Ways to Improve Health in the Russian Federation, 2000–2017

Findings from the Global Burden of Disease 2017 Study
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This report was prepared by the Institute for Health Metrics and Evaluation (IHME), in collaboration with the Federal Research Institute for Health Organization and Informatics (FRIHOI), E.Varavikova and S.Soshnikov.

Estimates from the GBD study may differ from national statistics due to differences in data sources and methodology. The estimates are available from https://vizhub.healthdata.org/gbd-compare and http://ghdx.healthdata.org/gbd-results-tool.

This report is not intended to give a full explanation of the methodology of the GBD study. Those who are interested in methodological details are invited to read the GBD 2017 capstone papers (available at www.thelancet.com/gbd) and other relevant documents (available at http://ghdx.healthdata.org/gbd-2017).

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Cover photo: Moscow Kremlin, Kremlin Embankment and Moscow River at night in Moscow, Russia. Photo by Catarina Belova.

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About the Federal Research Institute for Health Organization and Informatics

The Federal Research Institute for Health Organization and Informatics (FRIHOI) was founded by order of the Ministry of Health of the Russian Federation in 1999. FRIHOI is led by Professor Vladimir Ivanovich Starodubov, Member of the Board of the Russian Academy of Science, former Minister of Health of Russia, and founder of many research areas in Russian public health and health policy. FRIHOI monitors health data; conducts research and analysis; and designs systems for collecting, preparing, and analyzing data – for example, by maintaining registries for medical personnel or monitoring, auditing, and evaluating health systems at the national and subnational levels. FRIHOI has extensive experience in cooperating with the World Health Organization (WHO) and other major foreign organizations and medical universities. The main goal of the FRIHOI is to develop high-quality health information and the evidence base for health policy, allowing for the improvement of health system management and the organization of professional education and international cooperation.

About the Institute for Health Metrics and Evaluation

The Institute for Health Metrics and Evaluation (IHME) at the University of Washington in Seattle is an independent health research center. IHME aims to improve health by making rigorous and comparable measurements of the world’s health problems freely available to researchers, donors, policymakers, and other decision-makers. It coordinates the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD), the world’s most comprehensive study of the impact of health problems on people. IHME and produced annually. Its methods and metrics emphasize comparability among causes that kill and causes that disable, and comprehensiveness – its measurements take into account all causes of health loss. The study is based on a dataset of over 100,000 sources, which can be explored at http://ghdx.healthdata.org. The vast majority of the sources used in the study are open-access and available to other researchers. The GBD’s methods and results are made freely, publicly available under the Guidelines for Accurate and Transparent Health Estimates Reporting (http://gather-statement.org).

Partnership between IHME and the World Health Organization (WHO)

In May 2018, WHO and IHME signed a Memorandum of Understanding as a formal agreement to collaborate in improving the accuracy, timeliness, and policy-relevance of health data. As part of that agreement, the two organizations aim to integrate their knowledge and expertise. That work will include mutual efforts to produce, review, assess, and improve health estimates; identify gaps in available health data; and strengthen connections between data, estimation, and policy-making processes.

About the Global Burden of Diseases, Injuries, and Risk Factors Study

The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) is an international collaboration, consisting of over 4,200 collaborators in more than 145 countries and territories, to measure the impact of health problems on people. The GBD is coordinated by IHME and produced annually. Its methods and metrics emphasize comparability among causes that kill and causes that disable, and comprehensiveness – its measurements take into account all causes of health loss. The study is based on a dataset of over 100,000 sources, which can be explored at http://ghdx.healthdata.org. The vast majority of the sources used in the study are open-access and available to other researchers. The GBD’s methods and results are made freely, publicly available under the Guidelines for Accurate and Transparent Health Estimates Reporting (http://gather-statement.org).
Glossary of terms and concepts

**LIFE EXPECTANCY**
The number of years that a person at a given age can be expected to live. For the GBD, life expectancy is calculated for every location in the study from 1950 through 2017.

**HEALTHY LIFE EXPECTANCY (HALE)**
The number of years that a person at a given age can be expected to live in full health, taking into account both mortality and morbidity. HALE depends on the calculation of years lived with disability (YLDs), explained below.

**YEARS OF LIFE LOST (YLLs)**
Years of life lost due to premature death. The GBD uses as reference life expectancies the highest observed life expectancies in the world for each age and sex group (for example, females aged 40-44 years old in a given year). YLLs are calculated by subtracting the age of death from the reference life expectancy.

