Gender Differences in Health in the Russian Federation: The Role of Lifestyles

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Abstract

Around the world, gender differences in health have revealed an important paradox: women report worse self-rated health than same-aged men, but are less likely to die at each age. This paradox is especially striking in the Russian Federation, where the gender gap in life expectancy currently exceeds 10 years, but where women still report to be in poorer health than same-aged men. This paper examines the paradox in Russia by decomposing the female disadvantage in poor self-assessed health and the male excess in one-year mortality using lifestyles. The results indicate that gender differences in lifestyles can explain almost 40% of the female disadvantage in poor self-assessed health: men's overall more moderate drinking behaviour, compared to women's more infrequent drinking behaviour, accounts for slightly more than half of this contribution, with men's apparently more favourable exercise and eating patterns, represented by the contributions of leisure-time exercise and Body Mass Index, accounting for the rest. In contrast, and although men's more frequent excessive alcohol use and high rates of smoking, on their own, seem able to potentially explain a considerable part (about 85%) of the male excess in one-year mortality, the combined differences in characteristics between men and women cannot explain the gender gap. Instead, the male excess remains almost completely unexplained. Perhaps the male excess can be explained by taking into account the underlying gender roles inherent in Russian society, something which future research should investigate.

1. Introduction

Gender differences in self-rated health and mortality are well-recorded in the scientific literature. Studies consistently show that women report worse self-rated health in comparison to men, but women, virtually all around the world, live longer than their male counterparts, suggesting that women may, in fact, be healthier than men (Idler & Benyamini, 1997; Idler, 2003; Nathanson, 1975; Verbrugge, 1989). Many studies have attempted to explain this paradox.

One explanation that is often investigated relies on epidemiological differences between men and women. Case & Paxson (2005) present convincing evidence by looking at gender differences in the prevalence of chronic conditions to reconcile the gender disparities in self-rated health and mortality in the US. They find that the female disadvantage in self-rated health can be entirely explained by gender differences in the prevalence of chronic conditions. That is, women suffer significantly more often than men from conditions which decrease self-rated health, but have little effect on mortality, such as arthritis and depression. However, the male disadvantage in mortality cannot be solely explained by these differences. Equally important for explaining the gender difference in mortality are the larger adverse effects of certain smoking-related conditions, such as cardiovascular disease and emphysema, on male mortality. That is, men who suffer from these smoking-related conditions are significantly more likely to die than women who suffer from these same conditions, which may be due to men smoking more frequently throughout their lives than women.

A second explanation which is often proposed is that women may actually be healthier than men, as suggested by their higher life expectancy, but, given objective health, they are simply more likely to report health problems, resulting in worse self-reported health (Verbrugge, 1982). Women may be less stoical than men, making women more likely to factor less serious conditions into self-reports of health (Spiers et al., 2003). Or, women may simply report their health more accurately than men do (Idler, 2003; Verbrugge, 1989). However, these suggestions are not indisputable. For example, Macintyre et al. (1999) find that men provide more complete information to open-ended questions about health problems, suggesting that men are not likely to give inaccurate reports of their health, and they find that women are not more likely to report less serious, or trivial, conditions. Although it was not the main focus of their paper, Case & Paxon (2005) also provide some evidence against the second explanation. Their results indicate that, given the same chronic conditions, men and women are equally likely to report poor health, suggesting that the paradox does not rest upon systematic gender differences in the reporting of health.

More recently, vignettes have been introduced to formally test reporting heterogeneity by gender, but studies using the vignette method also present mixed results. Dowd & Todd (2011) find evidence of gender-specific reporting in six health domains, but only in four domains American women tend to be more pessimistic in their health assessment. In the remaining two domains, women showed more optimistic reporting. By contrast, Peracchi & Rossetti (2012) do find that European women are more likely to report health problems in all six domains. Purging the self-assesments of these reporting differences decreases, but does not completely eliminate, gender differences in health. For Chinese respondents, Zhang et al. (2015) find evidence of homogenous health reporting by gender. Overall, whether the paradox can be (partly) explained by gender differences in health reporting, appears to depend on the specific context.

Education might also partly explain why women report worse health, but have lower mortality than men. Using data from the US, Ross et al. (2012) find that the positive influence of education on self-reported health and on life expectancy are conditional on gender, but in different directions. Specifically, education has a larger influence on women's self-rated health than on men's self-rated health, but the effect is opposite for mortality. That is, education has a larger effect on male mortality than on female mortality. As such, education could partly solve the paradox. At lower educational levels, women are more likely to report poorer health than men. At high levels of education, the gender gap in self-reported health becomes vanishingly small. The gender gap in mortality is also smallest at high levels of education. Zhang et al. (2015) also provide evidence for the role of education in explaining the female disadvantage in self-assessed health in China. Using decomposition analysis, they find that the female disadvantage in education is an important factor in explaining the gender health gap in China, even after controlling for chronic conditions and health functioning.

So far, most of the research has tried to resolve the paradox by focusing on epidemiological reasons, reporting heterogeneity and socioeconomic status. However, relatively little is known about the role of lifestyles in explaining the gender gaps in health. Russia offers a good example for investigating this. In the late 20th century, health declined dramatically in the former Soviet Union (Cockerham, 1997). In Russia, the fall of communism has been followed by a steep rise in mortality (Brainerd & Cutler, 2005; Cockerham, 2000). To give an indication, life expectancy at birth in 1989 was 64 years for men and 74 years for women[1]. By 1994, life expectancy at birth had decreased by 6 years for men and by 2 years for women in comparison to 1989. Only in the early 2010s did life expectancy in Russia return to its pre-transition levels. In other words, it took life expectancy about 25 years to recover from the dramatic deterioration following the decline of communism, but life expectancy in Russia still continues to lag behind life expectancy in other industrialized countries. For example, in the same period life expectancy at birth in the Netherlands increased by 5 years for men to 79 years and by 3 years for women to 83 years. Additionally striking is the large disparity in life expectancy at birth of males and females in Russia, with a current gender gap in life expectancy of more than 10 years. In comparison, the gender gap in life expectancy in the Netherlands is slightly less than 4 years.

Many studies have tried to explain this 'mortality crisis' in Russia. Most of the research points to increased alcohol consumption, mostly among middle-aged men, as the main culprit in fostering rising mortality and declining life expectancy in post-communist Russia (Brainerd & Cutler, 2005; Leon et al., 1997; Shkolnikov et al., 1998). According to Brainerd & Cutler (2005), much of the increase in alcohol consumption can be attributed to the decreasing price of alcohol over time, but the elimination of Gorbachev's anti-alcohol campaign, which restricted the availability of alcohol, most likely also played a role. Their results also point to increased stress from the transition to a market economy as an important factor in explaining the mortality crisis. Shkolnikov et al. (1998) also find that stress caused by the economic transition played an important role, and they add that the relationship between stress and life expectancy is partly mediated by heavy alcohol use.

Studies indicate that unhealthy lifestyles in general play an important role in explaining the high mortality and low life expectancy in Russia (Cockerham, 2000; Perlman & Bobak, 2008). Cockerham (2000) finds that, besides excessive alcohol consumption, smoking, high-fat diets and a lack of exercise are major contributors to premature deaths among middle-aged, mostly working-class, Russian men. He further adds that these unhealthy lifestyles of Russian men can be largely attributed to structural conditions, such as societal and group norms concerning health-related behaviour, the drinking culture inherent in Russian society and even the communist background with its focus on the state and not on the individual, nor the individual's health. Additionally, the unhealthy lifestyles of men, and especially the high rates of smoking and alcohol abuse among Russian males, seem able to partly explain the high excess male mortality in Russia (Nicholson et al., 2005; Shkolnikov, Field & Andreev, 2011).

