

# Alcohol and Russian mortality: a continuing crisis

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## ABSTRACT

**Background** Russia remains in the grip of a mortality crisis in which alcohol plays a central role. In 2007, male life expectancy at birth was 61 years, while for females it was 74 years. Alcohol is implicated particularly in deaths among working-age men. **Aims** To review the current state of knowledge about the contribution of alcohol to the continuing very high mortality seen among Russian adults. **Results** Conservative estimates attribute 31–43% of deaths among working-age men to alcohol. This latter estimate would imply a minimum of 170 000 excess deaths due to hazardous alcohol consumption in Russia per year. Men drink appreciably more than women in Russia. Hazardous drinking is most prevalent among people with low levels of education and those who are economically disadvantaged, partly because some of the available sources of ethanol are very cheap and easy to obtain. The best estimates available suggest that per capita consumption among adults is 15–18 litres of pure ethanol per year. However, reliable estimation of the total volume of alcohol consumed per capita in Russia is very difficult because of the diversity of sources of ethanol that are available, for many of which data do not exist. These include both illegal spirits, as well as legal non-beverage alcohols (such as medicinal tinctures). In 2006 regulations were introduced aimed at reducing the production and sale of non-beverage alcohols that are commonly drunk. These appear to have been only partially successful. **Conclusion-**

There is convincing evidence that alcohol plays an important role in explaining high mortality in Russia, in particular among working age men. However, there remain important uncertainties about the precise scale of the problem and about the health effects of the distinctive pattern of alcohol consumption that is prevalent in Russia today. While there is a need for further research, enough is known to justify the development of a comprehensive inter-sectoral alcohol control strategy. The recent fall in life expectancy in Russia should give a renewed urgency to attempts to move the policy agenda forward.

**Keywords** Cardiovascular disease, mortality, public health, Russia.

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## INTRODUCTION

Russia remains in the grip of a mortality crisis in which alcohol plays a central role. In 2007 male life expectancy at birth was 61 years, while for females it was 74 years. For males this is lower than life expectancy in 1970, and below that in many much poorer countries such as Bangladesh. Both the low level and the massive fluctuations of longevity across time since the mid-1980s are unique. The scale of these fluctuations is unprecedented in peacetime in any country with complete death registration. Despite this, the full scale of the crisis is poorly appreciated or understood by the global public health and alcohol research community. This paper aims to summarize current knowledge and argues that far

greater attention needs to be paid to this crisis. This is both because it is one of the most serious public health challenges facing any industrialized country, and also because it generates new insights of more general relevance.

After an extended period of stagnation during the Brezhnev years (1964–1982), life expectancy in Russia rose sharply in 1985 with the implementation of an anti-alcohol campaign by Gorbachev [1–3]. However these gains were short-lived, and with the collapse of the Soviet Union life expectancy at birth fell dramatically: in males declining by 6 years between 1990 and 1994 [4]. At this low point, life expectancy was 57 years for males and 70 years for females. A brief recovery ensued, only to be reversed in 1998, coinciding with a foreign exchange

crisis and the collapse in the value of the Russian rouble [5]. In 2004 things started to improve again slowly, although preliminary data for 2008 suggest that life expectancy may once again be decreasing.

There is a need to explain both the low average life expectancy and the fluctuations around it. Alcohol provides the most plausible, proximal explanation for the massive fluctuations in Russian mortality [4,6,7] while other factors, such as smoking [8] and quality of effective medical treatment [9,10], also contribute to the low average life expectancy compared to other industrialized countries. Detailed analyses of the mortality fluctuations have shown that the largest proportional rises and falls have been from causes related most directly to alcohol, including acute alcohol poisoning and liver cirrhosis [4,5]. Mortality in infancy and childhood, as well as in old age, have been remarkably unaffected. Indeed, death rates in childhood have fallen steadily since the mid-1980s, other than for a transient increase in 1993. Mortality in old age has remained relatively stable. Instead it is mortality at working ages, and among men in particular, that has shown the largest variation. The limited data that are available on trends in alcohol consumption mirror these fluctuations [7].