**YEARS LIVED WITH DISABILITY (YLDs)**
Years lived in less than full health. YLDs measure the impact of health problems that cause sickness, but not death. They take into account both the severity and the length of time lived with a disability, so they can measure health loss from short-term, acute periods of disability and long-term periods of chronic disability.

**DISABILITY-ADJUSTED LIFE YEARS (DALYs)**
Years of life lost to both premature death and disability. DALYs are the sum of YLLs and YLDs. Accordingly, DALYs combine in one measure all health loss within a population.

**RISK FACTORS**
Potentially modifiable causes of disease and injury. The GBD uses estimates of exposure and severity of exposure to estimate risk-attributable burden, or the share of the burden of a disease that is due to exposure to particular risk factors.
The GBD in the Russian Federation

Data sources

The database used to produce GBD estimates includes 445 sources that contain data on the Russian Federation. Many different types of sources are represented in that total, such as surveys, scientific studies, censuses, and disease registries. Sources in the GBD database are scrutinized to ensure they meet standards for quality and validity. As openness is a key value of the GBD, comprehensive information on the sources used to produce estimates for the Russian Federation is made freely, publicly available.

Important sources of data for the Russian Federation used in the GBD include datasets from the Center for Demographic Research at the New Economic School, series from the Russian Federation’s Federal State Statistics Service, surveillance data from the European Centre for Disease Prevention and Control, series from the International Clearinghouse for Birth Defects Surveillance and Research, datasets from the International Institute for Strategic Studies, and many others.


What GBD estimates for the Russian Federation

The GBD includes estimates for 359 causes of death and disability and 84 risk factors affecting health in 195 countries and territories, including the Russian Federation, from 1990 through 2017. The study also estimates population, fertility rates, life expectancy, and all-cause mortality rates for 1950–2017. The GBD aims to publish its first subnational study of the Russian Federation in 2020. While the GBD estimates for the Russian Federation are extensive, they actually make up only a small proportion of the estimates produced by the GBD and by IHME.

What the GBD says about improving health in the Russian Federation

In general, health in the Russian Federation has improved since 2000. Mortality rates for most causes declined, while life expectancy increased. There are many ways, however, by which the Russian Federation could further improve health and increase life expectancy in the future. This brief focuses on some of the most important ways to improve – particularly those related to non-communicable diseases and injuries.

- Health outcomes for males and females were very different. While life expectancy at birth increased in 2000–2017 for both sexes (males by 7.5 years, females by 4.8), a large gap still separated life expectancy for males and females, with females outpacing males by more than 10 years.

- That difference between the sexes applies in many areas of disease burden, with males generally having higher mortality rates, overall rates of disease burden, and exposure to risk factors affecting health.

- Improvements in life expectancy were driven largely by improvements in the disease burden due to cardiovascular diseases, injuries, and cancers.


- As of 2017, the burden of injuries – especially non-transport, unintentional injuries among males – in the Russian Federation remained among the highest in the world, despite substantial improvements since 2000.

- It is likely that differences in exposure to health risk factors between males and females accounted for a substantial amount of the difference in disease burden between the sexes.

- Tobacco contributes to 18% of deaths in the Russian Federation; alcohol, 10%; drug use, 2%. Rates of disease burden due to those risk factors were among the highest in the world in 2017.

- The 2017 disease burden attributable to tobacco and alcohol use was five times higher in males than for females, and drug use in males was three times higher.
The GBD estimates life expectancy for 1950 to 2017 in 195 countries, including the Russian Federation. The GBD’s life expectancy estimates for the Russian Federation are comparable to those available from other sources, including those from WHO and the Russian Federation’s Federal State Statistics Service (Rosstat) (see Figure 1). The GBD estimates that in 2017, life expectancy at birth in the Russian Federation was 77.2 years for females and 66.8 years for males.

The GBD also estimates healthy life expectancy (HALE), or the number of years a person can expect to live in ideal health, for 1990 to 2017. Estimates for life expectancy and HALE for males and females in the Russian Federation are depicted in Figure 2. Both life expectancy and HALE at birth have been higher for females than males. Life expectancies in the Russian Federation have risen overall since 2000, with the lowest life expectancies occurring in 2005 and the highest in 2017.