Most of the research so far has focused on explaining the male disadvantage in life expectancy, which points to unhealthy lifestyles of Russian males, and particularly excessive alcohol use, as the main culprits. However, even though Russian females live substantially longer than males, which can partly be explained by their healthier lifestyles, they still report to be in worse health than their male counterparts (Paul & Valtonen, 2016; Perlman & Bobak, 2008). A higher percentage of women persistently reports below average health, even though the gender gap in self-reported health has reduced since the mid 1990s (Paul & Valtonen, 2016). Perlman & Bobak (2008) investigate whether the determinants of mortality and self-reported health in Russia coincide. Their results indicate that the determinants are not the same, despite the fact that mortality and poor self-reported health are strongly associated. Specifically, they find that smoking appears to be unrelated to self-reported health and frequent drinkers, in comparison to occasional drinkers, even report better health. These results could potentially (partly) explain why Russian males report better health, but have higher mortality than females. Note that these results also seem, although Perlman & Bobak (2008) did not control for health problems, to be in contrast with the findings of Case & Paxson (2005), who find that certain smoking-related conditions, such as respiratory cancer and lung problems, do increase the probability of reporting poor health. Moreover, they even find that men with lung problems are more likely to report poor health than women with lung problems, which again may be related to males being heavier smokers throughout their lives than females.

This paper will investigate the role of lifestyles in explaining the paradox for Russia. In particular, it will try to unpack the (potential) contribution of lifestyles to the male excess in mortality and the female disadvantage in self-reported health by using decomposition analysis. This research adds to the existing scientific literature concerning the gender health gaps by exploring the contribution of lifestyles. Although the contribution of unhealthy lifestyles to the male disadvantage in life expectancy in Russia seems to be well-documented, relatively few studies have focused on the contribution of lifestyles to the female disadvantage in self-reported health. Additionally, by focusing on the role of lifestyles, potentially important policy implications might be discerned. It is in the social interest to reduce gender differences in health, but it could be that policies targeted at healthier lifestyles for Russian men have conflicting results. That is, assuming that the healthier lifestyles of women contribute to reducing the gender gap in self-reported health, such policies are likely to reduce the gender gap in mortality, but widen the gender gap in self-

[1] All data about life expectancies at birth are obtained from The World Bank accessible at http://data.worldbank.org/.

reported health. This research might be able to shed more light on the consequences of such policies.

The rest of this paper is ordered as follows. Section 2 describes the data and methodology used. Section 3 interprets the results of the decomposition analyses. In section 4, conclusions are drawn, policy implications are discerned and additionally limitations of the research and suggestions for further research are discussed.

2. Data & Methodology

2.1 Data

Data from eight rounds (2008-2015) of the Russian Longitudinal Monitoring Survey (RLMS) are used. The RLMS consists of a set of nationally representative[2] surveys designed to collect information on the health and economic welfare of households and individuals in the Russian Federation. The data are obtained via face-to-face interviews using two main questionnaires: an individual questionnaire, which includes a separate questionnaire for adults and children, and a household questionnaire. Moreover, each year the data include two types of samples, a longitudinal and a cross-sectional sample. This paper uses data from the longitudinal follow-up sample, since the longitudinal sample allows to obtain information on the deaths of household members[3].

The data include a broad range of socioeconomic and health variables, such as information on health status and lifestyles. Overall health is assessed by answering the question "How would you evaluate your health?" on a five-point scale, with 1 corresponding to very good, 2 to good, 3 to average, 4 to bad and 5 to very bad. For the analysis of self-reported health, a binary indicator of poor health is created, which classifies respondents as being in poor health when they report either bad (4) or very bad (5) overall health. Mortality data is collected via the household questionnaire. In each round, respondents were asked whether household members had died since the previous round. The deceased household members form the recorded deaths for the mortality analysis. More specifically, mortality is analysed by recording one-year mortality: a dummy variable is created which indicates whether the individual died within one year following the survey or not. The mortality rates in the RLMS have been found to correspond to national Russian mortality rates (Perlman & Bobak, 2008).

Gender differences in one-year mortality and poor self-assessed health will be decomposed using lifestyles and socioeconomic control variables. Lifestyles include alcohol consumption, smoking, physical exercise and Body Mass Index (BMI). Alcohol consumption is divided into the following categories based on the frequency of alcohol consumption ("How often have you consumed alcoholic beverages in the last 30 days?"): none in the last 30 days (never or infrequent drinkers), 1-3 times in the last 30 days (occasional drinkers), 1-3 times a week (moderate drinkers) and 4-7 times a week (frequent drinkers). Smoking behaviour is assessed by classifying respondents as either never smokers, past smokers or current smokers. Physical exercise measures leisure-time exercise (respondents are specifically asked not to count physical activities at work) and is coded into three categories: no exercise, light physical exercise for relaxation fewer than three times a week and the last category which includes medium, intensive and daily exercise: medium and intensive physical exercise fewer than three times a week, intensive physical exercise at least three times a week for 15 minutes or more, and daily exercise not less than 30 minutes a day. Lastly, BMI is constructed using self-reported height and weight[4], and is used to classify individuals as either underweight, normal weight, overweight, or obese. Given lack of data on eating patterns and non-leisure related physical exercise, BMI functions as a proxy for eating behaviour, especially fat or calorie intake, and physical exercise not captured by the leisure-time exercise variable, such as work-related exercise.

Age, education, household income, marital status and area of residence are added as socioeconomic control variables. Age represents the age of the respondent at the time of the survey. To account for the non-linear relationship between age and poor self-rated health, and between age and one-year mortality, age dummies are constructed. Education is a categorical variable measuring the highest level of education achieved. Some educational levels were grouped together to obtain the following three categories: unfinished secondary or primary education, finished secondary education (general or vocational) and finished higher education (bachelor, master or doctoral degree). Real[5] monthly household income includes all sources of income received by household members. Monthly household income per household member is computed by dividing total household income by the square root of the household size[6]. Household income per person is subsequently divided into quartiles. Marital status indicates whether the respondent is either married (includes respondents who are married and live together, or respondents who live together, but are not married) or not married. Area of residence is measured by two variables: whether the individual lives in an urban or rural area, and in which of the following economic regions the individual lives: Central, Ural, North Caucasus, Volga, West Siberian, East Siberian, Volga-Vyatka, Northwestern, Central Black Earth, Far Eastern and Northern. Lastly, besides controlling for regional fixed effects by including dummies for the economic regions, year dummies are also added to control for year fixed effects. Note that the socioeconomic variables are added as controls to ensure that the contributions of the lifestyles do not capture the direct contributions of the socioeconomic variables.

Table 1 shows the weighted sample means, separately for men and women, of the variables used in the analysis. These descriptive statistics are based on the remaining 51556 observations, after removing individuals with missing values for any of the variables described above, and show substantial differences between men and women.

[2] Detailed information about the sampling design and implementation is available at http://www.cpc.unc.edu/projects/rlms-hse/project/sampling.
[3] Detailed information about data construction can be found in the Appendix (see A.1).

[4] BMI is calculated by dividing weight in kilograms by height in meters squared.
[5] Adjusted for yearly inflation by using the Russian Consumer Price Index (CPI) with 2010 as the reference year (CPI data are obtained from the OECD database: https://data.oecd.org/price/inflation-cpi.htm).
[6] Equivalence scale used in recent OECD publications (http://www.oecd.org/els/soc/OECD-Note-EquivalenceScales.pdf).

Table 1
Weighted means for women and men.

