

Population and Health

Лекция 18. Кризис здоровья в России: составляющие и детерминанты

Lecture 18. Health crisis in Russia: components and determinants



MAX PLANCK INSTITUTE
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РЭШ

Российская
экономическая
школа

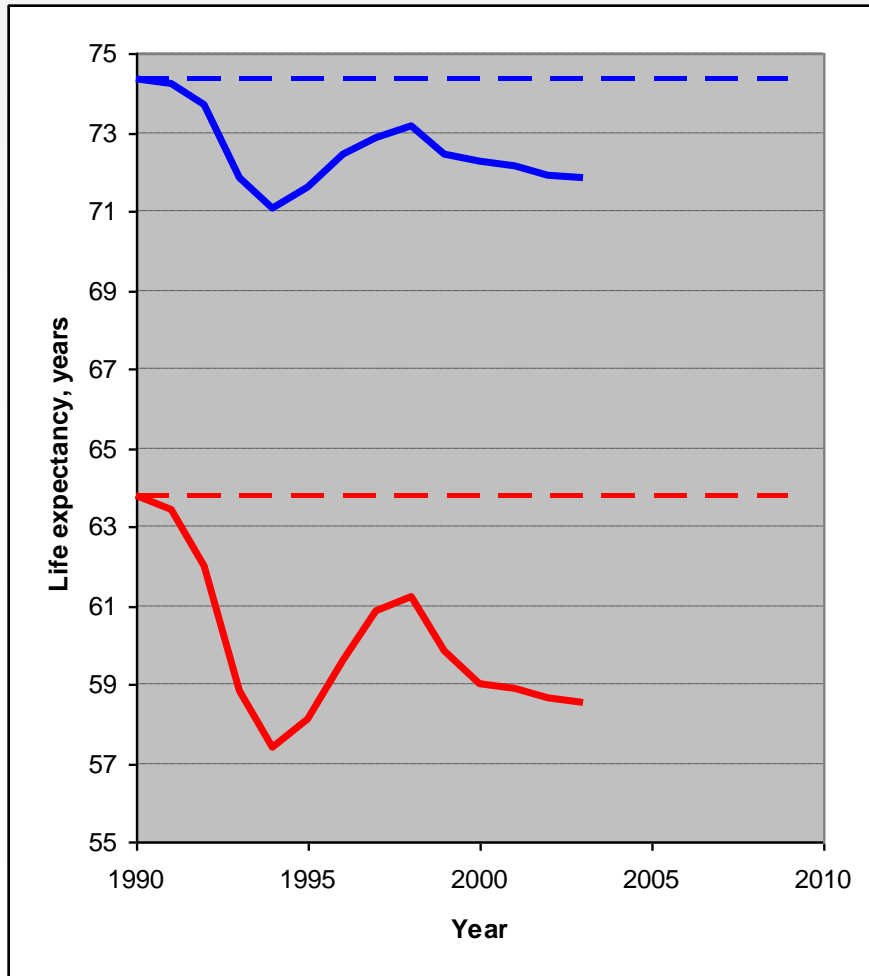


- ❖ “Health crisis”. Popular interpretation, political reactions and scientific approach.
- ❖ Mortality reversal in Russia as a major exception from the worldwide health progress.
- ❖ “Russian” studies of the early 1980s.
- ❖ The “data revolution” of the 1990s. Detailed age- and cause-of-death patterns.
- ❖ Puzzling mortality explosion in the 1990s: still a debate.
- ❖ Improvements since 2004. Beginning of a longer-term progress ?
- ❖ Explanations supported and not supported by evidence.



The “Health crisis”

Politicians and media consider health (and demographic) crisis in Russia as a sudden and strong mortality increase after disintegration of the USSR and other painful political and economic changes.



The scale of the increase was unprecedented in absence of war or famine.

The human cost of the excess mortality compared to the initial level of 1990 exceeded 2 mln. By the 2000s.

Demographic shrinking and its possible consequences for economic and military power of the country as a major concern. In the early 2000s, Russia was losing about 700 thousand people annually due to high mortality and low fertility.



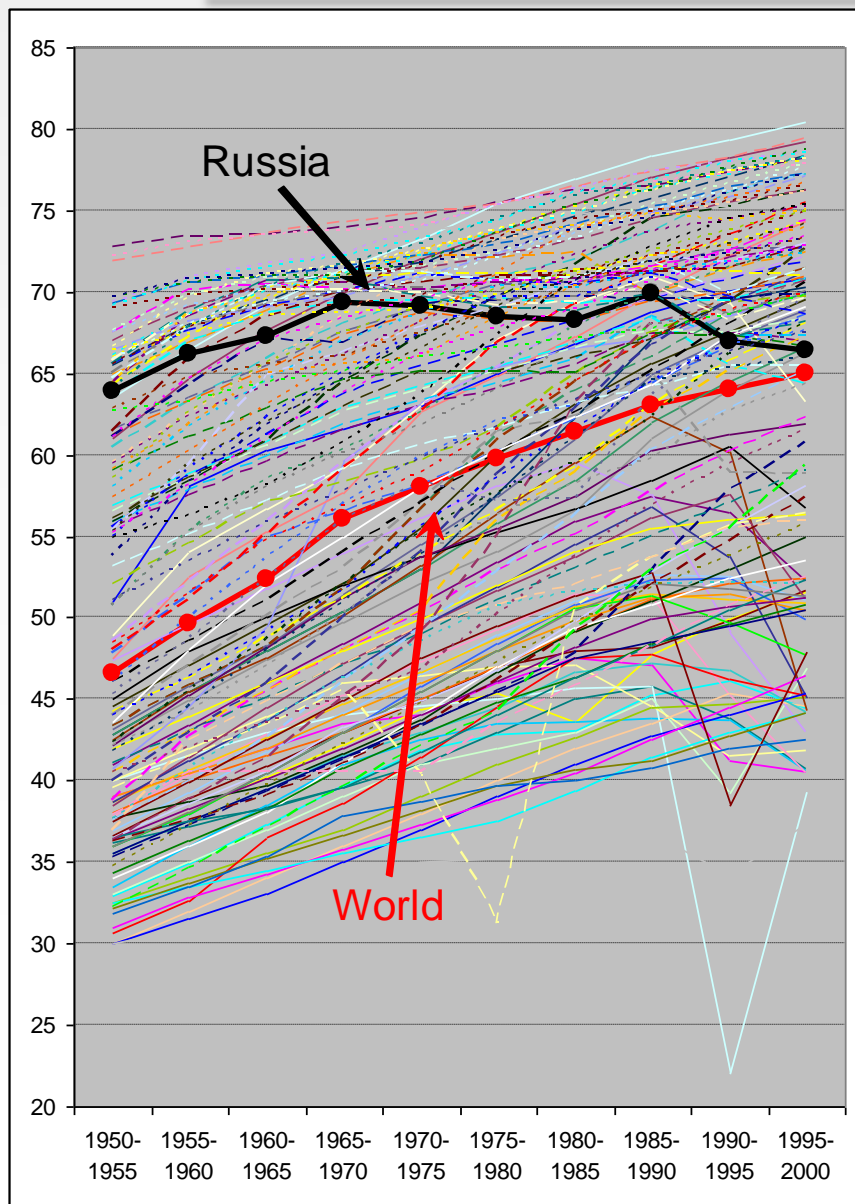
Three attempts of impeachment of the First President of President Eltsin in the State Duma in 1993 and 1999 initiated by the communist party. “Genocide of the Russian people” one of the main accusation points. Demographic data as principal evidence.

The demographic situation received unprecedented attention from President Putin and other first-rank politicians. Remarkable Putin’s address to the National Assembly of the 10th of May 2005 emphasizes low fertility but also refers to very high mortality. It was commented in the demographic journal *Population and Development Review* (June 2006).

“Concept of the Demographic Policy of the Russian Federation” launched by the President’s Decree of the 9th of October 2007 aims at 1.6-fold mortality reduction and the life expectancy value of 75 years in 2025.



- Attention to facts and figures rather than to their emotional presentation by media or other non-scientific sources.
- The situation of the 1990s-2000s can not be considered separately from mortality patterns of the past.
- Evidence-based approach relying on the strongest data elements (e.g. information about mortality and its changes). Use of mortality data for a long time period.
- Attention to detailed evidence highlighting nature of the crisis: detailed causes of death, differentials by region and population groups.
- Focus on associations of mortality changes with known events and changes in explanatory variables across time and region.



UN data on life expectancy at birth by 5-year periods: 1950-55 to 1995-2000. Atypical Russian trajectory. Substantial lowering of the rank. The lowest among industrialized countries.

In the 1960s-70s, when mortality in the USSR started to rise, mortality was decreasing everywhere. Demographers were expecting a worldwide convergence towards low mortality. In the 1970s-80s, projections of the UN Pop Division assumed a 2.5 year gain in LE 5 calendar years for countries with life expectancy below 62 years, after which the gain would decrease to 2 years.

