenness is often considered a problem—Poland and Finland—it can be seen that the earlier rate is 1.5 times higher than in modern Finland (11.2) and more than three times higher than in Poland (4.7). This finding highlights that while the alcohol situation in historical Russia does seem to have been less detrimental than in contemporary Russia in comparative terms, it was nonetheless still extremely serious—as even by today’s standards the level of alcohol mortality was very high.

Although the level of drunken mortality was high in the late tsarist period, the level in post-Soviet Russia seems to have far exceeded it. One possible reason for this difference may be related to the volume of consumption, as recent research has suggested that in most countries, the higher the level of alcohol consumption, the higher the level of total mortality (Norström and Ramstedt, 2005). In the earlier period (in 1885), it was estimated that the per capita consumption figure in Russia was 3.3 l of pure alcohol (M.V.D., 1887). However, this is dwarfed by estimates from the modern period, where one author has suggested that the mean per capita level was 20.9 l in 1990–1998 (Norström, 2011), while a more recent estimate has suggested that per capita male consumption was as high as 35.4 l in 2005 (Solodun *et al.*, 2011).

The effects of extremely high levels of alcohol consumption in the contemporary period may also be being exacerbated by a detrimental drinking pattern that possibly has resulted in high levels of mortality across time. In terms of the ‘riskiness’ of its drinking pattern, the WHO currently gives Russia a ‘5’ score, which indicates that it has the most dangerous drinking pattern in terms of potentially harmful outcomes (World Health Organization, 2011). However, the heavy episodic drinking of alcohol that occurs today was

also commonplace in the past. Indeed, at the end of the 19th century, when trying to explain why the alcohol mortality rate was >60 times higher in the Russian province of Vyakta than in the Baltic states even though more alcohol was consumed in the latter, one author highlighted the much more ‘irregular’ (*neravnomernyi*, i.e. infrequent but heavy) nature of alcohol consumption in Russia, together with the fact that the practice of drinking vodka without food ‘on an empty stomach’, which acted to intensify the danger from consumption, was also widespread in Russia (Nakhimov, 1898).

The high levels of alcohol-related mortality in Russia during the past and present may also underscore the importance of *what* is being drunk. Hard liquor (vodka) was, and continues to be, the drink of choice (Mäkinen and Reitan, 2006; Pomerleau *et al.*, 2005). This is important, as some previous western research suggests that a greater proportion of spirit drinkers may be heavier drinkers (Smart, 1996) and that the heavy episodic drinking of spirits is commonplace in Russia (Pomerleau *et al.*, 2008). As fatal alcohol poisoning seems to be more strongly associated with the consumption of spirits than with other types of beverage (Babor *et al.*, 2010), it is possible that the irregular ‘binge’ drinking of spirits across both points in time may have had an especially detrimental impact in terms of high rates of death due to ‘drunkenness’ in both the past and present. In addition, the high level of unrecorded alcohol consumption in the contemporary period (around one-third of all alcohol)—consisting of illegally produced homemade alcohol (samogon), and legal non-beverage alcohols (e.g. medicinal tinctures), may also be impacting on the extreme levels of alcohol mortality in present day Russia, as surrogate alcohols contain high levels of ethanol and sometimes other toxic ingredients (Solodun *et al.*, 2011).

CONCLUSION

Levels of drunken mortality have been high in Russia from at least the late 19th century onwards, but have seemingly reached new extremes in the post-Soviet period. While a detrimental drinking pattern and the consumption of spirits may have underpinned high levels of alcohol mortality in both periods, the very high levels of recent years are also possibly caused by extreme levels of consumption, in conjunction with a growing use of non-beverage alcohols that contain high levels of ethanol and possibly, other toxic elements harmful for health. This study highlights the necessity of lowering the level of consumption and of moving away from what has been termed the ‘vodka model’ of alcohol consumption (Zaigraev, 2010) in order to improve public health. However, as Nemtsov (2011) has rightly pointed out, drinking cannot be separated from the context in which it takes place. Growing fear about the future and high levels of poverty are not only pushing people to drink more in post-Soviet Russia, but often to drink cheaper, but poorer-quality alcohol which may be consequently more dangerous for health. In such circumstances, an important and necessary additional step in achieving change in the seemingly long-term harmful drinking culture in Russia may therefore be bringing about improvement in both the material and

social circumstances of the Russian population (Zaigraev, 2010).

SUPPLEMENTARY DATA

Supplementary tables are available at *Alcohol and Alcoholism* online.

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