	Women	Men	Difference
Overall self-rated health	2.888	2.698	0.1900***
Poor self-rated health	0.160	0.102	0.0585***
One-year mortality	0.007	0.014	-0.0076***
No alcohol in the last month	0.581	0.371	0.2099***
Alcohol 1-3 times in the last month	0.310	0.271	0.0390***
Alcohol 1-3 times a week	0.103	0.309	-0.2069***
Alcohol 4-7 times a week	0.006	0.048	-0.0420***
Never smoker	0.783	0.266	0.5168***
Past smoker	0.073	0.186	-0.1131***
Current smoker	0.145	0.548	-0.4037***
No exercise	0.783	0.752	0.0315***
Light exercise	0.122	0.099	0.0232***
Medium, intensive or daily exercise	0.095	0.150	-0.0546***
BMI	27.13	25.82	1.3103***
Underweight	0.035	0.015	0.0199***
Normal weight	0.378	0.469	-0.0907***
Overweight	0.298	0.358	-0.0606***
Obese	0.289	0.158	0.1315***
Age	47.97	43.64	4.3204***
18-24 years	0.111	0.142	-0.0315***
25-29 years	0.088	0.108	-0.0207***
30-34 years	0.077	0.099	-0.0213***
35-39 years	0.087	0.096	-0.0092***
40-44 years	0.086	0.092	-0.0062**
45-49 years	0.078	0.092	-0.0144***
50-54 years	0.099	0.099	-0.0006
55-59 years	0.100	0.093	0.0068**
60-64 years	0.077	0.061	0.0158***
65-69 years	0.049	0.036	0.0131***
70-74 years	0.065	0.039	0.0262***
75-79 years	0.046	0.025	0.0214***
80+ years	0.039	0.018	0.0206***
Unfinished secondary or primary school	0.168	0.198	-0.0299***
Finished secondary school	0.577	0.602	-0.0246***
Finished higher education	0.255	0.200	0.0544***
Lowest wealth quartile	0.253	0.216	0.0366***
2nd wealth quartile	0.258	0.251	0.0072*
3rd wealth quartile	0.245	0.261	-0.0162***
Highest wealth quartile	0.244	0.272	-0.0276***
Married	0.547	0.718	-0.1708***
Rural	0.268	0.289	-0.0209***
N	30380	21176	

Note: Difference = Women – Men.
* P-value < 0.1.
** P-value < 0.05.
*** P-value < 0.01.

Specifically, the descriptive statistics support the findings from the literature: women report worse self-rated health than men, but men have a higher mortality rate than women. On average, women report to be in lower overall health, and women are more likely to rate their health as bad or very bad. Given this, it is all the more striking that men are more than twice as likely to die than women in the sample. This excess male mortality is also reflected in the age distribution, where women are more likely to be concentrated in the older age categories, and perhaps in the distribution of marital status, where women are substantially less likely to be married, which could relate to a shortage of men due to excess male mortality. Table 1 also provides support for the unhealthy lifestyles of men. Men are more likely to drink alcohol at least once per week, and they are also substantially more likely to smoke. These healthier lifestyles of women, as well as the higher educational attainment among women, could help to narrow the female disadvantage in poor self-reported health, and might partly explain the male excess in one-year mortality. However, men seem to exercise more frequently and intensively than women, although the vast majority of both men and women do not engage in leisure-time exercise, and, in terms of BMI, men also seem to be healthier than women, which is best reflected by the higher obesity rate among women. These seemingly healthier eating and exercise patterns of men could help to reduce the male excess in one-year mortality and could potentially partly explain the female disadvantage in poor self-rated health.

2.2 Methodology

Decomposition analysis is applied to explore whether and how lifestyles influence the gender disparities in self-assessed health and mortality. This is done by first regressing poor self-reported health and one-year mortality on the lifestyles and socioeconomic control variables using standard probit models, which results in the following probability of reporting poor health:

$$Pr(\text{poor health} \mid x_{ij}) = \Phi(x_{ij}\beta_j)$$

and the following probability of dying within one year:

$$Pr(\text{died} \mid x_{ij}) = \Phi(x_{ij}\beta_j)$$

where j = male, female, and $\Phi(.)$ represents the cumulative distribution function of the standardized normal distribution.

An extension of the Blinder-Oaxaca decomposition method created for non-linear models by Yun (2004) is used to estimate the contribution of the lifestyles and socioeconomic variables to the gender difference in the predicted probability of reporting poor health, and to the gender difference in the predicted probability of dying. Denoting these probabilities as $Y = \Phi(x\beta)$, the overall decomposition equation for the mean difference in Y between women and men becomes:

$$\overline{Y}_w - \overline{Y}_m = \overline{\Phi(x_w\beta_w)} - \overline{\Phi(x_m\beta_m)} = \underbrace{\left\{\overline{\Phi(x_w\beta_w)} - \overline{\Phi(x_m\beta_w)}\right\}}_{E} + \underbrace{\left\{\overline{\Phi(x_m\beta_w)} - \overline{\Phi(x_m\beta_m)}\right\}}_{C}$$

where E denotes the overall endowment effect and C the overall coefficient effect. In the decomposition equation above women form the comparison group and men the reference group, which means that a positive endowment (coefficient) effect shows the reduction in the gender difference if women and men had the same characteristics (coefficients), where the endowment (coefficient) effect is assessed by fixing the coefficients (characteristics) to women's (men's) levels (Powers et al., 2011). Women form the comparison group for the decomposition of poor self-rated health, and men form the comparison group for the decomposition of one-year mortality, yielding positive health differences[7].

[7] An alternative decomposition of negative health differences can also be obtained by switching the comparison and reference groups. This reversed decomposition will produce different results, and is also known as the index problem. Therefore, in order to assess the robustness of the decompositions, reversed decompositions are generated. The results hereof are discussed in the Appendix (see A.2).

The above decomposition analyses gender differences in health by examining aggregate differences in characteristics and coefficients. However, to find the unique contribution of each explanatory variable, and particularly the contribution of lifestyles, detailed decomposition analysis is required. In other words, E and C need to be decomposed into parts, E_k and C_k, which represent the unique contribution of each explanatory variable, k, to E and C respectively. One way to calculate E_k and C_k is by sequentially replacing one group's characteristics and coefficients, respectively, with the other group's characteristics and coefficients. Although this method works for linear models, for non-linear models the detailed decomposition results are sensitive to the order in which the explanatory variables are substituted. Yun (2004) suggested a simple solution to this path dependency problem by using weights derived from a first-order Taylor linearization of the aggregate decomposition equation around the means of the regressors, $\overline{x}_w\beta_w$ and $\overline{x}_m\beta_m$. Applied to the previous decomposition, a detailed decomposition formula, which is invariant to the order of sequential substitution, may then be written as follows:

$$\overline{Y}_w - \overline{Y}_m = \Sigma_{k=1}^{n} W_{\Delta x}^{k} \left\{\overline{\Phi(x_w\beta_w)} - \overline{\Phi(x_m\beta_w)}\right\} + \Sigma_{k=1}^{n} W_{\Delta\beta}^{k} \left\{\overline{\Phi(x_m\beta_w)} - \overline{\Phi(x_m\beta_m)}\right\}$$

with the following kth individual weight for E:

$$W_{\Delta x}^{k} = \frac{\beta_w^k(\bar{x}_w^k - \bar{x}_m^k)}{\Sigma_{k=1}^{n}\beta_w^k(\bar{x}_w^k - \bar{x}_m^k)}$$

and the following kth individual weight for C:

$$W_{\Delta\beta}^{k} = \frac{\bar{x}_m^k(\beta_w^k - \beta_m^k)}{\Sigma_{k=1}^{n}\bar{x}_m^k(\beta_w^k - \beta_m^k)}$$

where $\Sigma_{k=1}^{n} W_{\Delta x}^{k} = \Sigma_{k=1}^{n} W_{\Delta\beta}^{k} = 1$.

Using this detailed decomposition equation, the weight of an explanatory variable is in principle proportional to the variable's contribution to the overall endowment or coefficient effect in a linear regression. The obtained weights provide an easy solution to the path dependency problem, and are invariant to a change in the scale of the explanatory variables. As such, the gender differences in health can be presented as the sum of the unique contributions of the explanatory variables:

$$\overline{Y}_w - \overline{Y}_m = E + C = \Sigma_{k=1}^{n} W_{\Delta x}^{k} E + \Sigma_{k=1}^{n} W_{\Delta\beta}^{k} C = \Sigma_{k=1}^{n} E_k + \Sigma_{k=1}^{n} C_k$$

The detailed decomposition as specified above does have one drawback: the coefficient effects of categorical variables are not invariant to the choice of the reference category. Specifically, changing the reference category will change the sum of the coefficient effects of the categories due to a redistribution of coefficient effects between the constant and the categories. Given that the choice of the reference category is rather arbitrary, this reallocation of coefficient effects sensitive to the choice of the reference category is undesirable. Yun (2005) proposes a simple and intuitive solution to this identification problem by using an averaging approach to obtain a normalized regression. The normalization entails expressing the coefficient of each category as a deviation from the coefficients' mean. This mean is obtained through an averaging approach and computed as follows:

$$\bar{\beta} = \Sigma_{j=1}^{n}\beta_j/j$$

where j denotes the number of categories and β_j are the coefficients of the categories, with $\beta_j = 0$ for the reference category. Specifically, the normalized regression is obtained by deducting this mean from the coefficients of the categorical variable, including the reference category, and then adding the mean to the constant in order to sustain mathematical consistency. After this procedure, the coefficient effects of the categories are invariant to the choice of the reference category.