Since then, mortality reversals have been observed in a number of countries (Sub-Saharan Africa and a few other). The Russian health crisis is the longest one.



An outstanding phenomenon

Mortality increase in the USSR was so unusual that at first researchers were unable to believe that it could be true.

“We can only understand the full severity of this situation when we remember how difficult it is to push life expectancy down these days. The amenities of modern life—cheap food, clean water, mass education, rapid communication, easy travel, competent doctors, wonder drugs, and the like—make it extremely hard to stay sick or die young. ... Clearly, something in Russia is going very, very wrong.” (N.Eberstadt, 1981)

It was difficult to study the emerging trend, because the Soviet authorities did everything to hide the negative (and ideologically devastating) changes. In the early 1970s the publication of statistical figures on mortality and life expectancy was greatly reduced and then completely terminated (1976). Publication of mortality statistics resumed only in times of Gorbachev’s “Glasnost” in 1987-88.

However, soviet scholars, who had access to the mortality data, and western scholars, who used data fragments and indirect estimates, have identified the emerging trend.



First openly published works that highlighted the trend:

- D. Peter Mazur, 'Using Regressions to Estimate Life Expectation in the USSR', *Journal of the American Statistical Association*, March, 1972
- John Dutton, Jr., 'Changes in Soviet Mortality Patterns, 1959/1977', *Population and Development Review*, June 1979
- Christopher Davis and Murray Feshbach, 'Life expectancy in the Soviet Union' *Wall Street Journal*, June 1978.
- Christopher Davis and Murray Feshbach, 'Review of Rising Infant Mortality in the USSR in the 1970s' United States Bureau of the Census. Series P-95, No 74, September 1980.
- Михаил Семенович Бедный Медико-демографическое изучение народонаселения. М., Статистика, 1979.

Davis and Feschbach were focusing on increasing infant mortality (a short-living trend of the early 1970s) but also acknowledged the general mortality increase. They linked these trends to contemporary factors including insufficient medical care.

M. Bedny explained the unfavorable changes by echoes of the past especially on health of people who were in war operations, who suffered food shortages and hard conditions during the war time as soldiers, children or adolescents. The same idea was proposed by R. Dinkel in his article of 1987 named "The seeming paradox of increasing mortality in a highly industrialized nation: the example of the Soviet Union."



The *New York Review* article by Nick Eberstadt

The health crisis in the USSR. *The New York Review*, February 19, 1981.

Major points:

- Rising infant and general mortality in the USSR are real and represent a major exception from the worldwide mortality decrease.
- Confident attribution of the trend to contemporary factors.
- Widespread alcohol abuse that can influence not only deaths from accidents but also from cardiovascular diseases.
- Underfinanced health care with underpaid health workers – corruption and lack of medicine for poor and those living in remote areas.
- Communist ideology and patriotism of Russians who are used to poor living standards for “great aims of the future”. Access to information about life in the west results in pessimism and demoralization.
- Health effects of poor ecology (air and water pollution, industrial waste, unsafe nuclear power stations. (written five years before the Chernobyl catastrophe).
- Rising infant mortality indicates a path to “pre-industrial health standards”.

The latter point not right. Data that were acquired later revealed a new type of crisis related to working-age rather than to infant mortality.



Detailed mortality data for the USSR and Russia available since 1995-96

In 1988 the Goskomstat resumes publication of mortality data. The amount of published information becomes much greater than ever before.

However, these publications did not provide continuous time series going back into the past and detailed cause-of-death categories.

From 1990 to 1997, the French National Institute for Demography / Paris (INED, Mesle, Vallin, Ertrich) and the Center of Demography and Human Ecology / Moscow (CDHE, Shkolnikov) carried out a joint project on reconstruction of continuous mortality series on causes of death for the USSR and Russia. A massive effort: copying, computerization, checking, connecting different revisions of the Soviet-Russian classifications of causes of death.

Publication of the data in 1996:

Meslé France, Shkolnikov Vladimir, Hertrich Véronique, and Vallin Jacques, 1996. – Tendances récentes de la mortalité par cause en Russie, 1965-1994. – Paris, INED, 140 p. + 2 floppy disks. (Données statistiques n°2).

Analysis of the data:

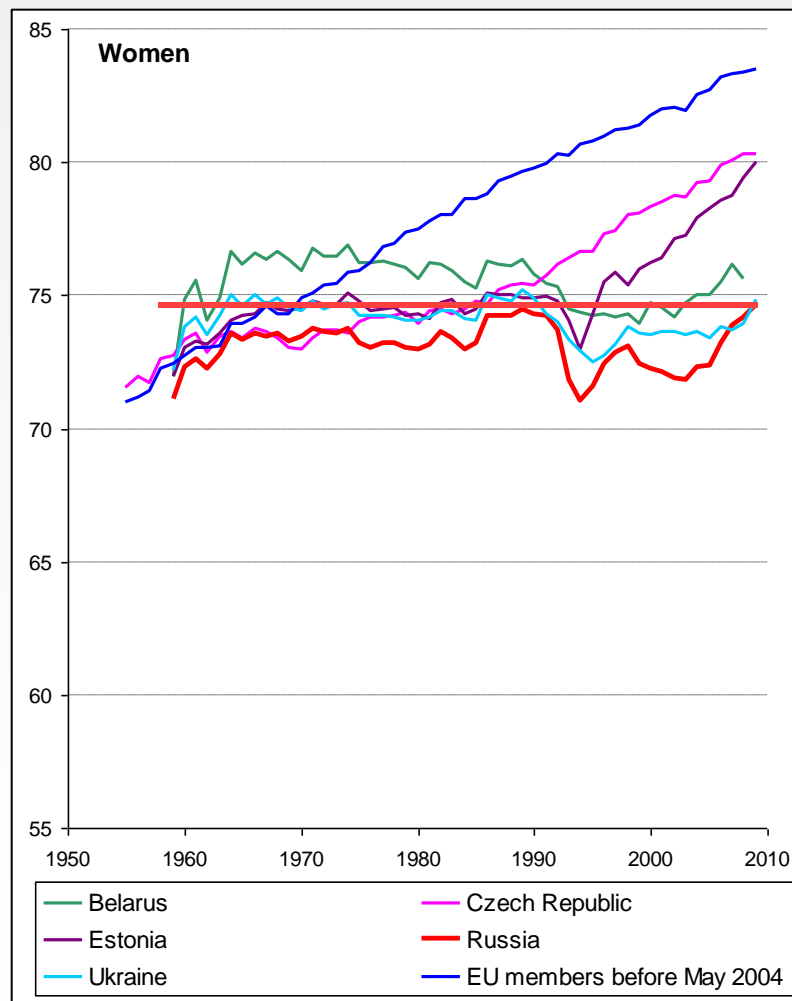
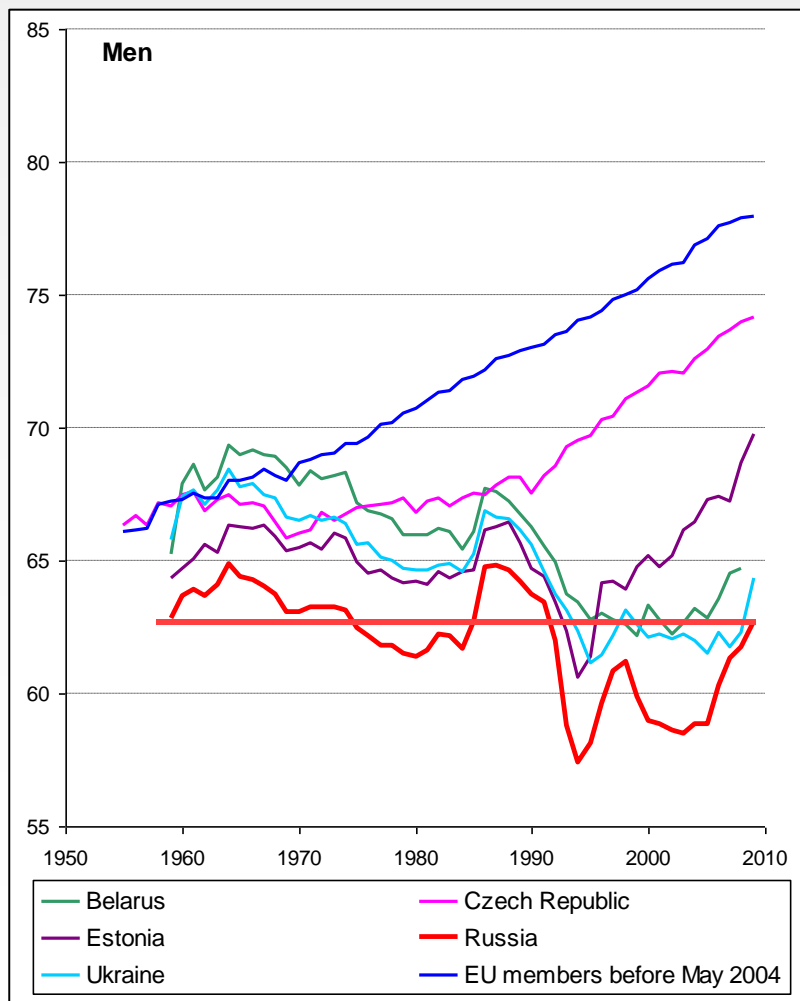
Shkolnikov Vladimir, Meslé France and Vallin Jacques, 1996. – Health crisis in Russia. I. Recent trends in life expectancy and causes of death from 1970 to 1993, II. Changes in causes of death: a comparison with France and England and Wales (1970 to 1993), Population, An English Selection, vol. 8, p. 123-190.



