Uncovering unusual mortality differentials in Central Asia

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Introduction

Research on global mortality has exhaustively documented a Russian mortality paradox—the phenomenon of populations of Slavic descent in experiencing higher adult mortality despite higher socioeconomic status. Remarkably, this is true of Russians not only in Russia, but also in the diaspora. Divergence in trends in vital statistics between Russia and Central Asian republics has increased, and Russian minorities in Central Asia seem to have followed the Russian trajectory.

We seek to identify the leading causes of death, with particular focus on alcohol consumption, which account for the mortality gap between ethnic Russians, Kyrgyz, and Kazakhs. We compare causes of death by ethnicity, but also within ethnicity across national borders. Our goal in the cross-national comparisons is to develop a unified framework for understanding patterns of excess mortality in all societies in the Russian cultural sphere of influence. Of particular interest is alcohol-related mortality, shown by Guillot (2011) to be the primary source of the Russian mortality gap in Kyrgyzstan. Our preliminary results for Kazakhstan suggest that adult mortality among ethnic Kazakhs is higher than among Kyrgyz and lower than among Russians. Crucially, the ethnic differential between Russians and Kazakhs in alcohol-related mortality is lower than between Russians and Kyrgyz. We attempt to explain this phenomenon by hypothesizing the existence a continuum between 'non-Russian' and 'Russian' model mortality patterns based on degree of accord to documented patterns of diet, behavior, and alcohol consumption among Russians in Central Asia. Differential mortality across republics of Central Asia may improve our understanding the Russian mortality paradox.

Related Literature

Russians in Central Asia have higher levels of household consumption and lower rates of poverty. Rates of infant and child mortality among Slavs are correspondingly lower. An important study by Guillot (2011) using new sources of data for Kyrgyzstan definitively demonstrated that the adult mortality gap between Russians and Kyrgyz is not a statistical artifact driven by under-registration of Kyrgyz deaths, but due to a high incidence among Russians of deaths in categories associated with alcohol consumption. The lower mortality rates in Kyrgyzstan may be attributable to lower rates of alcohol consumption among observant Muslims in Central Asia (Cockerham et al 2004), despite rather weak religious attachment in other aspects (Olcott 1995; Rose 2002; Roy 1997).

Kazakhstan shares many important similarities with Kyrgyzstan which enhance the comparability of the data. The statistical infrastructure in both countries remains heavily influenced by common practices during the Soviet period. However, Kyrgyzstan and Kazakhstan present useful contrasts. Both countries contain large populations of Slavic descent (mostly Russian, but also significant numbers of Ukrainians and Belorussians). Kazakhstan, however, has a much larger Russian presence. By the time of the 1926 Soviet Census, Russians already numbered over one million, comprising 31% of the national population. After 1954, state-sponsored migration of Russian agricultural workers pushed the Russian share of the population to 5.5 million or 40% by the time of the 1979 Census.

During 1995-2005, the high level of correlation in life expectancy between Kazakhstan and Russia had significantly eroded (Brainerd & Cutler 2005). This occurred due to both massive emigration of Russians during the 1990s, as well as increasing divergence in the cause-specific death rates by ethnicity between Russians and Central Asians. As in Russia, the post-transition era was defined by increases in adult mortality, rather than spikes in mortality among the infants and elderly as is usually the case during economic shocks (Cutler et al 2002). This divergence is clearly evident and well documented in Kyrgyzstan by the time of the 1999 Census (Guillot 2011).

The literature on mortality in Kazakhstan suggests that it shares some consistency with the pattern established in Kyrgyzstan. Becker & Urzhumova (2004) found that aggregate death rates in areas of Kazakhstan with more Russians were higher, after controlling for contextual differences by geography. However, research on Kazakhstan so far has been constrained by the lack of demographically specific mortality rates such as can be constructed from microdata. In addition, Becker & Urzhumova focused on urban mortality only, while a substantial portion of Kazakhstan's Russian population is rural. Mortality analysis in the country has relied on ecological measures such as differences in *oblast*- or province-wide mortality rates. Kazakhstan's high degree of Russian fluency, sizeable Slavic population, geographic heterogeneity, and relatively successful economic transition provide an interesting context in which to study the Russian mortality paradox, and reasons to expect that the results of cause-of-death analysis in Kazakhstan may differ from those previously estimated for Kyrgyzstan.

Data and Methods

Mortality rates used in this analysis are derived from coded death certificates from the vital statistics registration system during 1998-1999. Population counts come from the Kazakhstan and Kyrgyzstan 1999 Censuses.[1] We define a series of causes of death linked to alcohol (Zaridze et al 2009a, b). Of secondary interest are the secondary disease pathways identified with alcohol consumption, including tuberculosis (acquired during spells of incarceration; Bobrik et al. 2005) and violent crimes (Gavrilova et al. 2005).

We compare cause-specific mortality profiles of Russians, Kyrgyz, and Kazakhs in Kyrgyzstan and Kazakhstan. In addition, we compare contemporaneous data from the World Bank's Living Standards Monitoring Survey (LSMS) and the Demographic and Health Surveys

[1] In order to minimize discrepancies between the Census population counts (based on ethnic self-identification) and counts of deaths by ethnicity (based on nationality listed in official documents), we group Eastern Slavs (Russian, Ukrainian, and Belorussian) together and Kazakhs with other Central Asian nationalities (Kazakh, Uzbek, Kyrgyz, Turkmen, Tajik).