Analyses of routine mortality data establish a strong *prima facie* case for the central role of alcohol in the Russian mortality crisis, but much is still unknown. There is a paucity of detailed and reliable information about the types and quantities of alcohol used and consumed in Russia, patterns of drinking and differences in drinking behaviour between socio-demographic groups. Most importantly, few individual-level population-based studies have been conducted in Russia over the past 30 years which have directly assessed the health consequences of alcohol consumption.

## ALCOHOL-ATTRIBUTABLE MORTALITY

In the most recent estimate of alcohol related-mortality in Russia, produced using the World Health Organization (WHO) Comparative Risk Assessment methodology [11], it was estimated that in 2002, for those aged 20–64 years, 18% of male and 9% of female deaths were attributable to alcohol [12]. This was appreciably lower than in Hungary and Lithuania, but the same as France. However, the authors of this paper acknowledge that these are underestimates for Russia. The stated reason for this is that the abbreviated cause of death classification used in Russian official publications does not identify deaths from some important causes attributable directly to alcohol, such as alcoholic cardiomyopathy.

These estimates of alcohol attributable mortality may be biased for other reasons. Volume of alcohol consumed is very uncertain, not least because of the difficulties in

estimating the amount of non-beverage alcohols consumed in Russia, as discussed further below. In addition, although these estimates take account of some patterns of drinking (Russia being classified as a high-risk pattern, predominantly 'binge' drinking of spirits), they assume that the dose–response effects are the same as estimated from studies conducted largely in western Europe and North America. While this may be the case, as Russian drinking habits are different to those that have been studied in depth elsewhere, the validity of this assumption has yet to be tested rigorously.

Classic cohort studies [13–15] tend to underestimate mortality effects of alcohol in Russia (and to some extent in other countries) for three reasons [16]. First, they often have a low probability of recruiting heavy drinkers, particularly if subjects have to attend a pre-arranged clinic appointment in order to enter the study. Secondly, in most studies deaths occur years if not decades after baseline measures of alcohol intake. This design is therefore not suited to capturing acute effects of episodes of binge or heavy drinking. Finally, self-reports of alcohol intake, that are usually used in cohort studies, tend to underestimate true consumption.

A different approach to estimating alcohol attributable mortality was taken in an individual-level study conducted in 2003–05 in Izhevsk, a city on the western side of the Ural mountains. This population-based case–control study concluded that 43% of deaths among men aged 25–54 years were attributable to hazardous drinking [17]. If generalized to Russia as a whole, this is equivalent to more than 170 000 excess deaths a year among working-age men. This compares to 31% alcohol-attributable mortality at ages 20–44 years among men (and 20% among women of the same age), derived using the WHO Comprehensive Risk Assessment methodology already mentioned [12].

The Izhevsk case–control study employed a number of methodological innovations, driven by the difficulty of using standard approaches to study this problem in the Russian context [16]. Rather than quantifying amount drunk based on self-reports of quantity and frequency of beverage consumption, it used proxy-reports of a variety of indicators of hazardous drinking, including frequency of consumption of non-beverage alcohols and frequencies of behaviours such as *zapoi* (a period of continuous drunkenness of 2 or more days where the subject is withdrawn from normal social life), hangover and going to sleep at night clothed because of drunkenness. Proxy-reports were validated partly by using external data on alcohol treatment, which was essentially compulsory for those with alcohol problems at work or committing alcohol-related crimes.

There were concerns about whether results from this study were completely generalizable: it was conducted in

only one city (Izhevsk), and was restricted to men living in households (because of the need to have a proxy respondent who had lived with the man). However, in demographic terms, Izhevsk is a typical Russian city and restricting to men living with others might be expected to lead to under- rather than overestimation of attributable fractions, as the study excluded the most social marginalized men, such as those living alone or those who were homeless. Further replication of these results in other locations is, nevertheless, required.

### CARDIOVASCULAR DISEASE

One of the central issues that cannot be avoided when considering the health impact of alcohol in Russia is the question of cardiovascular disease. A number of years ago it was argued that because alcohol is largely cardioprotective it cannot play a major role in explaining fluctuations in total mortality, as cardiovascular disease (the largest single component of total mortality) shows the same fluctuations [13]. This was disputed at the time [18], and more recently further evidence has emerged that at moderate to higher levels of consumption (that are common in Russia) cardiovascular risk increases [19]. Moreover, there is now evidence that heavy episodic drinking may reduce or eliminate any cardioprotective effect of moderate aggregate amounts of alcohol [20].

