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Russian mortality trends for 1991-2001: analysis by cause and region

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Abstract

Objectives To investigate trends in Russian mortality for 1991-2001 with particular reference to trends since the Russian economic crisis in 1998 and to geographical differences within Russia.

Design Analysis of data obtained from the Russian State statistics committee for 1991-2001. All cause mortality was compared between seven federal regions. Comparison of cause specific rates was conducted for young (15-34 years) and middle aged adults (35-69 years). The number of Russian adults who died before age 70 in the period 1992-2001 and whose deaths were attributable to increased mortality was calculated.

Main outcome measures Age, sex, and cause specific mortality standardised to the world population.

Results Mortality increased substantially after the economic crisis in 1998, with life expectancy falling to 58.9 years among men and 71.8 years among women by 2001. Most of these fluctuations were due to changes in mortality from vascular disease and violent deaths (mainly suicides, homicides, unintentional poisoning, and traffic incidents) among young and middle aged adults. Trends were similar in all parts of Russia. An extra 2.5-3 million Russian adults died in middle age in the period 1992-2001 than would have been expected based on 1991 mortality.

Conclusions Russian mortality was already high in 1991 and has increased further in the subsequent decade. Fluctuations in mortality seem to correlate strongly with underlying economic and societal factors. On an individual level, alcohol consumption is strongly implicated in being at least partially responsible for many of these trends.

Introduction

The huge fluctuations in Russian mortality during the 1990s have attracted much interest.¹⁻³ Although Russian adult mortality was relatively high in 1991 compared with levels in western Europe, it increased rapidly in the immediate period after the break up of the Soviet Union, with a more marked increase among men. Subsequent to this, a sharp improvement was observed in the period 1995-8. Analyses of these trends identified vascular diseases and external causes as being responsible for most of the changes and focused on the role of alcohol and socioeconomic stress related to rapid economic changes.¹⁻⁶ Individual level information on possible aetiological factors is, however, limited.

Russia experienced a further economic crisis in 1998, including rapid devaluation of its currency and increases in poverty. This economic crisis coincided with a further increase in adult mortality in the three years up to 2001, with life expectancy falling to 58.9 years among men and 71.8 among women, levels similar to the low points reached in 1994. The cause of this recent dramatic decrease in life expectancy is not known. We examined the disease specific trends during this period to clarify these unique patterns.

Methods

We obtained data from the Russian State statistics committee, including deaths by cause, sex, five year age group, and calendar year together with corresponding population denominators.

We analysed trends of total and cause specific mortality for 1991-2001 for Russia overall and for seven federal regions, five in European Russia (North Western, Central, Privolzhski, Southern, and Uralski) and two in Asian Russia (Siberian and Far Eastern). We excluded data on Chechenskaya and Ingushskaya republics from the Southern region because of war. All death rates were standardised to the world standard population.⁷

Results

Mortality by age, sex, and cause

Age standardised mortality from all causes increased between 1998 and 2001 by 189/100 000 among men and 49/100 000 among women. Similar to the increase in mortality in 1991-4 and the decrease up to 1998, over 80% of the 1998-2001 increase was due to changes in those aged 35-69 years (middle age). However, an increase in mortality was also observed among younger adults. We restricted analysis of these trends to young and middle aged adults.

All cause mortality in the 15-34 age group in 2001 was similar to that observed in 1994 among both men and women, with the modest improvements in the years up to 1998 having been completely reversed (table). Most of the increase in the mortality trends in the period 1998-2001 could be explained by trends in deaths from external causes. Mortality from cancer changed little over the 10 year period.

In middle aged adults (35-69 years) total mortality in 2001 was 21% higher for men and 15% higher for women than in 1998. The large increase between 1998

Death rate by selected causes at age 35-69 years per 100 000 (standardised to world population)

Cause of death	Age 15-34 years								Age 35-69 years							
	Men				Women				Men				Women			
	1991	1994	1998	2001	1991	1994	1998	2001	1991	1994	1998	2001	1991	1994	1998	2001
All causes	298	457	392	454	82.1	117	109	124	1789	2814	2117	2566	674	959	756	873
Infectious diseases	6.5	11.2	15.9	21.6	2.1	3.1	4.3	5.6	34	64.2	58	74.1	4.6	9	7.2	10.7
Cancer	12.7	13.3	12.6	11.6	12.4	12.2	11.9	11.6	447	455	403	384	194	201	189	187
Circulatory system	20.6	38.4	30.7	35.9	7	11	8.9	11.2	734	1180	905	1121	305	452	354	417
Respiratory system	4.2	9.4	8.0	11.3	2.3	3.5	3.0	4.1	102	193	118	155	23.1	34.4	22.4	26.7
Digestive system	4.6	9.9	7.8	11.7	1.8	3.3	2.8	4.3	60	106	84.1	107	24.8	43.6	33.3	46
External causes	229	341	287	320	40	64.3	61.9	67.9	336	657	446	567	73.4	146	95.9	121

and 2001 seemed to be predominantly due to diseases of the circulatory system and external causes.