- The Russian routine mortality data have disadvantages and peculiarities but are mostly reliable.
- Mortality increase in Russia since 1965 with the only short-term interruption in 1985-87.
- In 1985-87 mortality sharply dropped due to the Gorbachev's anti-alcohol campaign and remained quite low until 1991.
- The long-term mortality increase of 1965-84, the improvement of the late 1980s, the severe deterioration of 1992-94 were determined by mortality changes at about the same ages between 15 and 60 years and about the same causes of death (CVD and external causes).
- During the whole period since 1965 (except a 1971-73 and 1993) mortality of infants and children has been declining.
- Mortality trends in the USSR and Russia greatly contrast to continuous progress in other industrialized countries and in most of developing countries.



Russian mortality patterns. Life expectancy trends: 1956-2009



Two clear stages of the crisis: gradual deterioration (males) and stagnation (females) in 1965-84 and fluctuations since 1985 (the anti-alcohol campaign). Very important episode of enormous mortality rise in 1992-94. Some recovery since 2004.



Life expectancy at the turning points

	Males	Females
1965	64.9	73.3
1984	61.7	72.3
1991	63.4	74.2
1994	57.4	71.1
1998	61.2	73.1
2003	58.5	71.8
2010	63.0	74.9

Keep in mind several important events and changes in mortality.

1965: beginning of the Brezhnev's era;

1985: the anti-alcohol campaign;

1986: the Chernobyl accident;

1991: the disintegration of the USSR;

1992-94: the "shock therapy" and hyperinflation;

1998: the Ruble crisis;

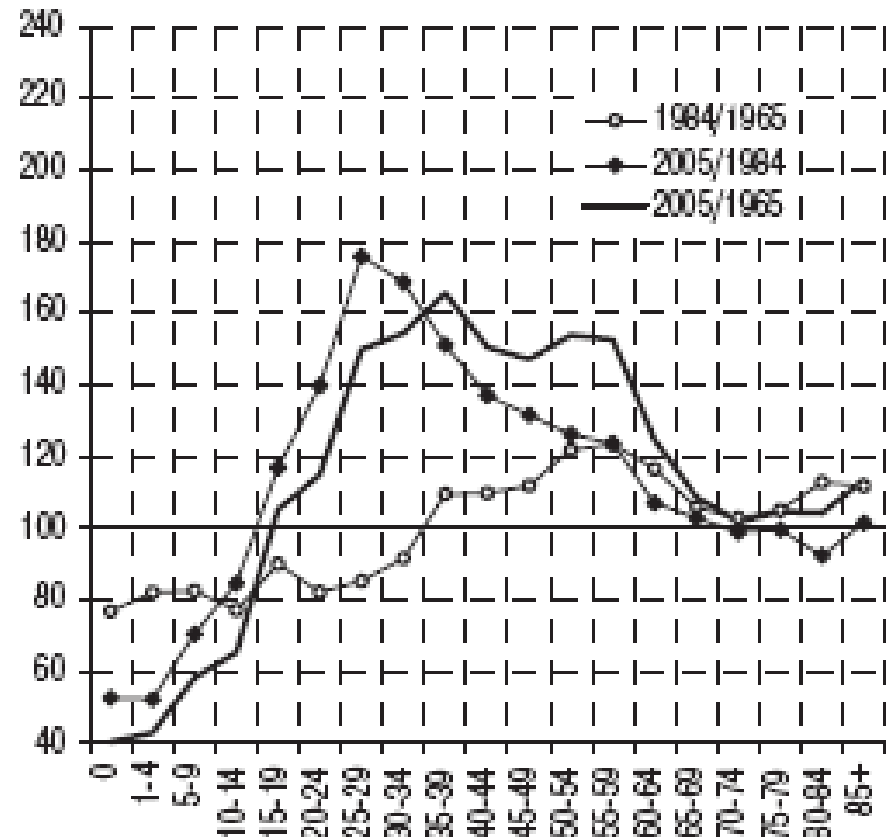
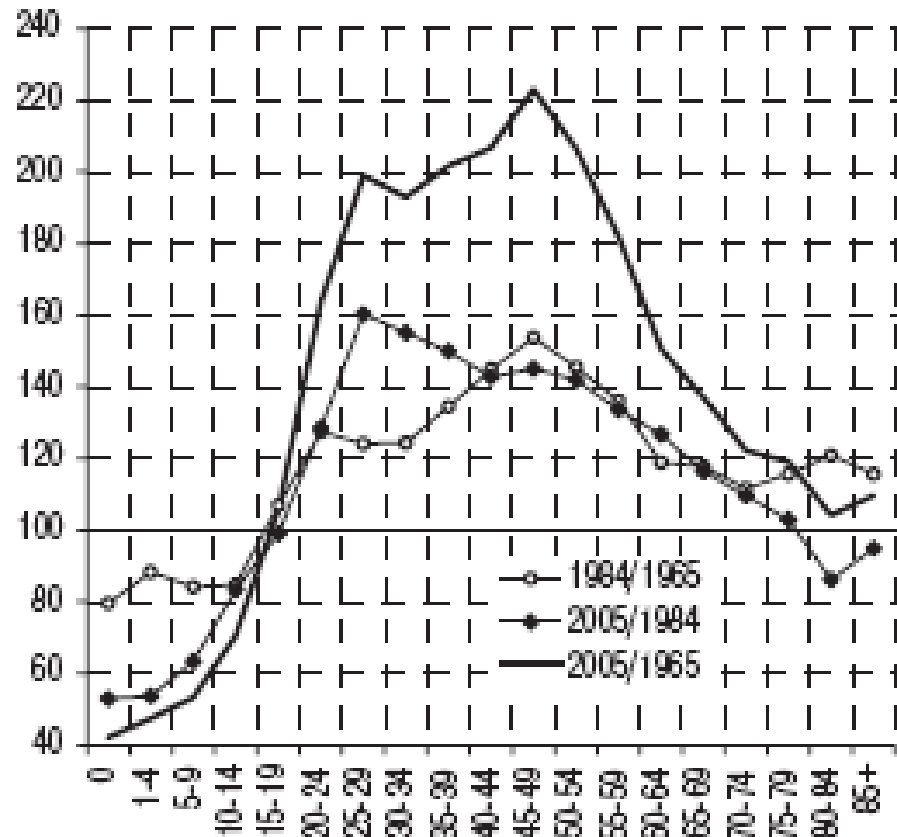
2005-6: measures for the control on production and sales of ethanol;

2006+: the national-priority project "Health"



Age pattern of mortality change

Рисунок 2. Относительное изменение возрастных показателей смертности с 1965 по 1984 г. и с 1984 по 2005 г. в %

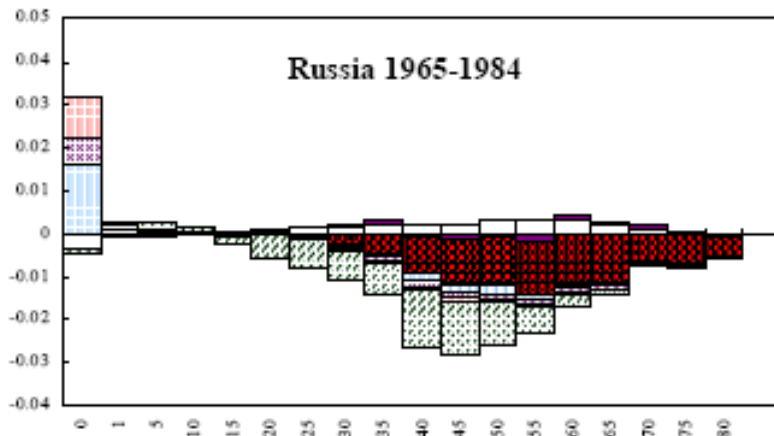


Андреев, Жданов, Школьников, 2007

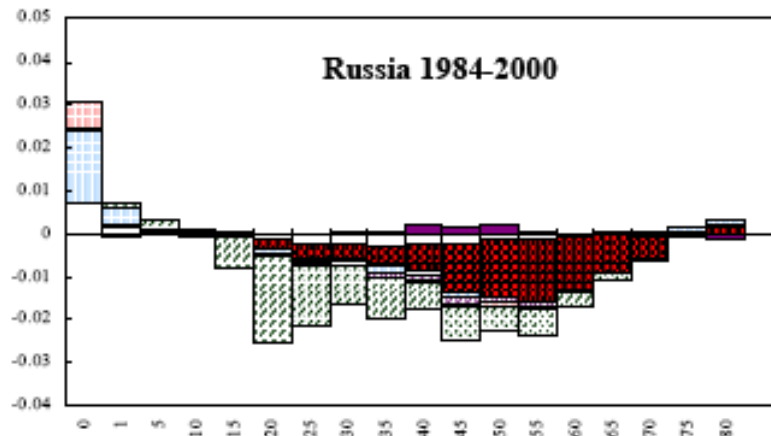
Decisive role of mortality changes in the most active working ages 15 to 64. Decreasing mortality of children partly balances worse trends at older ages.