A number of biological mechanisms have been put forward to explain why Russian drinking patterns may increase the risk of cardiovascular disease [21]. For example, transiently high levels of blood ethanol may induce cardiac arrhythmias, while a propensity to arrhythmias may persist between episodes of heavy drinking. Episodic heavy drinking also has adverse effects on blood clotting. The very strong causal association of alcohol with blood pressure [22] may also be particularly important in the Russian context. A further development of the idea that alcohol can have acute effects on cardiovascular mortality risk comes from a large study of 23 000 forensic autopsies (aged 15+ years) conducted between 1990 and 2004 in the Siberian city of Barnaul [23]. This showed that among autopsies of men and women aged 35–69 years, 17% had potentially lethal concentrations of alcohol (4+g/l) in their blood. Most importantly, high levels of alcohol were found among the considerable number certified as dying from ‘other’ or ‘not classified’ cardiovascular disease. The authors linked this with the observation that in national mortality data for Russia as a whole it was the corresponding class of ‘other’ forms of heart disease that showed the most pronounced fluctuations in rates over the 25 years of study. From this they concluded that many of these ‘circulatory’ system deaths were, in fact, misclassified deaths from acute ‘alcohol poisoning’. However, this emphasis on

‘poisoning’ may be a little misleading, as it glosses over the fact that many of these ‘other’ circulatory system deaths are due to alcoholic cardiomyopathy. This condition is due to the chronic toxic effects of alcohol on the myocardium, although death may be precipitated by a final binge.

### NON-BEVERAGE ALCOHOLS

It is well established that the predominant beverage types drunk in Russia is spirits [24]. Home-brew (*samogon*) is also a common characteristic of Russian drinking, especially in rural areas. However, in Russia (as in many other countries) non-beverage alcohols and alcohol surrogates are also consumed, although quantifying this is difficult [25]. Russia has a particularly long tradition of consuming these sorts of products, described both by researchers [26] and literary authors [27]. Writing in the early 1980s, Trembl drew on Soviet sources to compile a list of things known to have been drunk ‘as substitutes for alcohol, culled from Soviet sources, includes medicinal alcohol, medicine based on alcohol, aftershave and other lotions, perfume, shellac, varnish, antifreeze, de-icing fluids, brake fluid, industrial cleaning fluids and solvents, denatured alcohol, glues, gasoline, kerosene, tooth powder, vinegar, and shoe polish’ [28]. According to press reports cited by Segal [29], the anti-alcohol campaign introduced by Gorbachev in 1985 led rapidly to a significant rise in ‘consumption of ethanol-based after-shave, colognes, toothpaste and technical alcohol’ (p. 163), a phenomenon also recorded during the prohibition that followed the outbreak of the First World War [26].

Consumption of non-beverage alcohols remains a feature of Russian drinking today. In the 2003–05 Izhevsk case-control study of premature male mortality, described above [16], drinking of manufactured ethanol-containing liquids not intended for consumption was relatively common. These included eau-de-colognes, medicinal tinctures and antiseptics that are manufactured legally and sold in conventional retail outlets, including street kiosks, small shops and pharmacies. Of 1750 live working-age men (25–54 years) living in Izhevsk, 8% were reported by proxy informants to have consumed non-beverage alcohol in the previous year [30]. A toxicological analysis of a sample of these products found that they were, without exception, concentrated sources of ethanol (60–95%), but did not contain significant amounts of any other toxic alcohols [31]. These findings are consistent with results obtained by Russian narcologists [32]. A more recent study of the composition of samogons and industrial ethyl alcohols concluded that these did not differ significantly in toxicological properties from legitimate beverage alcohols [33].

In 2006–07 a high prevalence of non-beverage alcohol consumption was also found in a small qualitative study of 40 men and women being treated for problems in health-service facilities in Novosibirsk, a city on the eastern side of the Ural mountains [34]. This is consistent with much earlier work conducted in Russia in the 1960s [29] that concluded that people in the 'final (third) stage' of alcoholism turned to drinking 'cologne, varnish and various medicines based on alcohol' (p. 389).