In 1998-2001 mortality from diseases of the respiratory system also increased, mainly due to an increase in death from pneumonia. Mortality from digestive diseases, mostly alcohol induced liver disease and cirrhosis, and from infectious diseases, mostly tuberculosis, increased moderately.

The one disease category that did not follow these trends was cancers, with moderate decreases among men and a constant rate among women during 1998-2001, after more substantial decreases in 1994-8.

Mortality by region

When we compared all cause mortality between the seven different Russian regions, there were similar temporal trends (fig 1). High rates were consistently observed for the Siberian and Far Eastern regions, whereas the Southern regions experienced a considerably lower rate.

In 1991, mortality in Russian men was about 20% higher than in the Czech Republic, although mortality then decreased in the Czech Republic, resulting in an age standardised mortality in Russia in 2000 of 1484/100 000 that was 100% higher than that in the Czech Republic (733/100 000). Mortality also decreased in Finland, with which Russia shares a border, over the period 1991-2001. In 2000, age standardised mortality in Russia was over twice that in Finland for men (1484 and 589/100 000 respectively) and women (678 and 333/100 000 respectively).

Finally, we calculated the numbers of extra premature deaths in adults (that is, age 15-69 years) in the period 1992-2001 on the basis of two different scenarios: the number of premature adult deaths that would have occurred if mortality in 1992-2001 had stayed constant at the level of 1991, and if Russian mortality in the period 1992-2001 had decreased at a similar level to that seen in the Czech Republic, about 3% per year (fig 2). Of the 8 317 789 premature deaths in men and the 3 699 717 premature deaths in women that occurred among adults aged 15-69, about 2 142 000 in men and 625 000 in women would have been avoided if mortality had stayed constant at 1991 levels. Furthermore, an additional 864 000 premature deaths in men and 402 000 premature deaths in women would have been prevented if Russian mortality had decreased as it did in the Czech Republic.

Discussion

The reasons behind the trends in mortality between 1991 and 1998 have been discussed previously in detail.¹⁻⁶ In particular, the trends are unlikely to have

been artefactual because of trends in data collection or underestimation of the Russian population,^{1,2} especially given the relatively constant mortality for all neoplasms combined. Furthermore, even though Russian mortality may have been overestimated in the past decade due to a large number of new non-resident immigrants who are not counted in population estimates,⁸ the strong consistency of these results across the Russian geographical regions would also argue against an artefactual explanation due to population movement or misclassification.

The role of lifestyle factors

Attention has previously focused on the role of lifestyle factors associated with rapid economic change as possible causes of these mortality trends, in particular alcohol consumption and "socioeconomic stress" associated with having to survive in a challenging economic climate. The role of alcohol consumption in explaining a large part of the mortality trends would seem reasonable. The largest relative changes have been observed for those conditions that are directly related to alcohol—namely, unintentional poisoning by alcohol and liver cirrhosis.

While changes in mortality from external causes were the main determinant for changes in overall mor-

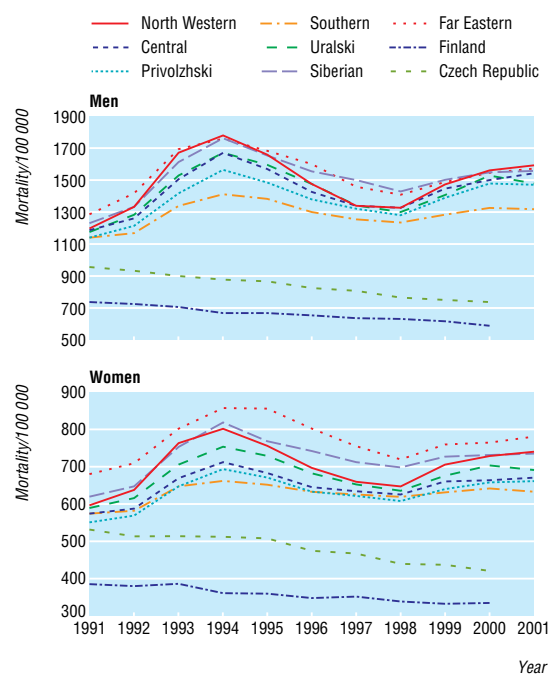


Fig 1 Age standardised mortality from all causes by region

What is already known on this topic

Adult mortality in Russia increased rapidly in the immediate period after the collapse of the former Soviet Union and fell rapidly in the period 1995-8