3. Results

Probit models are generated to assess the differences in coefficients between men and women. Table 2 gives the regression results from the probit models, which indicate that there are indeed some differences in coefficients between men and women.

Specifically, being an occasional or moderate drinker appears to decrease the probability of reporting poor health by more among men than among women. Additionally, alcohol consumption appears to have a protective effect on mortality: occasional and moderate drinkers are less likely to die than never or infrequent drinkers, and this protective effect seems to be stronger among men. However, frequent alcohol consumption does appear to increase the probability of dying, and this effect seems to be larger among females. In contrast, and somewhat surprising given the effect on mortality, frequent male drinkers still report to be in better health than never or infrequent male drinkers.

The adverse effects of smoking on poor self-reported health are larger among women, whereas men appear more likely to die than women due to smoking. This discrepancy might partly explain the paradox, given that female smokers report worse health than male smokers, but are less likely to die. Engaging in leisure-time exercise seems to decrease both the probability of reporting poor health and the probability of dying by more among men than among women. The effects of leisure-time exercise are larger among men who exercise more frequently and more intensively.

Being overweight or obese, in comparison to having a normal weight, rather unexpectedly appears to decrease the probability of dying among women, and this effect is larger among obese women. This effect might partly reflect measurement error in self-reported height and weight, since women might tend to underreport their weight. Female obese respondents do report to be in worse health than their normal weight counterparts. Overall, it appears that not having a normal weight seems to increase the probability of reporting poor health by more among women than among men, whereas it seems to decrease the probability of dying among women, and to increase the probability of dying among men. Lastly, it is interesting to see that the effect of education on poor self-reported health is stronger among females than among males, as the paper by Ross et al. (2012) indicated.

Table 2
Regression results from the probit models.

	Poor self-rated health		One-year mortality	
	Women	Men	Women	Men
Alcohol 1-3 times a month	-0.2917***	-0.3899***	-0.3270***	-0.1510**
Alcohol 1-3 times a week	-0.2859***	-0.4812***	-0.1075	-0.1767***
Alcohol 4-7 times a week	-0.1166	-0.2427***	0.4107*	0.2260***
Past smoker	0.1804***	0.1411***	0.2485*	0.1279*
Current smoker	0.1948***	0.0918***	0.1660	0.2209***
Light exercise	-0.0067	-0.1426***	-0.3538***	-0.2508**
Medium, intensive or daily exercise	-0.0758**	-0.2565***	-0.1596	-0.3085***
Underweight	0.3397***	0.2353**	0.1768	0.3621**
Overweight	-0.0047	-0.2072***	-0.2363***	-0.0903
Obese	0.2098***	0.0612*	-0.3234***	-0.0640
25-29 years	0.0507	0.1273	0.0648	0.2340
30-34 years	0.3069***	0.4384***	0.1392	0.4315**
35-39 years	0.4468***	0.5170***	0.3947	0.5060***
40-44 years	0.5374***	0.5933***	0.6461**	0.4381**
45-49 years	0.7756***	0.6945***	0.7386**	0.6628***
50-54 years	1.0305***	1.0114***	1.0647***	0.8159***
55-59 years	1.2317***	1.1985***	0.8405***	0.9200***
60-64 years	1.4067***	1.3966***	1.039***	0.9292***
65-69 years	1.6138***	1.5340***	1.3777***	1.1721***
70-74 years	1.7810***	1.6528***	1.4088***	1.2525***
75-79 years	2.0684***	1.8956***	1.4039***	1.3800***
80+ years	2.3035***	2.1782***	1.9311***	1.6443***
Finished secondary school	-0.2021***	-0.1517***	-0.2484***	-0.1091*
Finished higher education	-0.3596***	-0.2768***	-0.4675***	-0.2329***
2nd wealth quartile	-0.0648**	-0.0092	0.1553*	0.0081
3rd wealth quartile	-0.1355***	-0.1854***	0.2278**	0.0736
Highest wealth quartile	-0.2141***	-0.2655***	0.2490**	-0.0986
Married	-0.0734***	-0.2197***	-0.0310	-0.1200*
Rural	0.0428*	-0.2657***	0.0355	0.0128
Regional controls	Yes	Yes	Yes	Yes
Year controls	Yes	Yes	Yes	Yes
N	30380	21176	30380	21176

Note: Although the data contain multiple observations per individual, standard errors are not clustered at the individual level to correct for this, since the Stata command used for the decompositions does not allow for clustering. However, the significance of the probit results hardly changes when clustering is allowed for. In terms of lifestyles, only the effects of intensive leisure-time exercise among women and obesity among men on poor self-reported health become insignificant at the 10% level. Furthermore, among men effects of certain lifestyles on poor self-rated health decrease in significance, but stay significant at the 10% level.
* P-value < 0.1.
** P-value < 0.05.
*** P-value < 0.01.

However, the effect of education on one-year mortality does not appear to be larger among males, but rather larger among females[8].

Table 2 indicates some differences in coefficients between men and women, and Table 1 shows substantial differences in characteristics. To examine how lifestyles contribute to the female excess in poor self-reported health and the male excess in one-year mortality, overall and detailed decompositions are carried out. Table 3 summarizes the decomposition results.

The upper panel of Table 3 shows the mean predicted probabilities of reporting poor health and of dying within one year for women and men. The predicted probability of reporting poor health for women and men is, respectively, 16.04% and 10.19%, resulting in a female excess of 5.85 percentage points. For one-year mortality, the predicted probability for men equals 1.44% and for women equals 0.68%, giving a male excess of 0.76 percentage points. These predicted probabilities, and their differences, correspond closely to the means of poor self-reported health and one-year mortality as shown in Table 1.

The decomposition of the gender gap in poor self-rated health is shown in the first two columns of Table 3. The overall decomposition indicates that differences in endowments can explain the majority of the gender gap, namely 69.81%. The detailed decomposition shows that age makes the largest contribution to the overall endowment effect: if women would have the same age composition as men, i.e. if women were younger and all else remained equal, the female excess in the probability of reporting poor health would be reduced by 4.1 percentage points (69.94%). This large contribution of age was to be expected, since age functions as a proxy for overall health: the prevalence of chronic conditions, such as heart disease and arthritis, increases with age, and health functioning, such as mobility and vision, declines with age.

After age, lifestyles contribute most to the overall endowment effect. Among the lifestyles, the frequency of alcohol consumption makes the largest contribution: if women had men's drinking behaviour, this would reduce the female disadvantage in poor self-reported health by

[8] The average marginal effects of the probit results, as shown in the Appendix (see Table A1), illustrate that the effects of lifestyles and education appear to be quite substantial in magnitude given the rather low mean levels of poor self-reported health and one-year mortality among men and women, as shown in Table 1.

Table 3
Decomposition of the gender differences in poor self-rated health and one-year mortality.