Age-cause components of the life expectancy change in Russia and Ukraine

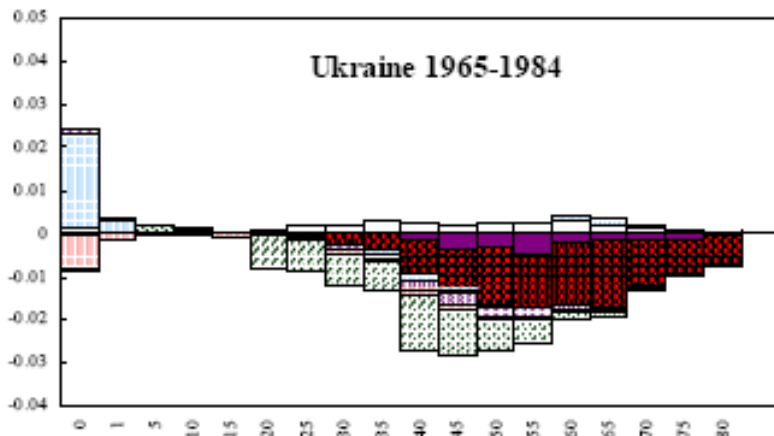
Mean annual contribution (years)



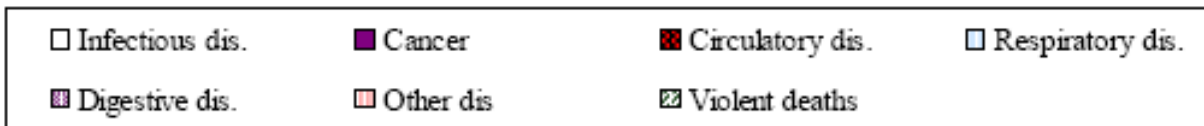
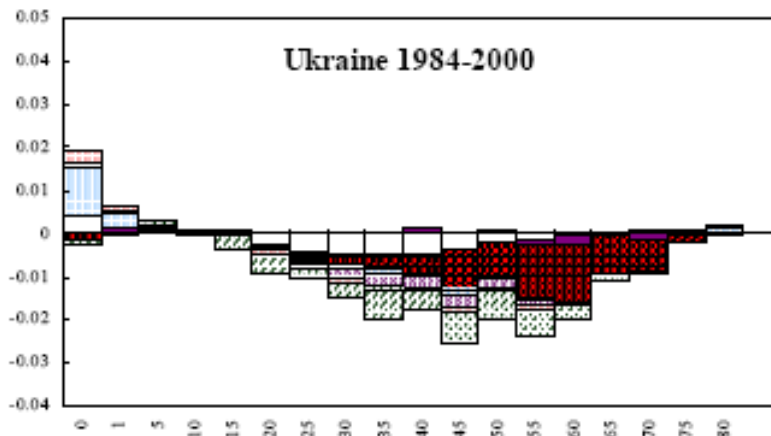
Mean annual contribution (years)

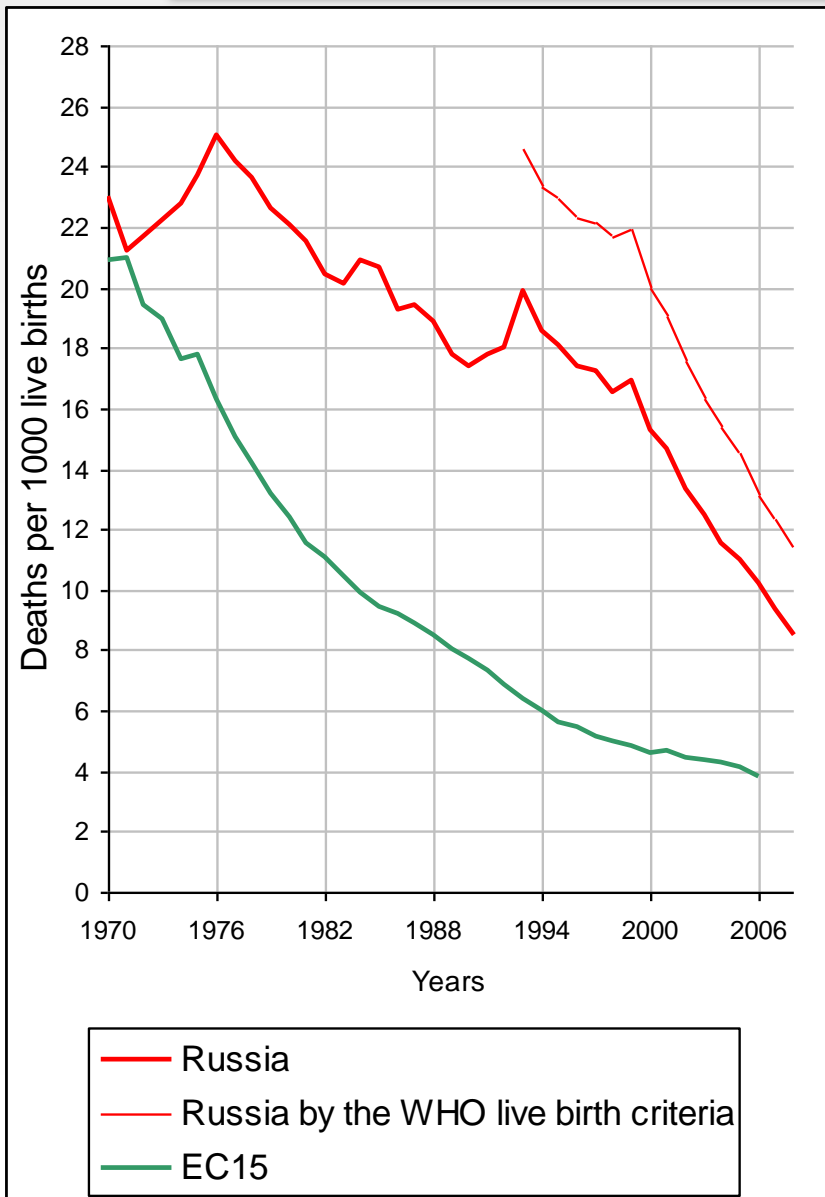


Mean annual contribution (years)



Mean annual contribution (years)





Младенческая смертность снижалась за исключением двух коротких эпизодов повышения в начале 1970-х и в 1992-93 гг. Первый эпизод мог быть связан с сокращением мед. помощи в сельской местности и повышением качества ее регистрации. Второй – с изменением в правилах регистрации живорождений и селективностью рождаемости в момент ее падения до крайне низких значений.