Vascular diseases and external causes were responsible for most of these changes, probably influenced by changes in alcohol consumption

Subsequent to the economic crisis in 1998, mortality increased again, with life expectancy falling to 58.9 among men and 71.8 among women by 2001

What this study adds

The increase in mortality in 1998-2001 followed a similar cause specific pattern to the increase in 1991-4

Trends were similar in all parts of the Russian Federation

An estimated extra 2.5-3 million Russian adults died in middle age in the period 1992-2001 than would have been expected based on 1991 mortality

tality among young adults, trends in circulatory disease are primarily responsible for mortality trends in middle aged adults, in particular ischaemic heart disease and cerebrovascular disease. Regarding the latter, alcohol consumption may have an important role. Alcohol consumption strongly increases the risk of haemorrhagic stroke, although the association with ischaemic stroke is less clear.⁹ Heavy alcohol consump-

tion and binge drinking are common in Russia, and are associated with ischaemic heart disease. The other disease categories that show substantial temporal variation include respiratory infections, in particular pneumonia, and also tuberculosis. Again, there is evidence for a link between alcohol consumption and mortality from these diseases,¹⁰ possibly through an immunosuppressive effect of heavy alcohol consumption.

Societal factors

Other proposed explanations for these rapid mortality changes include lifestyle and societal factors linked to general economic and political uncertainty.⁵ The rapid transition from a state controlled communist society to a capitalist society, which started in 1991 with rapid relaxation of economic controls, was combined with much political and societal uncertainty and resulted in devaluation of the currency, hyperinflation, increasing inequality, and removal of most forms of job protection. After some general improvement in the period 1994-8, a second economic crisis occurred in July-August 1998, which again resulted in further devaluation of the currency, an increase in inflation, and further political and economic uncertainty. Although the effect on mortality patterns seems to have been immediate, what remains to be identified is the exact role of rapid changes in alcohol consumption as opposed to other less clearly defined factors such as perceived lack of control over outside events, an increase in social stress, or a breakdown in trauma care.

Prospects

With regard to future mortality trends in Russia, it is clear that a period of constant economic stability is required. One sign of optimism is that while mortality increased between 2000 and 2001, among young adults overall mortality decreased, indicating that the most recent part of this story may have turned another corner.

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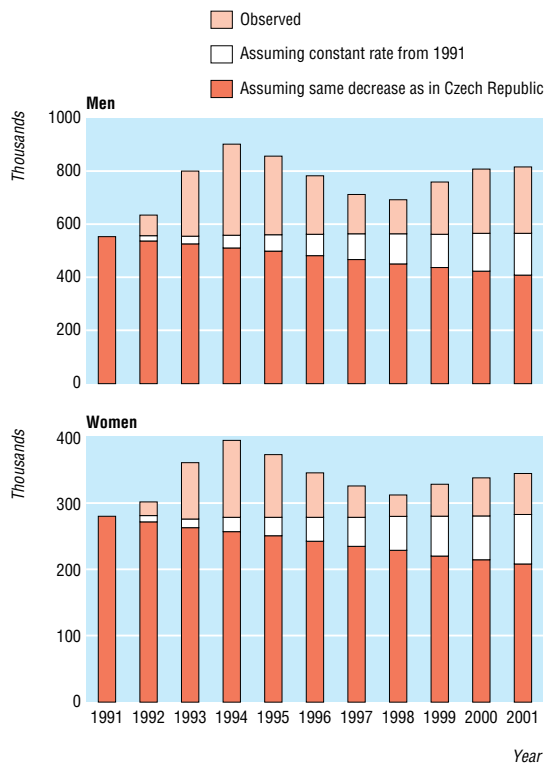


Fig 2 Observed and expected mortality in young and middle aged Russian adults 1991-2001. Data for men from 8 317 789 observed, 6 175 768 assuming constant rate from 1991, and 5 311 486 assuming same decrease as in Czech Republic. For women numbers were 3 699 717, 3 074 790, and 2 672 962

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