	Poor self-rated health		One-year mortality	
	Absolute	**Percent**	**Absolute**	**Percent**
Predicted mean among women	0.1604		.0068	
Predicted mean among men	0.1019		.0144	
Difference	0.0585***		0.0076***	
Decomposition of difference				
Overall endowment effect	0.0408***	69.81%	-0.0028	-36.71%
Overall coefficient effect	0.0177***	30.19%	0.0104***	136.71%
Detailed endowment effects				
No alcohol in the last month	0.0091***	15.61%	-0.0003	-3.99%
Alcohol 1-3 times in the last month	-0.0012***	-1.97%	0.0003**	3.65%
Alcohol 1-3 times a week	0.0058***	9.96%	-0.0018***	-23.36%
Alcohol 4-7 times a week	-0.0006	-1.02%	0.0006***	7.88%
Total effect of alcohol consumption	0.0132***	22.57%	-0.0012**	-15.81%
Never smoker	-0.0162***	-27.69%	0.0034*	44.84%
Past smoker	-0.0016*	-2.68%	0.0001	0.98%
Current smoker	-0.0071**	-12.06%	0.0024*	31.53%
Total effect of smoking behaviour	-0.0248***	-42.43%	0.0059	77.35%
No exercise	0.0002	0.37%	-0.0003***	-4.38%
Light exercise	0.0001	0.21%	0.0001	1.11%
Medium, intensive or daily exercise	0.0007*	1.13%	-0.0004*	-4.98%
Total effect of leisure-time exercise	0.001	1.71%	-0.0006**	-8.24%
Underweight	0.001***	1.73%	-0.0004**	-4.59%
Normal weight	0.0031***	5.29%	-0.0003	-3.52%
Overweight	0.0021***	3.66%	-0.0005***	-6.43%
Obese	0.0024***	4.15%	0.0009*	11.37%
Total effect of BMI	0.0087***	14.83%	-0.0002**	-3.17%
Age	0.0409***	69.94%	-0.0058	-75.40%
Education	-0.0037***	-6.26%	0.0006	7.46%
Wealth	0.0019***	3.27%	-0.0001	-1.18%
Marital status	0.0031***	5.37%	-0.0012	-15.29%
Area	-0.0002*	-0.38%	0.0000	0.20%
Region	0.0009***	1.46%	-0.0002	-0.00%
Year	-0.0002***	-0.28%	-0.0000	-0.00%
Detailed coefficient effects				
No alcohol in the last month	-0.0077**	-13.23%	0.0002	2.81%
Alcohol 1-3 times in the last month	-0.0004	-0.62%	0.0011*	15.04%
Alcohol 1-3 times a week	0.0056*	9.50%	-0.0001	-1.26%
Alcohol 4-7 times a week	0.0002	0.35%	-0.0000	-0.24%
Total effect of alcohol consumption	-0.0023***	-4.00%	0.0012	16.34%
Never smoker	-0.0025	-4.29%	0.0003	4.26%
Past smoker	-0.0003	-0.52%	-0.0001	-1.78%
Current smoker	0.0061*	10.35%	0.0002	2.75%
Total effect of smoking behaviour	0.0032	5.55%	0.0004	5.23%
No exercise	-0.0158***	-26.95%	0.0002	2.97%
Light exercise	0.0006	1.02%	0.0003	3.58%
Medium, intensive or daily exercise	0.0022*	3.82%	-0.0002	-3.15%
Total effect of leisure-time exercise	-0.0129***	-22.11%	0.0003	3.40%
Underweight	-0.0000	-0.05%	0.0000	0.33%
Normal weight	-0.0106**	-18.13%	-0.0011*	-13.85%
Overweight	0.0063**	10.77%	-0.0000	-0.13%
Obese	0.0011	1.87%	0.0006	8.02%
Total effect of BMI	-0.0032***	-5.54%	-0.0004	-5.62%
Age	-0.006	-10.18%	0.0003	4.18%
Education	-0.0005	-0.85%	0.0003	3.86%
Wealth	0.0003*	0.54%	0.0000*	0.41%
Marital status	0.0063***	10.84%	-0.0001	-1.05%
Area	-0.0129***	-22.08%	0.0001	1.31%
Region	-0.0003	-0.46%	0.0003	4.19%
Year	-0.0004	-0.74%	0.0001	1.20%
Constant	0.0463***	79.22%	0.0079	103.25%

Note: Difference represents the female disadvantage in poor self-reported health and the male excess in one-year mortality.
* P-value < 0.1.
** P-value < 0.05.
*** P-value < 0.01.

1.3 percentage points (22.57%). As shown in Table 3, this effect is largely driven, given that women's characteristics are equalized to those of men, and given that men are less likely to never or infrequently drink alcohol as shown in Table 1, by a reduction in the number of women who either never drink alcohol or drink alcohol infrequently. As shown in Table 2, women in this category are more likely to report poor health than occasional or moderate drinkers. However, if more women were to become frequent drinkers, the gender gap in poor self-rated health would potentially increase somewhat by 0.06 percentage points (-1.02%). This small contribution of excessive alcohol consumption in narrowing the female disadvantage can partly be explained by the overall low percentage of frequent drinkers in the sample. As such, and in accordance with the findings of Perlman & Bobak (2008), women's less frequent alcohol consumption seems to have an overall negative impact on self-reported health.

The second largest contribution of lifestyles can be attributed to BMI: if women had men's distribution of BMI, the gender gap in poor self-rated health would be reduced by 0.87 percentage points (14.83%). The increase in the number of women with normal weight, and the decrease in the number of women with obesity accounts for most of this effect. Although women also engage less frequently in leisure-time exercise, exercising more frequently and more intensively would only reduce the gender gap slightly by 0.07 percentage points (1.13%). This small contribution of frequent and intensive leisure-time exercise can partly be explained by the large percentage of both men and women in the sample who do not engage in leisure-time exercise, and partly by the exclusion of non-leisure time exercise, such as work-related exercise. However, work-related exercise and eating patterns are most likely captured by the contribution of BMI. Lastly, the detailed decomposition also shows that the healthier lifestyles of women help to narrow the gender gap in poor self-reported health. Namely, if women had men's smoking behaviour, this would increase the female excess by 2.5 percentage points (-42.43%). Moreover, the better educational levels of women also help to narrow the gender gap.

Differences in coefficients account for the remainder, namely 30.19%, of the gender difference in poor self-assessed health. However, the detailed decomposition indicates that most of this effect remains unexplained, due to the large contribution of the constant (79.22%). Still, differences in effects of some lifestyles between men and women seem to explain a part of the gender gap.

Specifically, Table 2 indicates that men benefit more from moderate drinking, and this greater health benefit seems to explain a part of the gender gap: if men and women were to obtain the same health benefit from moderate drinking, the female excess would be reduced by 0.56 percentage points (9.50%). Although men also benefit more from drinking frequently, the coefficient effect of frequent drinking at best reduces the female disadvantage marginally. This small coefficient effect of frequent drinking is partly the result of the overall low percentage of men in the sample who consume alcohol frequently. Table 2 also indicates that the adverse health effects of smoking are larger among women, and this is reflected in the positive coefficient effect of current smokers: if women obtained the same health effect from smoking as men, the female disadvantage in poor self-assessed health would decrease by 0.61 percentage points (10.35%). Moreover, men's greater health benefit from intensive leisure-time exercise and men's more favourable response to being overweight also explain a part of the gender gap.

Besides lifestyles, the difference in the effect of marital status between men and women, which, as shown in Table 2, indicates that men benefit more from marriage, also seems to explain a relatively big part of the gender gap. Lastly, although in Table 2 larger health benefits of education were found among women, the coefficient effect of education at best reduces the gender gap slightly.

In contrast, the decomposition of the male excess in one-year mortality shows quite a different pattern, as shown in the last two columns of Table 3. The aggregate decomposition indicates that the overall coefficient effect can explain the complete gender gap in one-year mortality. More precisely, the overall coefficient effect can actually account for a larger male disadvantage in one-year mortality than currently observed: it can explain a gender gap of 10.4 percentage points (136.71%). The contribution of the overall endowment effect is negative, albeit not significant. This negative endowment effect could be interpreted as endowments being better among men than among women, and thus they help to narrow the gender gap. Or, alternatively, the reason why the gender gap is not larger than the one currently observed is because men have better endowments.