**FIGURE 1**

Most recently available estimates of life expectancy at birth, males and females, from various sources

![Life expectancy chart](chart.png)

**Sources:**
Rosstat: Federal State Statistics Service, Russian Federation¹
WHO: Global Health Observatory, World Health Organization²
US: Census Bureau, United States of America³
UN: World Population Prospects, United Nations⁴
What caused the increase in Russian life expectancy?

The GBD allows researchers to combine life expectancy estimates with changes in patterns of disease burden to determine why life expectancy changed the way it did over time. Figure 3 shows how changes in certain categories of disease affected life expectancy for males and females in the Russian Federation between 2000 and 2017. Positive numbers (to the right of the axis) indicate causes that decreased in burden and thereby increased life expectancy. Causes closest to the axis changed the most from 2000 to 2017. In that time, life expectancy at birth increased by 7.5 years for males and 4.8 years for females. The most important factor in that increase was a decline in burden due to cardiovascular diseases.

Figure 4 further breaks down changes in the burden of cardiovascular diseases, showing how changes in the burdens of different cardiovascular diseases contributed to the overall decline in that category. For males, reductions in ischemic heart disease burden were the biggest change factor, and for females, stroke played the biggest role.
FIGURE 3
Breakdown of changes in life expectancy at birth, males and females, 2000–2017

FIGURE 4
Effects of cardiovascular disease burden on life expectancy at birth, males and females, 2000–2017
Overall disease burden in the Russian Federation

Health in the Russian Federation has improved since 2000. Overall, mortality rates have decreased and life expectancies have increased.

Figure 5, which shows the leading causes of death in the Russian Federation in 2000 and 2017, indicates that cardiovascular diseases, cancers, neurological disorders, and digestive diseases are the most common causes of death. Cardiovascular diseases are of particular concern: they caused 54.5% of deaths in the Russian Federation in 2017. While self-harm, interpersonal violence, and unintentional injuries have declined in rank since 2000, Russians still die from them at greater rates than people in most other countries.

The following pages contain further information on areas of interest for improving health in the Russian Federation.

### Figure 5
Leading causes of death, both sexes combined, 2000–2017

<table>
<thead>
<tr>
<th>Communicable, maternal, neonatal, and nutritional diseases</th>
<th>Non-communicable diseases</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of total deaths</td>
<td>2000 rank</td>
<td>2017 rank</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>55.32%</td>
<td>Cardiovascular diseases</td>
<td>1</td>
</tr>
<tr>
<td>13.91%</td>
<td>Cancers</td>
<td>2</td>
</tr>
<tr>
<td>6.01%</td>
<td>Self-harm and interpersonal violence</td>
<td>3</td>
</tr>
<tr>
<td>4.79%</td>
<td>Unintentional injuries</td>
<td>4</td>
</tr>
<tr>
<td>3.24%</td>
<td>Neurological disorders</td>
<td>5</td>
</tr>
<tr>
<td>3.10%</td>
<td>Digestive diseases</td>
<td>6</td>
</tr>
<tr>
<td>2.90%</td>
<td>Respiratory infections and tuberculosis</td>
<td>7</td>
</tr>
<tr>
<td>2.79%</td>
<td>Substance use disorders</td>
<td>8</td>
</tr>
<tr>
<td>2.74%</td>
<td>Chronic respiratory diseases</td>
<td>9</td>
</tr>
<tr>
<td>2.11%</td>
<td>Transport injuries</td>
<td>10</td>
</tr>
<tr>
<td>1.04%</td>
<td>Diabetes and kidney diseases</td>
<td>11</td>
</tr>
<tr>
<td>0.80%</td>
<td>Other non-communicable diseases</td>
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<tr>
<td>0.42%</td>
<td>Maternal and neonatal disorders</td>
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<tr>
<td>0.35%</td>
<td>HIV/AIDS and sexually transmitted infections</td>
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<td>0.21%</td>
<td>Other infectious diseases</td>
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<td>0.08%</td>
<td>Musculoskeletal disorders</td>
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<tr>
<td>0.08%</td>
<td>Skin and subcutaneous diseases</td>
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<tr>
<td>0.06%</td>
<td>Enteric infections</td>
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<tr>
<td>0.03%</td>
<td>Nutritional deficiencies</td>
<td>19</td>
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<tr>
<td>0.01%</td>
<td>Neglected tropical diseases and malaria</td>
<td>20</td>
</tr>
<tr>
<td>0.003%</td>
<td>Mental disorders</td>
<td>21</td>
</tr>
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</table>

OVERALL DISEASE BURDEN IN THE RUSSIAN FEDERATION | 15
Ischemic heart disease

Several different types of cardiovascular disease are among the most frequent causes of death in the Russian Federation. Therefore, reducing the disease burden due to those causes would be effective in improving health and increasing life expectancies in the Russian Federation.