(DHS) in Kazakhstan and Kyrgyzstan in order to assess whether diet and behaviors vary by ethnicity across Central Asia in a manner consistent with the literature. Evidence suggests Kazakhs tend to drink substantially more than Kyrgyz (Waters & Thom 2007), and to follow Russian habits of drinking more closely than other Central Asian ethnicities (spirits, binge drinking). This being the case, we should expect a smaller difference in the age-standardized death rates for males and females between Russians and Kazakhs compared to previous results for Kyrgyz.

The mortality rates are standardized to a uniform age distribution to account for differences in the age structure across countries and between ethnicities. To measure the effect of ethnicity on mortality net of contextual factors, we use a Poisson regression of the form:

$$D_{ij} = \exp\left[ln\left(N_{ij}\right) + \beta_i X_i + \beta_j X_j + \varepsilon_{ij}\right] \quad (1)$$

Where *D* represents deaths among the population age i of ethnic group j and *X* is a dummy variable representing group membership. To model 1, we introduce education level, urban/rural, location, and additional contextual variables with particular interest to the effect on coefficient β_j.

We also test the robustness of an alternative to the behavioral explanation for the Russian mortality paradox by determining how much of the Russian mortality gap in Kazakhstan is due to contextual (i.e., related to geographic and economic circumstances) versus behavioral (i.e., related to diet, consumption patterns, and practices) differences of Slavic and Central Asian populations of Kazakhstan. We compare mortality in regions with high and low concentrations of Russians and construct individual-level measures of relative Russification or indigenization. We also take advantage of the available data to predict mortality among Central Asians based on Russian language proficiency and other measures of Russian acculturation. If Russian cultural affiliation is driving higher Kazakh mortality relative to Kyrgyz, it suggests a continuum between 'non-Russian' and 'Russian' model mortality patterns based on degree of Slavic influence.

Preliminary Findings

We have estimated cause-specific mortality rates for Kazakhstan and Kyrgyzstan by sex and ethnicity. We find that Kazakh mortality levels are in between Kyrgyz (low) mortality and Slavic (high) mortality for causes where alcohol related deaths are concentrated. In Kazakhstan, the gap between Slavic and Central Asian mortality for males is approximately 409 deaths per 100,000 population; for females, it is 76 per 100,000. Slavic male mortality is nearly 150% of Central Asian mortality; females are just over 20% greater.

The role of alcohol in mortality is assessed in two ways. The first is by examining causes of death directly attributable to drinking, such as cirrhosis, alcohol psychosis, and alcohol poisoning. The second is to examine differences in causes of death where a majority of deaths may not be due to alcoholism, but where the vast majority of alcohol-related deaths accrue. These include traffic accidents, violent deaths, circulatory conditions, and other conditions identified in the literature (see Guillot 2011).

Mortality from alcohol poisoning, psychosis, and related causes is 4-5 times greater for Russian males and females than for Kazakhs. Alcohol poisoning alone accounts for almost one fifth of the total mortality gap between Slavs and Central Asians in Kazakhstan. Notably, this is lower than the ratio for Russians to Kyrgyz, 14.1. There are other causes besides those directly related to alcoholism that account for significant parts of the mortality gap. In particular, circulatory diseases might be an exception to the rule identified above, as Russians have significantly higher death rates from myocardial infarction, ischemic heart disease, and related conditions that may have underlying behavioral causes and may be incorrectly classified (Zaridze et al. 2009a, b). Tuberculosis is another notable condition, explaining 10 percent of the

ethnic gap. TB infection in the Russian population has been linked to incarceration (Bobrik et al 2005), which is unsurprising if incarceration is a consequence of violence related to alcohol (Gavrilova et al 2005).

The Russian mortality paradox applies to both sexes, but in previous studies the excess mortality has been more pronounced among men. The results in Kazakhstan are consistent with this pattern. Female mortality is around one-third to one-half the male level, and female mortality directly attributable to alcohol is closer to one-fourth the male level. The ethnic mortality gap is correspondingly lower. Immediately, it is evident that alcohol also plays a significant role here, although through a somewhat different profile of causes. External causes are an even greater share of the mortality gap for females than for males, at 58.9%. The most important external causes are the same for males and females -- poisoning (25.1%), accidental death (11.3%), and violence (21.3%). For the non-external causes with significant ethnic gaps for males, neoplasms (41.3%) and circulatory diseases (16.5%) are also important. Deaths directly attributable to alcohol consumption account for just 8.8% of the male mortality gap, but excess mortality among Russians to causes "strongly related to alcohol consumption" (Zaridze et al. 2009a) accounts for fully 86.9%. For females, direct causes account for 14.5% of the gap and direct plus indirect causes account for 70.7%. Interestingly, physical manifestations of chronic alcohol abuse such as upper digestive tract cancers and liver cirrhosis are not dramatically higher among Russians. Overall, it is psychological and circumstantial factors--overdose, violence, and accidents relating to alcohol consumption--where the disparity between Kazakhs and Russians is greatest.

Comparing these results with those for Kyrgyzstan (Guillot et al 2011), ethnic Kazakhs have significantly greater alcohol related mortality than other Central Asians. Kazakhs appear to be situated squarely between Russians on the one hand and Kyrgyz on the other, consistent with accounts of alcohol consumption patterns closer to Russian norms. This evidence points to the Russian mortality paradox as describing a continuum, along which closer affinity to Slavic eating and drinking habits result in mortality patterns approaching the ‘Russian’ standard. In this typology, Kazakhs may be the "missing link" between non-Russian Central Asian and Russian populations, illustrating some properties of each.