Specifically, if men had women's drinking behaviour, this would increase the male disadvantage in one-year mortality by 0.12 percentage points (-15.81%). However, the difference in frequent alcohol consumption can explain a part of the gender gap, albeit a small part: if less men were to consume alcohol frequently, this would reduce the male excess by 0.06 percentage points (7.88%). This small contribution of excessive alcohol consumption can again partly be attributed to the low proportion of frequent drinkers in the sample. Besides alcohol consumption, men's more frequent (leisure-time) exercise patterns and presumably healthier eating patterns also contribute to narrowing the gender gap in one-year mortality, as represented by the overall negative contributions of leisure-time exercise and BMI. However, not all men's endowments contribute to narrowing the gender gap in one-year mortality: if men would have the same smoking patterns as women, the male excess would be reduced by 0.59 percentage points (77.35%). Although this overall effect of smoking behaviour is insignificant, the individual coefficient effects of never and current smokers appear to be able to explain a big portion of the gender gap in one-year mortality.

Investigating the detailed coefficient effects shows that the complete gender gap in one-year mortality can be explained by the constant, and as such remains largely unexplained. However, men's greater health benefit from occasional alcohol consumption also seems to be able to explain a part of the gender gap: if men obtained the same health benefit as women from occasional alcohol consumption, the male excess would be reduced by 0.11 percentage points (15.04%). Still, the large contribution of the constant indicates that this model appears largely unable to explain the gender gap in one-year mortality. The differences in lifestyles seem to play a role in explaining the male disadvantage in one-year mortality, but a limited one, since the combination of the differences in endowments cannot explain the observed gender gap, or more precisely, can only potentially explain a female excess in one-year mortality.

4. Discussion

4.1 Conclusion and policy implications

Gender differences in health around the world have revealed an important paradox: women report worse self-rated health than men, but are less likely to die than their male counterparts, indicating that women may, in fact, be healthier. This paradox is especially striking in the Russian Federation, where the gender gap in life expectancy currently exceeds 10 years, but where women still report to be in worse health than same-aged men. Most research identifies the unhealthy lifestyles of Russian males as responsible for fostering excess male mortality. However, relatively little is known about the contribution of lifestyles to the gender gap in self-assessed health. Therefore, the aim of this paper is to try to unpack the (potential) contribution of lifestyles to the female disadvantage in poor self-reported health and the male excess in one-year mortality in the Russian Federation using decomposition analysis.

Almost 70% of the female disadvantage in poor self-reported health can be explained by gender differences in endowments. Differences in lifestyles between men and women play an important role in explaining this endowment effect: gender differences in the frequency of alcohol consumption, the frequency and intensity of leisure-time exercise and the distribution of BMI can explain almost 40% of the female disadvantage, with alcohol consumption explaining slightly more than half of this contribution. In contrast, gender differences in lifestyles seem to play a limited role in explaining the male excess in one-year mortality. Although differences in smoking patterns and frequent alcohol consumption between men and women seem to potentially explain a considerable part, namely about 85%, of the male excess, the combined differences in endowments cannot explain the gender gap. Instead, differences in coefficients, and more specifically the constant, can explain the entire gender gap in one-year mortality. Put differently, the male excess remains almost completely unexplained by the variables considered in this analysis.

As such, it seems that gender differences in lifestyles play a much larger role in explaining the female disadvantage in poor self-assessed health than the male excess in one-year mortality. However, the healthier lifestyles of men, i.e. their apparently healthier drinking behaviour, especially men's more moderate drinking behaviour compared to women's more infrequent drinking behaviour, and men's apparently healthier (leisure-time) exercise and eating patterns, appear to help in narrowing the male excess in one-year mortality and seem to explain a considerable part of the female disadvantage in poor self-reported health. Likewise, the lower smoking rate among women helps to narrow the gender gap in poor self-reported health and seems to play a role in explaining the gender gap in one-year mortality. Therefore, gender differences in lifestyles do not seem able to explain the paradox. It would also suggest, although the results should not be understood as causal, that policies targeted at reducing the prevalence of smoking among men may lead to a reduction in excess male mortality, but will most likely increase the female disadvantage in self-reported health. Policies targeted at healthier lifestyles for women would also seem to narrow the gender gap in poor self-reported health, only to widen the gender gap in one-year mortality. Therefore, purely from the perspective of narrowing gender differences in health, policies targeted at healthier lifestyles might not be able to achieve much, or at least they might not be the most obvious choice for reducing gender differences in health as a whole. Still, given that the contributions of lifestyles to the gender health gaps are not equal, if causal evidence could be brought forward in the future, it could perhaps illustrate that policies targeted at certain combinations of lifestyles are able to substantially reduce one gender gap in health, while keeping the other gender gap in health more or less constant.

Moreover, and rather surprising given previous research, excessive alcohol use and high rates of smoking, in combination with men's other endowments, do not seem able to explain the excess male mortality in the Russian sample. This could possibly be related to using one-year mortality as an indicator of mortality, which results in a very low mortality rate. If a longer follow-up period was chosen to record mortality, the contributions of heavy drinking and smoking among Russian males might be identified (see also 4.2). In addition, perhaps the underlying gender roles inherent in Russian society should be taken into account when trying to explain the male excess in one-year mortality. The norm of traditional masculinity, as implied by the male gender role, not only positions men as the households' primary breadwinners, which often leads to physical and psychological stress, but also seems to encourage unhealthy behaviour as such, e.g. excessive alcohol use, but also men's reluctance to seek (medical) help, with suicide as the possible outcome (Ashwin & Lytkina, 2004; Möller-Leimkühler, 2003). Research also indicates that stress[9] resulting from the transition to a market economy, following the fall of communism, has led to an increase in male defective behaviour, such as drug abuse, but also increases in violence, aggression, and even suicides (Möller-Leimkühler, 2003). Thus, traditional masculinity, which appears responsible for men's negligence of their health, might play a crucial role in promoting male vulnerability. Perhaps men's physical and psychological pressure due to their role as primary breadwinners, and their reluctance to seek (medical) help, in combination with men's unhealthy coping strategies, can explain the male excess in one-year mortality.

4.2 Limitations and suggestions for further research

This research is also subject to limitations. First of all, it does not allow for a formal testing of reporting heterogeneity by gender. As discussed in the introduction, females might actually be healthier than males, as indicated by their lower mortality, but just report worse health. Given the evidence of reporting heterogeneity described in the introduction, it seems unlikely that

[9] For example, women's entry into the labour market, accompanied by changing gender roles, and high rates of male unemployment, left many Russian males feeling unequipped. In response, Russian males adopt defective coping strategies, such as the aforementioned risk-taking behaviours, in an attempt to regain their lost masculinity (Möller-Leimkühler, 2003).

reporting heterogeneity, if indeed present, would be able to completely explain the gender gap in poor self-reported health. Most likely, it would reduce the female disadvantage, but not entirely eliminate it. The detailed decomposition also indicates that the female excess does not entirely rest upon systematic gender differences in the reporting of poor health, given that most of the gender gap can be explained by differences in endowments, not by differences in coefficients. However, given that self-assessed health is not purged of potential reporting heterogeneity, the contribution of the lifestyles to the gender gap might not be accurately measured. For example, by purging the self-assessments of reporting heterogeneity, the entire gender gap in poor self-reported health might be explained by differences in endowments. Future research should therefore try to purge the self-assessments of reporting heterogeneity, so as to arrive at a more accurate estimate of the contribution of lifestyles to the female excess in self-reported health.

A second limitation of this research is that the results might not be representative of the Russian population. Specifically, around five-sixth of the observations were dropped due to missing values for certain variables, and therefore item non-response bias could be present. For example, if mainly heavy drinkers did not respond to the question about frequency of alcohol use (maybe because they are ashamed), then the proportion of heavy drinkers in the population is underestimated and, given that most heavy drinkers are male, male mortality might be underestimated. The exclusion of these respondents might, therefore, lead to an underestimation of the male excess in one-year mortality, as well as to an underestimation of the contribution of excessive alcohol use to the gender mortality gap. The exclusion of these respondents might also be one of the reasons for the small contribution of frequent alcohol consumption to the gender mortality gap, and perhaps for the insignificant overall endowment effect.