Ischemic heart disease is the most common form of cardiovascular disease and the leading individual cause of death in the Russian Federation. Figure 6 shows that mortality rates due to ischemic heart disease were considerably higher for males than for females in the early 2000s, but that since then the rates for both sexes have converged.

The main impact of ischemic heart disease on the Russian Federation’s health system and people is its effects on premature death. Figure 7 shows that the overall disease burden of ischemic heart disease, measured in disability-adjusted life years (DALYs), consisted mostly of years of life lost (YLLs) as opposed to years lived with disability (YLDs).

Risk factors for ischemic heart disease

- The leading drivers of DALYs due to ischemic heart disease in the Russian Federation in 2017 were dietary risks, high blood pressure, high cholesterol, tobacco, and obesity and overweight.
- Tobacco caused over four times the disease burden due to ischemic heart disease in males compared to females in 2017.
**FIGURE 7**
DALYs, broken down into YLLs and YLDs per 100,000 due to ischemic heart disease, both sexes combined, 2000–2017

DALYs (disability-adjusted life years) = YLLs + YLDs
Stroke

Stroke is the second leading cause of health loss from cardiovascular disease and the second leading individual cause of death in the Russian Federation.

Dying of stroke is more common among females than among males. Figure 8 shows a consistent difference of 60 to more than 100 deaths per 100,000 between the female and male mortality rates due to stroke from 2000 to 2017. That difference is likely due, at least in part, to the fact that females in the Russian Federation tend to live longer than males.

As shown in Figure 9, the decline in overall disease burden due to stroke since 2000 has been achieved through reductions in premature death (YLLs). Since that time, however, YLDs due to stroke have increased by 53%, somewhat eroding improvements in mortality.

Risk factors for stroke

- The leading drivers of DALYS due to stroke in the Russian Federation in 2017 were high blood pressure, dietary risks, obesity and overweight, tobacco, and high blood sugar.

- The risk factor profiles for stroke among males and females were similar, with the exceptions of alcohol and tobacco. Tobacco was the third leading risk factor for males and the seventh for females. Alcohol use was the fifth leading risk factor for males and the 10th for females.
Figure 9
DALYs, broken down into YLLs and YLDs per 100,000 due to stroke, both sexes combined, 2000–2017

DALYs (disability-adjusted life years) = YLLs + YLDs
Lung cancer

Cancers in general are the second leading cause of death in the Russian Federation and, therefore, a key target for improvement. Among individual types of cancer, lung cancer is the leading cause of death.

Figure 10 shows a large disparity between mortality rates due to lung cancer in males compared to females. Since 2000, lung cancer mortality rates among males have declined gradually. Among females, they have been flat.

Figure 11 indicates that, in accordance with the declining mortality rates among males shown in Figure 10, YLLs due to lung cancer declined gradually between 2000 and 2017. As in the case of ischemic heart disease, the overall disease burden of lung cancer consisted mostly of YLLs as opposed to YLDs.

Risk factors for lung cancer

- The main driver of DALYs due to lung cancer in the Russian Federation in 2017 was tobacco. Tobacco caused nearly seven times the lung cancer disease burden of the second leading driver, dietary risks.
- GBD estimates, which incorporate both exposure and the severity of exposure to risk factors, show that males had nearly five times more exposure to smoking than females in 2017.
**FIGURE 11**

DALYs, broken down into YLLs and YLDs per 100,000 due to lung cancer, both sexes combined, 2000–2017

\[ \text{DALYs (disability-adjusted life years)} = \text{YLLs} + \text{YLDs} \]
Unintentional injuries

Reducing the burden of injuries is also a way to improve health in the Russian Federation. It has one of the highest burdens due to unintentional injuries — all injuries not the result of transport, self-harm, or interpersonal violence — in the world. As Figure 12 shows, death rates from unintentional injuries were much higher among males.

Figure 13 breaks down the burden of unintentional injuries in the Russian Federation. Each color in the bars represents a different sub-category of unintentional injuries. The figure shows that, for most years, falls were the largest cause of DALYs. Heat or cold exposure and exposure to mechanical forces (physical trauma) were also common causes of early death and disability in the Russian Federation.