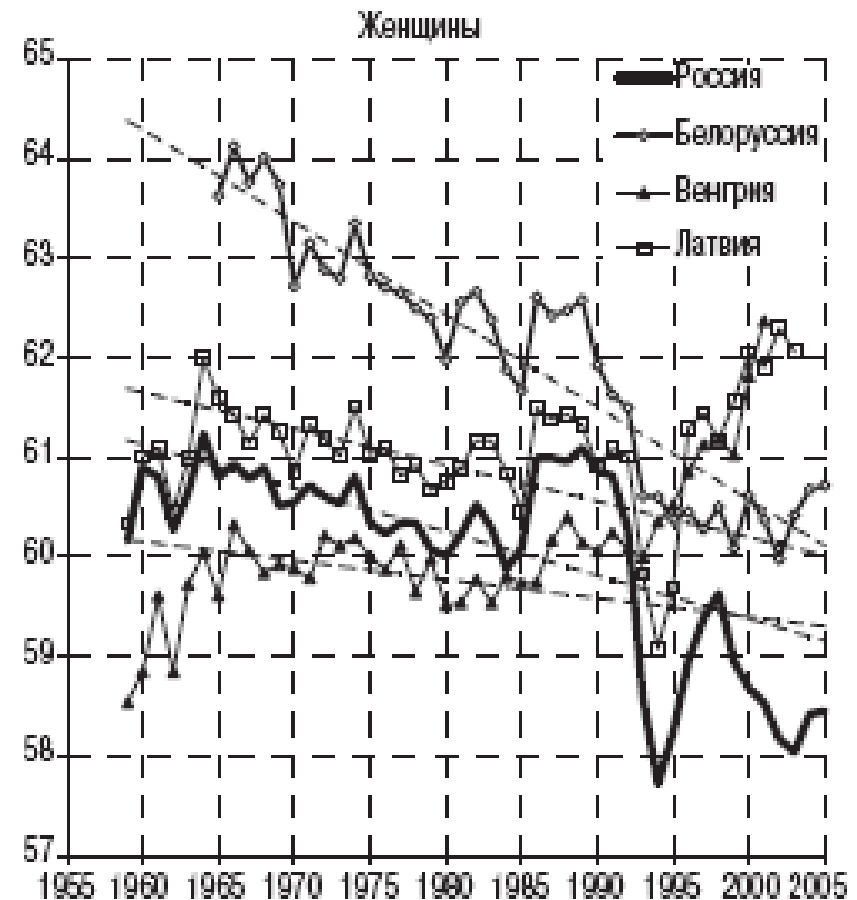
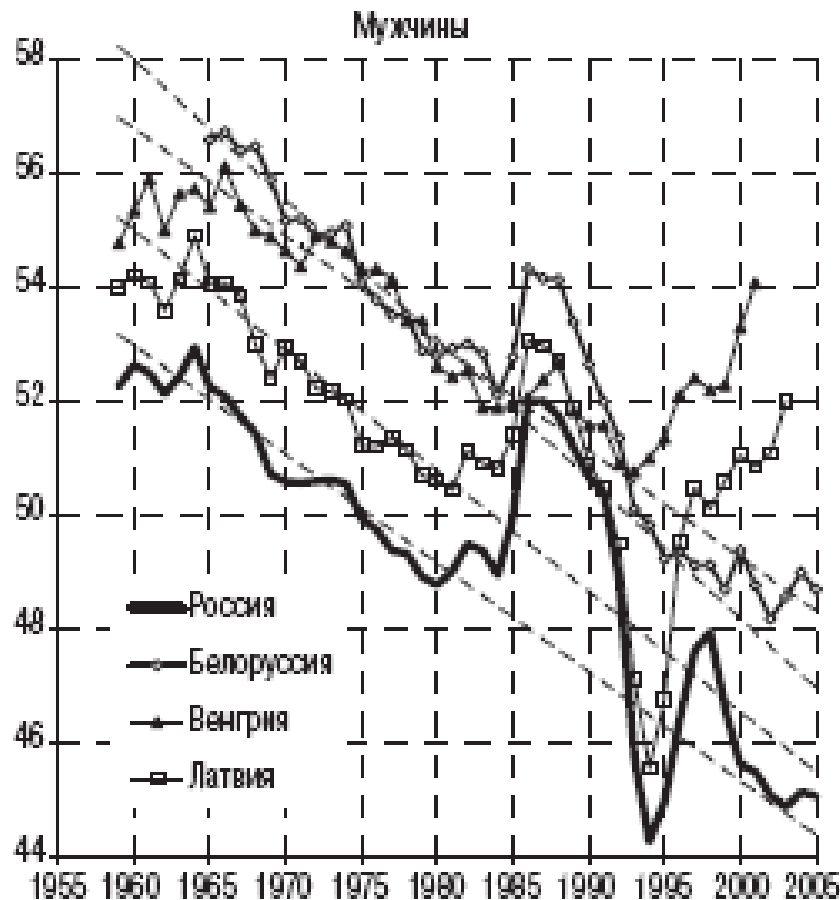
Ускоренное снижение началось в конце 1990-х. По официальным данным, в 1990 г. КМС в России составлял: 17/1000 в 1990г., 15/1000 в 2000 г. и 7,5/1000 в 2010 г. Таким образом, значительно сократилось отставание от ЕС15 (КМС=3,5/1000 в 2008 г.).

В соответствии с критериями живорождения ВОЗ, КМС в России в 2008 г. составил бы 11,4/1000 против 8,5/1000 по официальной статистике.



Downward trends in life expectancy at age 15

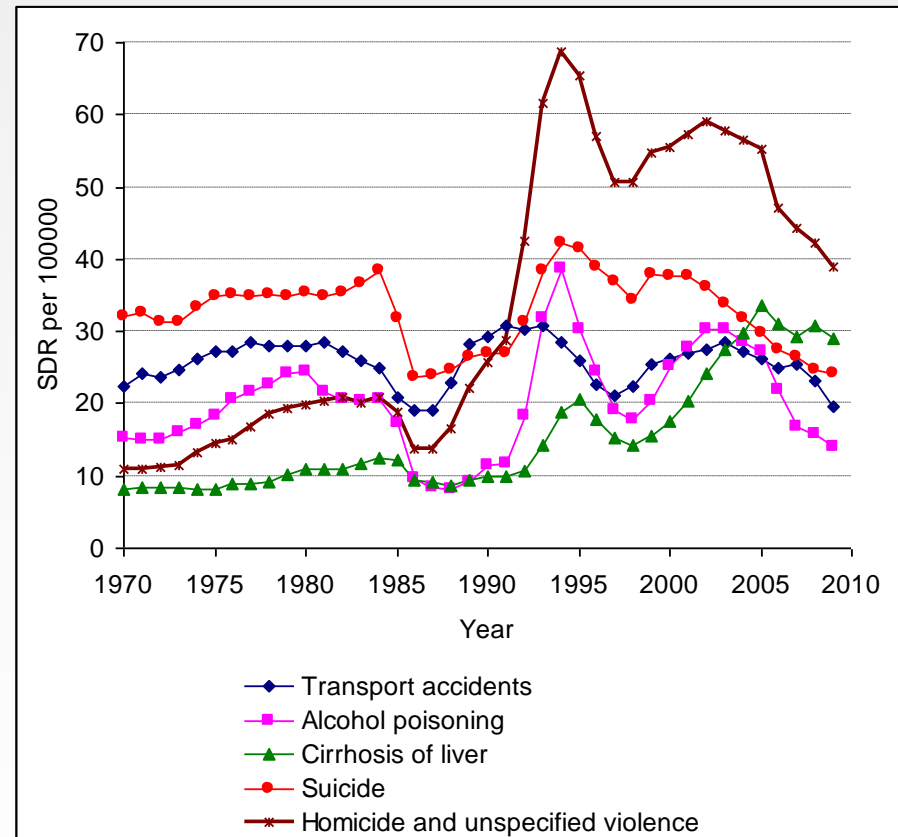
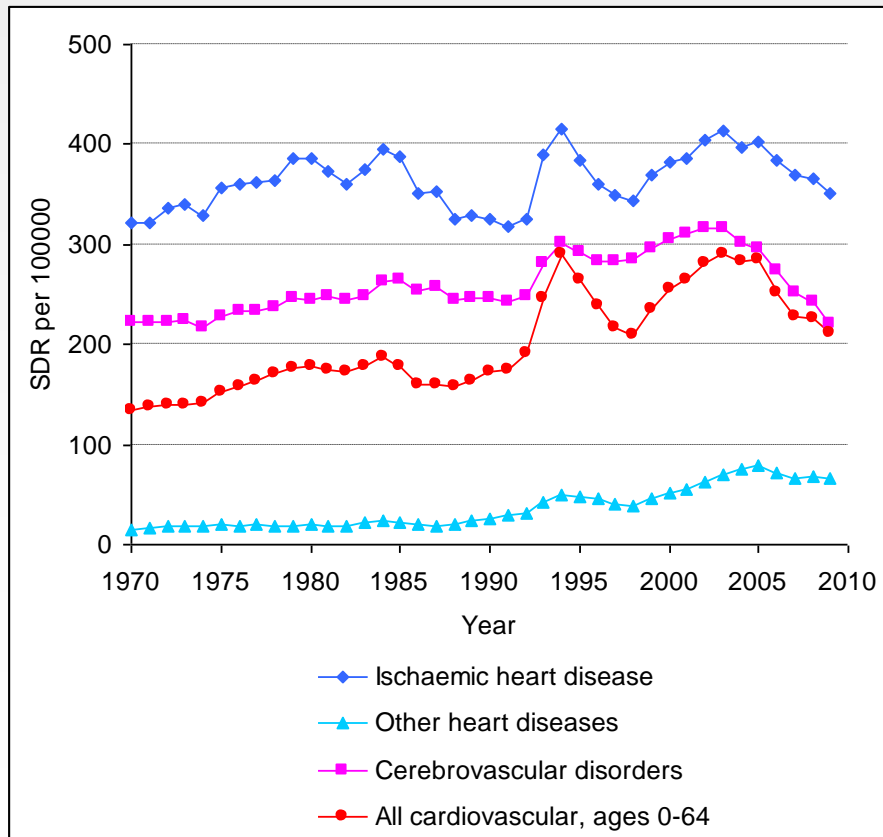
Рисунок 1. Ожидаемая продолжительность жизни мужчин и женщин в возрасте 15 лет в России, Белоруссии, Венгрии и Латвии после 1959 г.