Moreover, although the mortality rates in the RLMS have been found to be comparable to Russian national mortality rates in previous studies (see e.g. Perlman & Bobak, 2008), the mortality rates used in this paper are almost certainly underestimated due to attrition. More specifically, individuals who are ill and die due to their condition are unlikely, given that they have suffered from their illness for more than a year, to have responded to last year's individual questionnaire. As such, deceased respondents who did not respond to the previous questionnaire are excluded from the analysis[10], which leads to an underestimation of mortality rates. Given that men are more likely to die, they might also be more likely to be ill and thus not respond to the previous year's questionnaire. And therefore, male mortality might be less accurately measured than female mortality, leading to an underestimation of excess male mortality.

Besides item non-response and attrition, the results most likely also suffer from measurement error. As briefly mentioned before, respondents, and especially women, might tend to underreport their weight, which could lead to an underestimation of the favourable health effects of having a normal weight (Rowland, 1990). Respondents might also underreport their drinking behaviour, resulting in an underestimation of respondents who consume alcohol frequently and in a possible underestimation of the (adverse) health effects of frequent alcohol use (Boniface et al., 2014). This might also be one of the reasons for the overall low percentage of respondents in the sample who report to be frequent drinkers.

Moreover, although this paper has extensive information on the frequency of alcohol use, it cannot discern the type of alcohol consumed, nor how much alcohol is consumed during a drinking session. This information is important, however, since it is fair to assume that consuming a bottle of vodka occasionally is detrimental to health, whereas consuming a beer occasionally might actually have a protective effect. Therefore, future research should distinguish between the types of alcohol consumed and the amount thereof, which should lead to more accurate estimates concerning the role of alcohol consumption in explaining the gender health gaps. Future research should also focus on examining more directly the impact of eating and exercise patterns, since leisure-time exercise and BMI are imperfect proxies. Especially the simple calculation adopted to compute BMI is flawed, since studies have shown that, as an indicator of body fat, BMI is age and sex dependent[11] (see e.g. Gallagher et al., 1996). Lastly, further research could also focus on adding chronic conditions, since it would be interesting to see whether unhealthy lifestyles, especially excessive drinking, still have a direct impact on health after controlling for their contribution to health via chronic conditions. Specifically, controlling for the impact via chronic conditions might indicate whether alcohol causes more direct deaths, such as alcohol poisoning or accidents due to binge drinking, or more deaths via chronic conditions, such as cirrhosis due to long-term alcohol abuse. If causal effects can be established, then the results might also influence policy campaigns directed at lowering the consumption of alcohol.

Another limitation of this research is that the self-assessments of health among women are not corrected for pregnancy-related health. Pregnancies and the corresponding detrimental health effects most likely contribute to the worse self-reports of health among women, and as such pregnancy-related health problems should ideally be removed when examining the gender gap in self-reported health. Hence, future research should focus on non-pregnancy related health by removing pregnant women and women who recently gave birth. Moreover, as mentioned in the conclusion, future research should investigate the contribution of gender roles in Russia, especially men's employment status and (medical) help-seeking behaviour, to the male excess in mortality, and should record mortality using a longer follow-up period.

Lastly, an important point that should be mentioned is that, as in previous decomposition analyses of the gender health gaps, the results should not be interpreted as causal contributions (Case & Paxson, 2005; Zhang et al., 2015). The main limitation of not finding causal contributions is that the results will not necessarily be a good guide for policy makers. Therefore, further research

[10] The one-year mortality indicator cannot be linked to the previous individual questionnaire, since these respondents did not respond to this questionnaire (presumably due to illness). See also the Appendix (A.1).

[11] Particularly, the simplistic BMI calculation is inaccurate for individuals aged 19 or younger. Aware of this, the decompositions are also performed on data which exclude these individuals (see Appendix, A.2).

should focus on finding causal effects to inform policy makers on how campaigns directed at healthy lifestyles should be constructed in order to reduce gender gaps in health. However, to my knowledge this is the first paper to decompose the gender health gaps in Russia, and such descriptive analysis is nevertheless useful, especially as a first assessment of the importance of lifestyles in explaining (or broadening) the gender health disparities in Russia.

Appendix

A.1 Data construction

As mentioned in the data section, data from eight rounds of the RLMS are used. In principle, the main dataset is the longitudinal individual dataset, which covers the years 1994-2015 and includes all necessary information, except information on mortality, household income and household size. This information is obtained from the longitudinal household dataset, which also covers the years 1994-2015. Household data from 2009-2015[12] are used to construct a variable which indicates whether the individual died in the respective year or not. This information is then merged with the individual data from 2008-2014.

The household data also include movers, which means that individuals can have multiple entries for the mortality variable. The vast majority of the duplicate entries do not lead to conflicting mortality results (either all households reply that the individual has died, or all households reply that the individual is still alive) and thus duplicate entries can be easily removed. However, a few duplicate entries (approximately 0.2% of the duplicate entries) do lead to conflicting results (certain households indicate that the individual has died, while others indicate that the individual is still alive). For the main analysis, these few duplicate entries were removed based on the time of the household interview and on whether the individual still has an individual questionnaire in subsequent years, resulting in only one entry per individual per year. Still, the analysis is also performed on data which exclude these conflicting mortality results altogether (see A.2).

Lastly, household data from 2008-2014 are used to obtain information about the household income and the household size. The household income and the number of household members are then also merged with the individual data from 2008-2014 to obtain one dataset that includes all the necessary variables for the analysis.

A.2 Robustness checks

Several checks have been performed to investigate whether the results are robust. As briefly mentioned in the methodology section, the decompositions suffer from an index problem: the decompositions change if the comparison and reference groups are reversed. However, switching the comparison and reference groups does not alter the decompositions greatly. Specifically, with men as the comparison group the entire gender gap in poor self-assessed health can be explained by differences in characteristics. Again, differences in the age composition can explain the majority, namely 55%, of the gender gap. Differences in lifestyles, however, also play an important role: 35% of the gender gap can be explained by differences in drinking behaviour, and around 13% of the gender gap can be explained by the apparently healthier eating and (leisure-time) exercise patterns of men, as represented by the contributions of leisure-time exercise and BMI. And again, the lower smoking rate among women helps to narrow the gender gap. The negligible role of differences in coefficients seems to indicate that the female excess in poor self-rated health indeed does not (entirely) rest upon systemic reporting differences by gender.

With women as the comparison group, almost the entire gender gap in one-year mortality again remains unexplained, due to the large contribution of the constant. However, although some of the individual endowment effects, notably some of the gender differences in lifestyles, were significant with men as the comparison group, no significant individual endowment effects are now found. This seems to support the limited role of lifestyles in explaining the gender gap in one-year mortality.

Moreover, as described briefly in the data construction, the main decompositions are also performed on data which exclude the conflicting mortality results. As expected due to the small number of conflicting entries, the decompositions hardly change when these conflicting entries are removed. Most notable is the somewhat smaller gender gap in one-year mortality of 0.73 percentage points, but the relative contributions remain largely unchanged.

Lastly, the main decompositions are also performed on data excluding individuals aged 24 or younger. This is done for two reasons. First of all, the simple calculation of BMI that is applied is only valid for adults aged 20 or older. Secondly, since the education variable refers to the highest finished level of education, individuals below the age of 25 are excluded to ensure that respondents have reached their final level of education. Excluding individuals aged 24 or younger increases both the female disadvantage in poor self-reported health and the male excess in one-year mortality, resulting in gender gaps of, respectively, 6.29 percentage points and 0.89 percentage points. However, the relative contributions again remain largely unchanged. As such, it seems that the main results are largely robust to both the index problem and changes in the composition of the data.

References

Ashwin, S., & Lytkina, T. (2004). Men in Crisis in Russia: The Role of Domestic Marginalization. *Gender & Society*, 189-206.

Boniface, S., Kneale, J., & Shelton, N. (2014). Drinking pattern is more strongly associated with under-reporting of alcohol consumption than socio-demographic factors: evidence from a mixed-methods study. *BMC Public Health*, 1297-1305.