Risk factors for unintentional injuries

- The leading drivers of DALYs due to unintentional injuries in the Russian Federation in 2017 were alcohol use, occupational risks, and low bone mineral density.
- Alcohol use contributed to about 15.5% of DALYS due to unintentional injuries among males aged 15 to 69 in 2017.

FIGURE 12

Mortality rates due to unintentional injuries, males and females, 2000–2017
FIGURE 13

Breakdown of DALYs per 100,000 due to unintentional injuries, both sexes combined, 2000–2017

DALYs = disability-adjusted life years
Risk factors

One way to reduce disease burden and increase life expectancy would be to reduce the exposure of the Russian Federation’s population to risk factors that affect health.

The GBD assesses the exposure and severity of exposure to risk factors, then attributes proportions of disease burden to those risk factors. Figure 14 depicts the disease burden attributable to different risk factors among males and females in the Russian Federation in 2017.

The lengths of the bars indicate that exposure to risk factors is higher among males than females. One of the most important differences between males and females was the pronounced effects of tobacco, alcohol use, and drug use among males compared to females. Other risk factors have much more similar patterns among males and females, both in the size of attributable burden and in the diseases and injuries they caused.

Figures 15 and 16 show the rates of overall disease burden due to smoking and alcohol use among males and females between 2000 and 2017. (Smoking, as opposed to other forms of tobacco use or secondhand smoke, is responsible for the vast majority of disease burden attributable to tobacco for both males and females in the Russian Federation.) These two modifiable behaviors have substantial effects on health in the Russian Federation, but those effects differ markedly between males and females.

Rates of DALYS attributable to both smoking and alcohol use among males, depicted in Figure 15, have tracked closely together between 2000 and 2017, while trending downward since 2005. Despite that downward trend, rates of DALYS attributable to these risk factors were five to 11 times higher for males than for females throughout the time period.

Figure 16 shows that the pattern over time of DALYS attributable to alcohol use among females is similar to that among males, albeit at much lower numbers. DALYS attributable to smoking, however, show a different pattern: they have been trending slightly upward among females since 2000. Since 2005, rates of DALYS attributable to smoking and alcohol among females have converged.
FIGURE 14
Breakdown of DALYs attributable to specific risk factors, males and females, 2017

Risk factors are arranged from highest to lowest rates of all-ages risk-attributable DALYs per 100,000 for both sexes combined.
FIGURE 15
DALYs per 100,000 due to smoking and alcohol use, males, 2000–2017

FIGURE 16
DALYs per 100,000 due to smoking and alcohol use, females, 2000–2017
Conclusion

Although health in the Russian Federation has been improving since 2000, there remain many ways to foster further improvements in Russian health. Accurate health information and incisive health research will play vital parts in any concentrated efforts to improve population health in the coming years.

To that end, FRIHOI and IHME plan to deepen their working relationship in the future. That partnership, which has already resulted in high-quality published research and improvements in the evidence base for health policy in the Russian Federation, will grow to include in-depth work on health at the oblast level, the incorporation of additional data sources into the GBD database, new research publications, and more.

As that partnership grows, it could be enhanced through collaboration with others in the Russian Federation, including stakeholders from government entities. IHME already works with representatives of many research organizations and country governments either by providing health estimates or collaborating on research – all with the goal of improving health for people everywhere. Doing so in the Russian Federation could, with time and effort, help the people of the Russian Federation live longer, healthier lives.
Where to access more information

More information on health in the Russian Federation, and about the GBD study in general, may be accessed in the following ways:

**Further information on GBD estimates for the Russian Federation, hosted by the Federal Research Institute for Health Organization and Informatics (FRIHOI):**

**General information on the GBD study:**
http://www.healthdata.org/gbd.

**GBD Results Tool:**
*Viewing and downloading tool for GBD estimates.*

**GBD Compare:**
https://vizhub.healthdata.org/gbd-compare.
*Visualization tool for GBD estimates.*

**Global Health Data Exchange (GHDX):**
*Searchable database of data sources used to produce the GBD estimates.*

**GBD Data Input Sources Tool:**
*Data sources tool for GBD study components and study locations.*

**Country profiles:**
*Standardized, country-specific overviews of disease burden and other health-related topics.*

**Call for collaborators:**
*Information for researchers, policymakers, advocates, and anyone else interested in collaborating with the GBD study.*
References