Примечание: Пунктирные линии на графике — экстраполяция тренда 1965–1984 гг. — рассчитаны с опорой на эти годы с помощью стандартной функции TREND (Excel 2003).



Trends in principal causes of death (1)

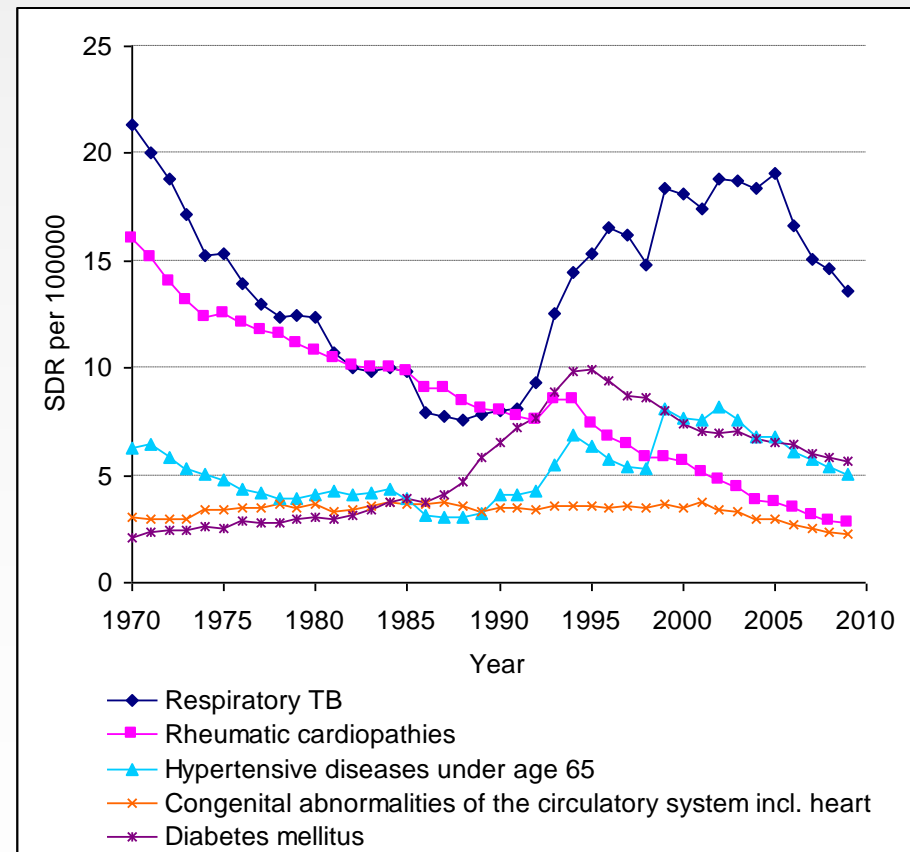
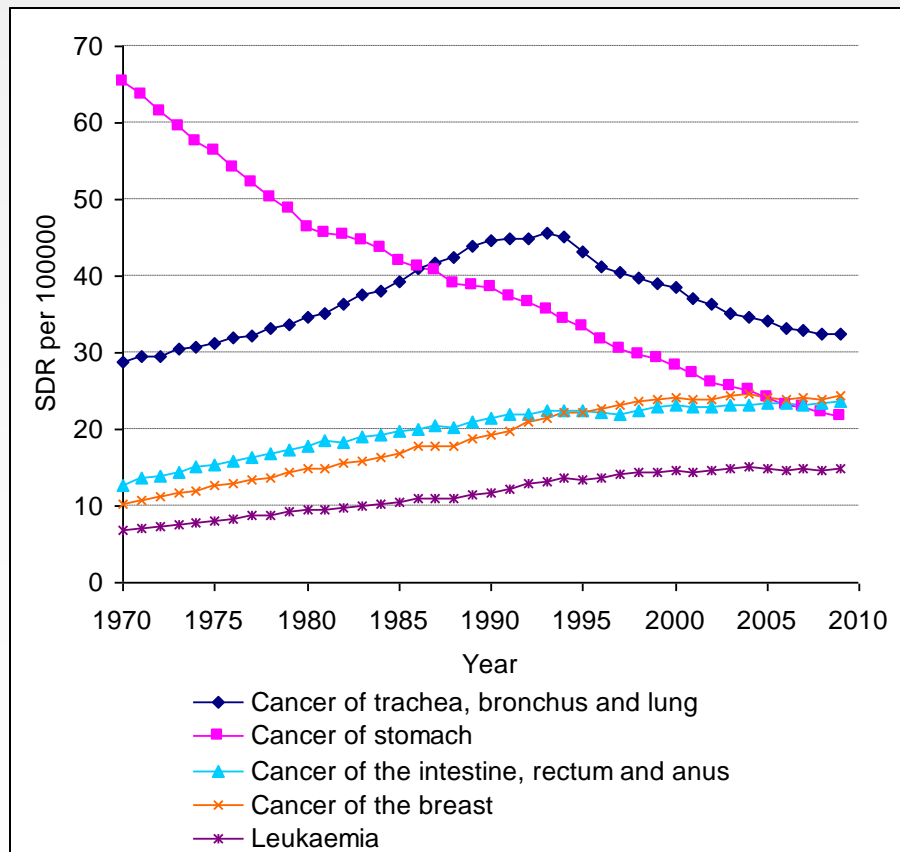


SDRs for both sexes combined.

Accidents, violence, and alcohol-related causes experience fluctuations of the greatest magnitude. However, fluctuations are seen also in cardiovascular causes.

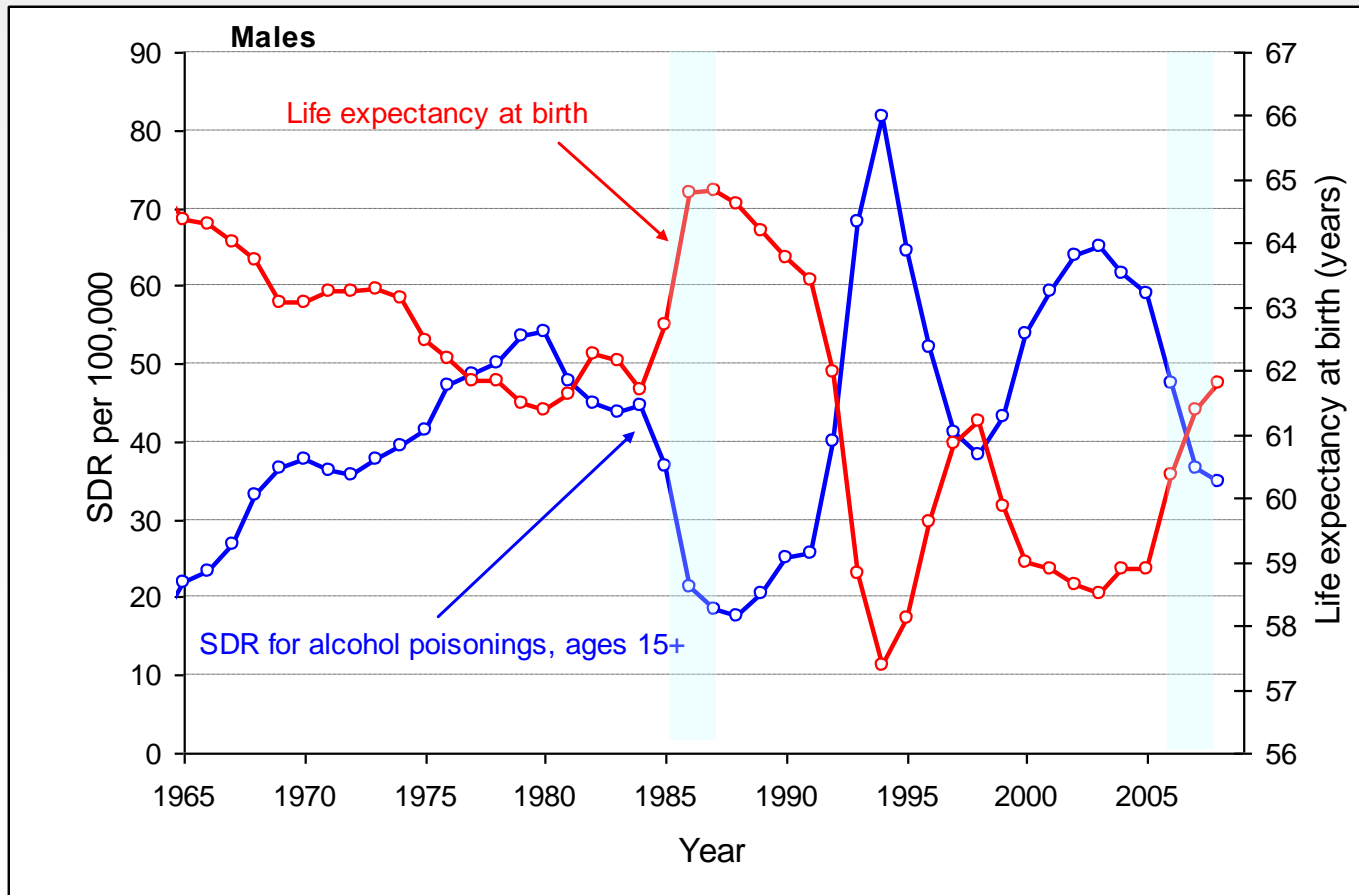


Trends in principal causes of death (2)



Gradual trends in cancers and striking ups and downs in selected “avoidable” causes.