In 2006, the Russian government introduced regulations aimed at restricting production and consumption of these non-beverage alcohols [35,36]. However, a study of the availability of these products in 17 Russian cities conducted in 2007 found that medicinal tinctures in particular remained widely available [37]. On average these tinctures were 78% by volume ethanol, and one type in particular (Hawthorn tincture) had been one of the most commonly sold products in retail pharmacies. Many of these non-beverage alcohols were cheaper per unit volume of ethanol than cheap legitimate Russian vodkas, and tended to be sold in bottles that were considerably less expensive than the standard 50 cl or 70 cl bottles of vodka. Both these factors provide a sound economic rationale for their consumption, particularly among those whose financial circumstances have deteriorated because of a history of heavy drinking.

## QUANTIFYING CONSUMPTION

Quantifying the total consumption of alcohol in Russia is a challenge. As is generally accepted in the alcohol research field, survey-based data of this sort nearly always underestimate real consumption [38]. For example, the estimates produced by the Russian Longitudinal Monitoring Study have been challenged strongly [39,40]. The alternative approach is to derive average per capita consumption estimates based on government and alcohol industry figures of production and sales. However, it is necessary to add 'unrecorded' consumption to these official estimates. Estimating unrecorded consumption is particularly difficult in Russia because of the size and diversity of this fraction of alcohol consumption, that ranges from *samogon* through legal non-beverage alcohols (such as medicinal tinctures) to illegal bootleg spirits. These include the production and bottling of counterfeit vodka produced from technical ethanol obtained illegally from industrial sources.

Indirect estimates of components of unrecorded consumption have been made by Nemtsov. Following earlier work by Trembl [41], he estimated the amount of home-brewed alcohol in Russia using retail sales of sugar as a proxy for home production. Nemtsov additionally used data on acute alcohol poisoning as an indicator of total alcohol consumption in his algorithm. On this basis he

estimated total annual per capita ethanol consumption in the second half of the 1990s as just over 14 litres (18 l per capita aged 15+ years), half of which was from sources other than legal beverages [7]. These are the most widely cited and probably the best estimates available for the past 15 years, and show strong correlations with mortality [7].

A lower estimate of 4.9 l (ethanol) per capita of unrecorded consumption is often cited in the international literature, although the methodology used to derive it has been vague. First published in 2001 [42], it is described unhelpfully as having been made by 'key experts' [43]. Nevertheless, this estimate was used in the most recent international review of alcohol consumption in central and eastern Europe [24]. This study concluded that only a third (4.9 l/15.5 l) of all ethanol consumed in Russia (nominally in 2002) was from unrecorded sources, mainly home-brew.

While retail sales of sugar have been used as proxies for consumption of home-brew, estimating consumption of non-beverage alcohols and other manufactured illegal sources remains even more problematic. Since the introduction of the 2006 Russian non-beverage alcohol regulations [35,36], the state will have been gathering data on production. However, these data are not in the public domain.

There therefore remain major uncertainties about the extent of total per capita ethanol consumption in Russia, both today and in the past. Population surveys will tend to underestimate consumption for all the well-known reasons of response and selection bias. However, in addition, quantifying consumption in terms of pure ethanol equivalents is particularly difficult for anything other than standard beverages because of wide variations in concentrations and bottle/container sizes.

## DRINKING BEHAVIOUR

Population surveys provide the only source of data on drinking patterns. What is clear is that among Russian men, vodka and other strong spirits are the most common beverage type [24,44]. Moreover, there is a tendency to drink large hazardous amounts on single occasions [24,45], which was even found in studies where total ethanol consumption is clearly underestimated [46]. This hazardous drinking behaviour is often described as a pattern of 'binge' drinking. Outside Russia and Eastern Europe the term 'binge drinking' has gained currency to describe consumption over a fixed threshold on one occasion (for example, a single evening), and is applied particularly to describe public drunkenness among young people in countries such as the United Kingdom [47]. However, this does not capture the full scale of periodic drinking bouts that are not uncommon in Russia.

Figes, in his breathtaking *Cultural History of Russia* [48], observes: 'Since the sixteenth century . . . the custom has been to indulge in mammoth drinking bouts on festive occasions and holidays' (p. 167). Russians recognize the phenomenon of *zapoi*: a period of continuous drunkenness lasting 2 or more days in which the person is withdrawn from normal social life. In the Izhevsk Family Study, 12% of working age men were reported by proxy informants with whom they lived to have had one or more episodes of *zapoi* in the previous year [30]. In this study, *zapoi* was linked strongly to other indicators of hazardous drinking, including frequent hangover and consumption of non-beverage alcohols.