Brainerd, E., & Cutler, D. M. (2005). Autopsy on an Empire: Understanding Mortality in Russia and the Former Soviet Union. *The Journal of Economic Perspectives*, 107-130.

Case, A., & Paxson, C. (2005). Sex differences in morbidity and mortality. *Demography*, 189-214.

[12] Before 2009 the data do not identify who died, so the mortality information cannot be linked to the individual data.

Table A1

Average marginal effects of the regression results from the probit models.

	Poor self-rated health		One-year mortality	
	Women	Men	Women	Men
Alcohol 1-3 times a month	-0.0528***	-0.0551***	-0.0051***	-0.0049**
Alcohol 1-3 times a week	-0.0518***	-0.0680***	-0.0017	-0.0058***
Alcohol 4-7 times a week	-0.0211	-0.0343***	0.0064*	0.0074***
Past smoker	0.0327***	0.0199***	0.0038*	0.0042*
Current smoker	0.0353***	0.0130***	0.0026	0.0072***
Light exercise	-0.0012	-0.0201***	-0.0055***	-0.0082**
Medium, intensive or daily exercise	-0.0137**	-0.0362***	-0.0025	-0.0100***
Underweight	0.0615***	0.0332**	0.0027	0.0118**
Overweight	-0.0009	-0.0293***	-0.0037***	-0.0029
Obese	0.0380***	0.0086*	-0.0050***	-0.0021
25-29 years	0.0092	0.0180	0.0010	0.0076
30-34 years	0.0556***	0.0619***	0.0022	0.0141**
35-39 years	0.0809***	0.0730***	0.0061	0.0165***
40-44 years	0.0974***	0.0838***	0.0100**	0.0143**
45-49 years	0.1405***	0.0981***	0.0114**	0.0216***
50-54 years	0.1867***	0.1429***	0.0165***	0.0266***
55-59 years	0.2231***	0.1693***	0.0130***	0.0300***
60-64 years	0.2548***	0.1972***	0.0161***	0.0303***
65-69 years	0.2924***	0.2167***	0.0213***	0.0382***
70-74 years	0.3226***	0.2334***	0.0218***	0.0408***
75-79 years	0.3747***	0.2677***	0.0217***	0.0449***
80+ years	0.4173***	0.3076***	0.0299***	0.0536***
Finished secondary school	-0.0366***	-0.0214***	-0.0038***	-0.0036*
Finished higher education	-0.0651***	-0.0391***	-0.0072***	-0.0076***
2nd wealth quartile	-0.0117**	-0.0013	0.0024*	0.0003
3rd wealth quartile	-0.0246***	-0.0262***	0.0035**	0.0024
Highest wealth quartile	-0.0388***	-0.0375***	0.0039**	-0.0032
Married	-0.0133***	-0.0310***	-0.0005	-0.0039*
Rural	0.0078*	-0.0375***	0.0006	0.0004
Regional controls	Yes	Yes	Yes	Yes
Year controls	Yes	Yes	Yes	Yes
N	30380	21176	30380	21176

Note: As with the probit results shown in Table 2, the average marginal effects are not clustered at the individual level.
* P-value < 0.1.
** P-value < 0.05.
*** P-value < 0.01.

Cockerham, W. C. (2000). Health lifestyles in Russia. *Social Science & Medicine*, 1313-1324.

Cockerham, W. C. (1997). The Social Determinants of the Decline of Life Expectancy in Russia and Eastern Europe: A Lifestyle Explanation. *Journal of Health and Social Behavior*, 117-130.

Dowd, J. B., & Todd, M. (2011). Does Self-reported Health Bias the Measurement of Health Inequalities in U.S. Adults? Evidence Using Anchoring Vignettes From the Health and Retirement Study. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 478-489.

Gallagher, D., Visser, M., Sepulveda, D., Pierson, R. N., Harris, T., & Heymsfield, S. B. (1996). How Useful Is Body Mass Index for Comparison of Body Fatness across Age, Sex, and Ethnic Groups? *American Journal of Epidemiology*, 228-239.

Idler, E. (2003). Discussion: Gender Differences in Self-Rated Health, in Mortality, in the Relationship Between the Two. *The Gerontologist*, 372-375.

Idler, E., & Benyamini, Y. (1997). Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies. *Journal of Health and Social Behaviour*, 21-37.

Leon, D. A., Chenet, L., Shkolnikov, V. M., Zakharov, S., Shapiro, J., Rakhmanova, G., et al. (1997). Huge variation in Russian mortality rates 1984–94: artefact, alcohol, or what? *The Lancet*, 383-388.

Macintyre, S., Ford, G., & Hunt, K. (1999). Do women 'over-report' morbidity? Men's and women's responses to structured prompting on a standard question on long standing illness. *Social Science & Medicine*, 89-98.

Möller-Leimkühler, A. M. (2003). The gender gap in suicide and premature death or: why are men so vulnerable? *European Archives of Psychiatry and Clinical Neuroscience*, 1-8.

Nathanson, C. (1975). Illness and the Feminine Role: A Theoretical Review. *Social Science and Medicine*, 57-62.

Nicholson, A., Bobak, M., Murphy, M., Rose, R., & Marmot, M. (2005). Alcohol consumption and increased mortality in Russian men and women: a cohort study based on the mortality of relatives. *Bulletin of the World Health Organization*, 812-819.

Paul, P., & Valtonen, H. (2016). Inequalities in perceived health in the Russian Federation, 1994–2012. *BMC Public Health*, 165-176.

Peracchi, F., & Rossetti, C. (2012). Heterogeneity in health responses and anchoring vignettes. *Empirical Economics*, 513-538.

Perlman, F., & Bobak, M. (2008). Determinants of self rated health and mortality in Russia - are they the same? *International Journal for Equity in Health*, 19-26.

Perlman, F., & Bobak, M. (2008). Socioeconomic and Behavioral Determinants of Mortality in Posttransition Russia: A Prospective Population Study. *Annals of Epidemiology*, 92-100.

Powers, D. A., Yoshioka, H., & Yun, M.-S. (2011). mvdcmp: Multivariate decomposition for nonlinear response models. *The Stata Journal*, 556-576.

Ross, C. E., Masters, R. K., & Hummer, R. A. (2012). Education and the Gender Gaps in Health and Mortality. *Demography*, 1157-1183 .

Rowland, M. L. (1990). Self-reported weight and height. *The American journal of clinical nutrition*, 1125-1133.
Shkolnikov, V. M., Cornia, G. A., Leon, D. A., & Meslé, F. (1998). Causes of the Russian Mortality Crisis: Evidence and Interpretations. *World Development*, 1995-2011.
Shkolnikov, V. M., Field, M. G., & Andreev, E. M. (2011). Russia: Socioeconomic Dimensions of the Gender Gap in Mortality. In T. Evans, M. Whitehead, F. Diderichsen, A. Bhuiya, & M. Wirth, *Challenging Inequities in Health: From Ethics to Action* (pp. 138-155). New York: Oxford University Press.
Spiers, N., Jagger, C., Clarke, M., & Arthur, A. (2003). Are Gender Differences in the Relationship Between Self-Rated Health and Mortality Enduring? Results From Three Birth Cohorts in Melton Mowbray, United Kingdom. *The Gerontologist*, 406-411.
Verbrugge, L. M. (1982). Sex Differentials in Health. *Public Health Reports*, 417-437.
Verbrugge, L. M. (1989). The Twain Meet: Empirical Explanations of Sex Differences in Health and Mortality. *Journal of Health and Social Behavior*, 282-304.
Yun, M.-S. (2005). A simple solution to the identification problem in detailed wage decompositions. *Economic Inquiry*, 766-772.
Yun, M.-S. (2004). Decomposing differences in the first moment. *Economics Letters*, 275–280.
Zhang, H., Bago d'Uva, T., & Van Doorslaer, E. (2015). The gender health gap in China: A decomposition analysis. *Economics and Human Biology*, 13-26.