Alcohol and mortality fluctuations



Nearly perfect correlation between the overall life expectancy and mortality from the accidental alcohol poisoning (2% to 3% of the total mortality). The correlation is very clear during the anti-alcohol campaign as well as for periods before and after the campaign.



Alcohol and mortality rise in 1992-94

The enormous mortality increase in 1992-94 attracts special attention. During three calendar years male life expectancy dropped by 6 years and female life expectancy dropped by 3 years.

Correlation on the previous slide suggests prominent role of alcohol abuse in the rapid mortality changes after 1985. Careful study by Leon et al. (The Lancet, 1987) demonstrated that mortality increase in 1992-94 was symmetrical to the prior mortality decrease during the anti-alcohol campaign in 1985-87 with respect to ages and causes of death.

So, there is a simple model. People drank a lot and mortality was high. Gorbachev reduces the consumption and mortality goes down. Eltzin returns the alcohol (24-hr availability, sales of ethanol “Royal” etc.), people start to drink even more than before the campaign and mortality goes up. A question remains why people drink so much and why the consumption changes so much from one year to another.

In addition, certain facts suggest that the mortality rise in 1992-4 was not an exact mirror image of the prior improvement (Shkolnikov, Cornia et al., 1998). For example, mortality rise at young adult ages and from certain causes (violence) was substantially greater than the prior drop, mortality increase was greater in urban than in rural areas, regional pattern of the increase differed from pattern of the prior decrease. For example, in Moscow and St. Petersburg life expectancy gains in male life expectancy in 1985-87 constituted 1 and 1.7 years, while the decrements in 1992-4 were 9.1 and 7.5 years, respectively. In Belarus, a country that did not launch economic reforms in the 1990s, mortality increase was much slower than that in Russia.



Geography of the male life expectancy drops in 1992-4 and associated factors (Walberg et al., 1998)

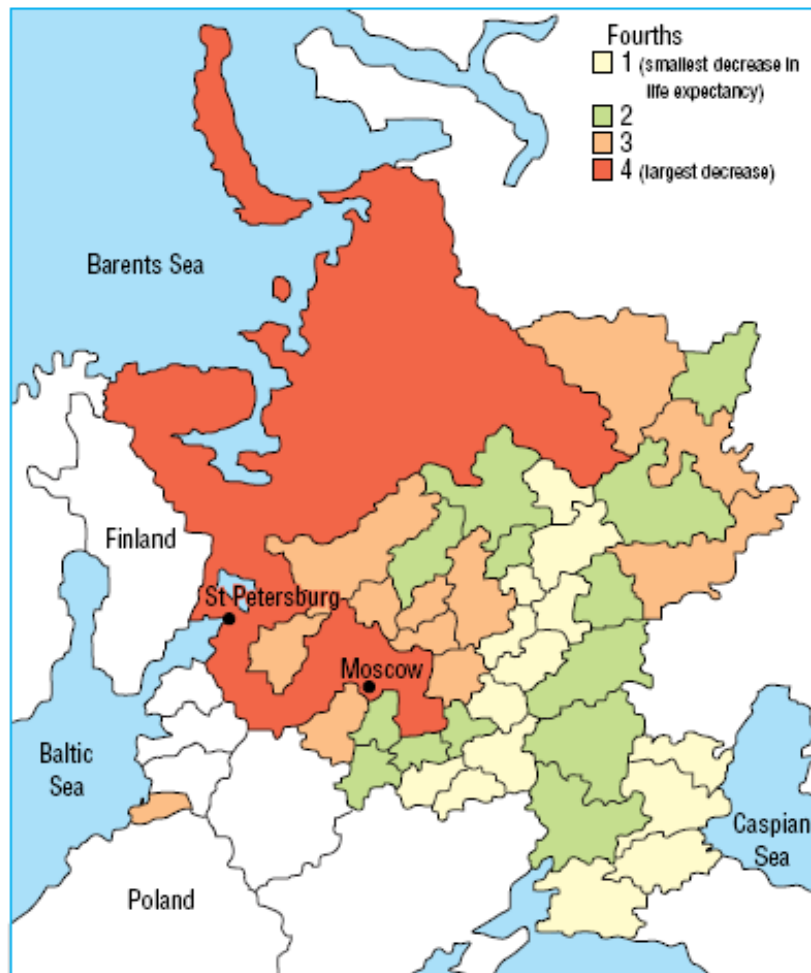


Fig 2 European Russia, showing regional pattern of change in male life expectancy at birth between 1990 and 1994

Mortality increases were greater in wealthier regions.

These increases were associated with:

- *labor force turnover* = $(\text{hired} + \text{fired}) / (\text{total labor force})$. Proxy for speed of reforms;
- *increase in registered crimes*. Proxy for a lack of social cohesion;
- *Robin Hood index* = portion of the total community income that would have to be redistributed (taken from the richer half of the population and given to the poorer half) for there to be perfect equality. Geometrically equal to the max distance between the diagonal and the Lexis curve $\max[x - L(x)]$. Measure of income inequality.



Role of the health care system

In the 1960s-1970s, mortality from infections and other causes among children was already low and constituted a small part of overall mortality. Further use of antibiotics and immunization and other traditional and relatively cheap means become less and less efficient for pushing up the overall life expectancy.

In this period a large majority of deaths are already caused by cardiovascular disease, cancers, other chronic conditions, accidents, alcoholism and other man-made problems. The new epidemiological profile had to be addressed by more sophisticated and expensive medical procedures for early diagnostics and treatment and by multi-sectoral policies for fighting against major risk factors such as smoking, alcohol, fatty food, risky driving, human insecurity, violence etc. Respective efforts to be coordinated by medical professionals and health care networks.

In the 1960s-70s, many countries experienced stagnation in life expectancy due to increasing mortality from cardiovascular diseases and cancers among men. This unfavorable tendency lasted 6-8 years. Then new health policies started to make a difference and the health progress resumed.

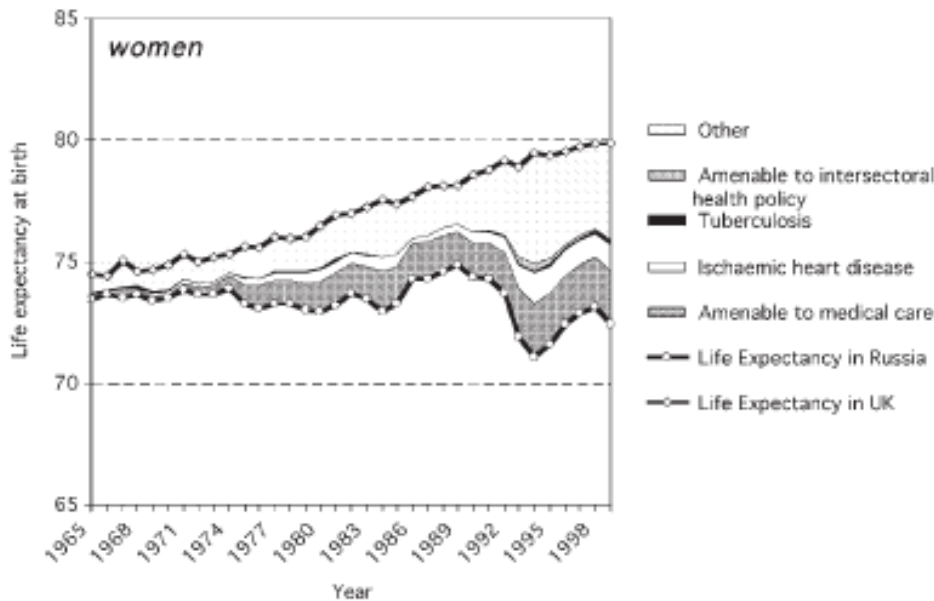
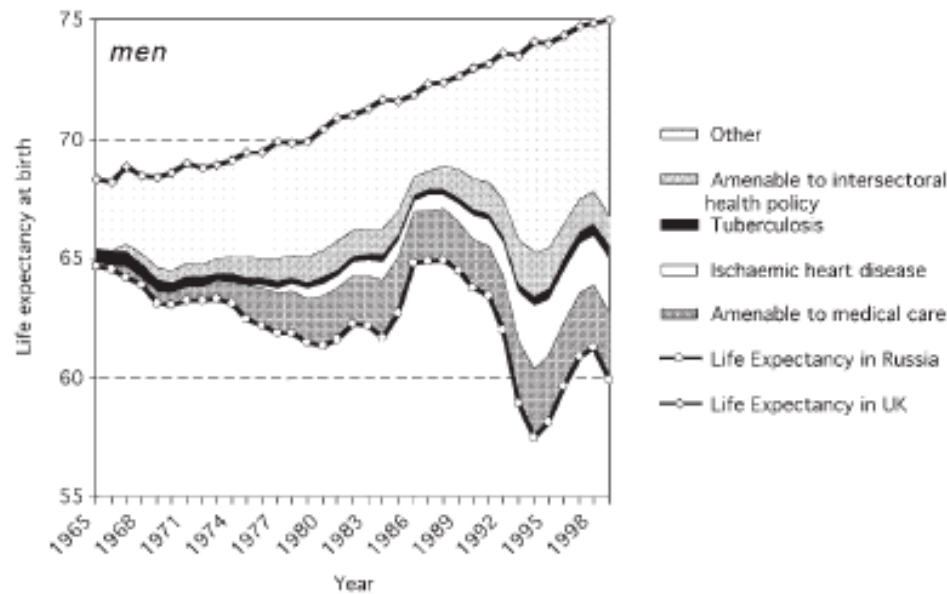
In the USSR and Russia, the health care system was unable to address the new epidemiological pattern. In spite of several success stories (e.g. infant health, treatment of leukemia), overall quality of the health care system and inter-sectoral health policies have been insufficient.