The health effects of these very intensive bouts of alcohol consumption are poorly studied. However, again like non-beverage alcohol consumption, they are probably particularly common among men in the terminal stages of their drinking careers. As already discussed above, these acute episodes may well explain at least part of the reason why cardiovascular disease trends mortality in Russia mirror those of acute alcohol poisoning [4].

#### WHO DRINKS IN RUSSIA?

The most consistent findings of all surveys of alcohol consumption in Russia are the pronounced differences between men and women. Men are far more likely to drink any type of alcohol, drink more on each occasion and drink in a hazardous fashion [24,49]. This is consistent with the observation that the fluctuations in life expectancy in Russia among women are much attenuated compared to those in men, although they show the same pattern [4,5].

In general, studies are also consistent in finding that hazardous drinking tends to show large and graded differences across educational groups, with men with university degrees having very low levels [30,49, 50]. Marital status differences are also pronounced, with married men showing the lowest rates of alcohol problems and the divorced and separated the highest [30,49].

Unemployment was related particularly strongly to hazardous drinking in the Izhevsk Family Study [30], as has been found in studies elsewhere [51]. One of the important questions, however, that applies to marital as well as employment status is: what comes first in any causal sequence? To answer this question, longitudinal data are required, which are very uncommon. However, analysis of panel data from the Russian Longitudinal Monitoring Survey suggests that the relationship is bidirectional. Heavy drinking in one round is associated with being fired in the next round, while a recent death of a family member (and especially a wage-earner) in one round is associated with increased consumption in the subsequent one [52]. However, while the evidence is

limited, what is clear is that the high rates of unemployment among hazardous drinkers immediately underline the economic impact of drinking in Russia, which is likely to be very large given its impact on men of working age.

#### CAUSES OF CAUSES—WHY DO RUSSIANS DRINK?

To understand fully the place of alcohol in Russian society requires a historical perspective going back centuries [1,53]. However, less ambitiously we are still lacking an adequate account of what underlying mechanisms may have transmitted the shocks of the collapse of communism and the succeeding convulsions that affected all aspects of Russian society, to the behaviours of individuals, inducing many to change their drinking and thereby altering their risk of premature death. The notion of stress and adaptation is one that has been discussed [54]. Very recently, it has been argued that unemployment resulting from the privatization and the economic 'shock therapy' adopted by Russia in the early 1990s, on the advice of international financial institutions, may be the key macro-economic driver [55]. However, as has been argued by Nemstov, a complete explanation for the role of alcohol in the Russian mortality crisis has to go beyond this to examine the social and psychological mechanisms involved. Pathways are going to operate both through the effects of ethanol on physiology as well as through the effects of social deprivation, impoverishment and isolation that are a result of drinking [56]. However, to date there has been a paucity of empirical research that has been able to investigate these issues convincingly. This is a research priority, with answers likely to flow from combining insights from history, sociology, economics psychology and bio-medicine.

#### WHAT IS TO BE DONE?

A recent national opinion poll conducted in March 2008 by the Moscow-based Levada Centre found that 26% of respondents said that among their family and friends there are people who have an addiction to alcohol [57]. However, only 2% reported that drinking/drug addiction was the thing that made the life of their family most difficult, the most important problem being low income and lack of money. Nevertheless, the Russian government does recognize the scale of the problem. In 2005 President Putin alluded to the problem in his state of the nation speech [58], and very recently Gennady Onishchenko, chief of Russia's consumer rights supervisor Rospotrebnadzor, stated that three-quarters of Russians regularly drink alcoholic beverages, and 2% of the country's population, some 2.8 million, 'have been drawn into hard and unhealthy drinking' [59]. However, a coherent,

comprehensive policy response has yet to be implemented, although a range of strategies are now being developed by those outside of government [36]. The recent fall in life expectancy in Russia should give a renewed urgency to attempts to move the policy agenda forward. This is particularly urgent given the potential of the global financial crisis and its negative impact on everyday life in Russia to lead to increased levels of hazardous drinking, as other recent social and economic crises have done.

#### Declarations of interest

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