Table 1 List of 'avoidable' causes of death

Cause of death	ICD-9 ^a	Age group
Causes amenable to medical care		
1 Intestinal infections	001–009	0–14
2 Other infectious (Diphtheria, Tetanus, Poliomyelitis)	032, 037, 045	0–74
3 Whooping cough	033	0–14
4 Septicaemia	038	0–74
5 Measles	055	1–14
6 Malignant neoplasm of skin	173	0–74
7 Malignant neoplasm of breast	174	25–74
8 Malignant neoplasm of cervix uteri	180	0–74
9 Malignant neoplasm of testis	186	0–74
10 Hodgkin's disease	201	0–74
11 Leukaemia	204–208	<15
12 Diseases of the thyroid	240–246	0–74
13 Diabetes mellitus	250	0–49
14 Hypertensive disease	401–405	0–74
15 Cerebrovascular disease	430–438	0–74
16 All respiratory diseases (excluding pneumonia /influenza)	460–479, 488–519	1–14
17 Pneumonia/influenza	480–487	0–74
18 Peptic ulcer	531–533	0–74
19 Appendicitis	540–543	0–74
20 Abdominal hernia	550–553	0–74
21 Cholelithiasis and cholecystitis	574–575.1	0–74
22 Nephritis and nephrosis	580–589	0–74
23 Maternal deaths	630–676	All
24 Congenital cardiovascular anomalies	745–747	0–74
25 Perinatal deaths, all causes excluding stillbirths	760–779	All
26 Ischaemic heart disease	410–414	0–74
27 Tuberculosis	010–018, 137	0–74
Causes amenable to intersectoral health policies		
28 Malignant neoplasm of trachea, bronchus, and lung	162	0–74
29 Accidental alcohol poisoning	E860 ^b	All
30 Motor vehicle accidents	E810–825	All
31 AIDS	042	All

Avoidable causes and their contributions to the UK-Russia life expectancy gap. A comparison between Russia and England and Wales (Andreev et al., 2003).



Between 1965 and 1999, the LE gap between England and Wales and Russia has increased from 3.6 to 15.1 years for men and from 1.6 to 7.4 years for women. The contribution of causes amenable to timely and effective medical care to these gaps increased from 1.2 to 3 years for men and from 0.5 to 2 years for women.

Figure 2 The contribution of deaths in each category to the difference in life expectancy in the UK and Russia



Recent improvements

Since 2004, mortality in Russia decreases.
The improvement was especially steep in 2006-2009.

Decomposition of the LE increase between 2005 and 2009

	Men					Women				
	All ages	0-14	15-44	45-64	65+	All ages	0-14	15-44	45-64	65+
All causes	3.879	0.306	1.584	1.576	0.413	2.359	0.229	0.451	0.858	0.821
Ischaemic heart diseases	0.622	0.000	0.143	0.364	0.115	0.391	0.000	0.043	0.188	0.160
Cerebrovascular diseases	0.413	0.000	0.031	0.178	0.204	0.717	-0.001	0.014	0.195	0.509
Other heart diseases	0.014	0.000	0.005	0.013	-0.004	0.016	0.000	0.002	0.019	-0.005
Other circulatory	0.046	0.001	-0.002	0.010	0.038	0.101	0.000	-0.001	0.003	0.099
Cancer of the lung and respiratory organs	0.041	0.000	0.005	0.029	0.007	0.000	0.000	0.001	-0.001	0.000
Cancer of breast						0.006	0.000	0.006	0.006	-0.007
Other neoplasms	0.021	0.004	0.009	0.019	-0.012	0.015	0.003	0.009	0.013	-0.010
Infectious and respiratory diseases	0.331	0.049	0.072	0.186	0.024	0.067	0.036	-0.019	0.038	0.012
Congenital anomalies and perinatal conditions	0.141	0.139	0.002	0.000	0.000	0.115	0.112	0.002	0.001	0.000
Alcohol related diseases and alcohol poisoning	0.492	0.000	0.269	0.218	0.005	0.242	0.000	0.103	0.131	0.009
Suicide and homicide	0.376	0.005	0.261	0.099	0.011	0.115	0.006	0.065	0.033	0.011
Other injury and poisoning	0.879	0.072	0.550	0.241	0.015	0.294	0.052	0.139	0.089	0.014
Ill-defined diseases	0.266	0.025	0.135	0.098	0.007	0.139	0.017	0.031	0.038	0.053
Other	0.238	0.010	0.105	0.121	0.002	0.141	0.004	0.057	0.104	-0.024

Another alcohol-related fluctuation or a longer-term positive trend?

On one side: predominant role of working ages and importance of alcohol-related and external causes. On the other side: importance of IHD and cerebrovascular disorders, especially for the female LE rise. The latter is similar to what was observed in countries of Central and Eastern Europe during improvements of the last decade.



Where we are after all ?

SDRs for selected causes of death per 100,000. Russia vs. EU-15

	Men				Women			
	EU-15 (1)	Russia (2)	(2)/(1)	(2)-(1)	EU-15 (3)	Russia (4)	(4)/(3)	(4)-(3)
All causes of death	702.8	1778.7	2.53	1075.9	438.7	870.6	1.98	431.9
All circulatory diseases	223.0	923.9	4.14	700.9	147.8	524.8	3.55	377.0
Ischaemic heart disease	96.3	503.3	5.23	407.0	46.3	255.9	5.53	209.6
Cerebrovascular disorders	45.7	268.0	5.86	222.2	38.6	189.6	4.92	151.0
Malignant neoplasms	217.1	266.1	1.23	49.0	127.8	132.3	1.04	4.5
Cancer of trachea, bronchus and lung	56.8	72.5	1.28	15.7	18.9	8.3	0.44	-10.5
Cancer of the breast					23.9	24.3	1.01	0.3
Infectious and parasitic disease w/o TB	11.4	9.5	0.84	-1.9	7.3	4.3	0.59	-3.0
Tuberculosis	0.69	27.7	40.10	27.0	0.28	5.6	19.97	5.3
Diseases of the respiratory system	61.4	93.1	1.52	31.7	33.4	23.7	0.71	-9.7
Chronic liver disease and cirrhosis	15.3	40.2	2.63	24.9	6.2	20.8	3.36	14.6
Diabetes mellitus	14.3	4.6	0.32	-9.6	10.7	6.2	0.58	-4.5
Suicide and self-inflicted injury	14.4	44.2	3.06	29.7	4.4	7.4	1.69	3.0
Homicide and intentional injury	1.0	22.5	22.74	21.5	0.5	6.4	13.62	5.9
Other external causes	32.8	183.3	5.59	150.6	13.7	46.2	3.37	32.5

Russia experiences a combination of very high mortality from circulatory diseases with very high mortality from non-natural causes (accidence and violence).



- **Alcohol**
- **Smoking**
- **Insufficient health care**
- **Psychosocial stress**
- **Lack of law and order, human insecurity, criminalization**
- **Growing economic disparities and concentration of health problems in disadvantaged groups**

No evidence of substantial mortality effects of:
environmental pollution, absolute poverty and malnutrition. This
does not mean that these problems are of no importance at all or
do not produce any health effect.



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