

# MORTALITY FROM UNDETERMINED CAUSES OF DEATH IN RUSSIA AND IN SELECTED COUNTRIES\*

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*Deaths due to injuries and poisoning which experts cannot identify, such as homicide, suicide or accident, are registered in statistical databases as deaths due to an event of undetermined intent. The proportion of such deaths can indicate the quality of statistics on causes of death, above all of statistics on intentional self-harm and assaults. In Russia, the proportion of deaths due to events of undetermined intent among other external causes has been growing for almost four decades. Such a trend was observed in the past during periods of growing mortality from external causes. Yet the steady and long decline in mortality from external causes in Russia that began in 2003 has not stopped the trend. The displacement of other external causes continues, though mortality from events of undetermined intent has exceeded both suicide and homicide mortality, and its proportion has increased tenfold, reaching very high levels relative to those of other countries. In several studies done in Russia over the past decade, scholars have argued that such a high proportion essentially results from the manipulation of statistics on mortality from external causes, the so-called conversion of socially important causes of death to a latent form.*

*The factors behind the persistent rise of the proportion of deaths due to events of undetermined intent (EUI) are analysed on the basis of a review of relevant research and long-term trends in mortality from external causes in Russia and selected developed countries. This makes it possible to expand the contextual framework of the discussion about the factors of the persistent growth of this “technical” indicator and about the hypothesis of the “natural” character of such dynamics.*

**Key words:** mortality, Russia, external causes of death, homicide, suicide, event of undetermined intent, ill-defined and unknown causes of death, quality of external causes of death statistics.

## 1. INTRODUCTION

Intention or “manner of death” is one of the axes of the classification of external causes, according to which such causes are divided into three main blocks: (a) accidents – unintentional events, the result of “a combination of circumstances”; (b) self-harm (e.g. suicide); and (c) attacks (e.g. murder). Blocks (b) and (c) include cases of the deliberate infliction of death.

However, in practice there are cases of death which are hard to assign to one of these three blocks, because “the available information is insufficient to enable a medical or legal authority to make a distinction between accident, self-harm and assault” [WHO 2003]. These cases relate to the fourth block: events of undetermined intent. In countries with well-developed coroner systems, this block comprises cases of death with an open verdict.

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Despite the long history of the International Classification of Diseases (ICD), EUI as a separate group of external causes appeared only in the ICD-8, adopted in 1965. In the English edition, these causes are called “injury undetermined whether accidentally or purposely inflicted” and, in Russian, they are labeled as “injuries without specification (of intent/intention)”. Before the switch to the ICD-10, Russian scientific literature used the terms “injury without specification of accidental or intentional nature” and “unspecified violent causes”.

The second axis of the classification of external causes of death is determined by the mechanisms (means) resulting in death. Along this axis the EUI block is built similarly to other blocks of external causes and, moreover, identically to the block of self-harm (X60-X84). Homicides – which are also called assaults (H85-Y09) – differ from EUI to a lesser degree of detail regarding the means of poisoning, as well as in having their own unique categories (Y04-Y07), in which the mechanisms of death are the use of physical force and various forms of ill-treatment. Comparison of these three blocks with the block of accidents is the most problematic, as the classification of the latter has a number of differences. Nevertheless, for each category Y10-Y34 there is a “category-namesake” in each of the major blocks of external causes of a given kind, so that the EUI block is called a reservoir or collector of causes of deaths from the main blocks of external causes of a given kind.

The uncertainty which leads to classifying the cause of death as an EUI is inevitable not only because of the lack of information about the circumstances of death. As “death of undetermined intent” is a rather “mild” verdict in comparison with others, e.g. suicide, the EUI include incidents about which enough is known to suspect suicide, but not enough to meet the stiff requirements to be registered as self-harm. According to Lado Ruzicka, the concept of EUI originated from the problem of underreporting of suicides due to their misclassification as accidents [Ruzicka 1996]. “To register a death as suicide, it must be established that the death was due to unnatural causes and came as a result of deliberate human action with the intention to terminate his life. If you have any doubt of suicidal intent, it is very likely that *the death was recorded as an accident* (italics added)” [Ruzicka 1996: 188].

Introducing a special set of causes helps to improve the quality of mortality statistics on accidents and to assess the prevalence of questionable situations. It is no coincidence that in the nomenclature of causes of death in many industrialised countries, including the USSR, EUI existed even before their inclusion in the ICD-8. However, the transition to ICD-8 did not go smoothly in some countries: in the first years after the transition, there was a sudden increase in the number of deaths from EUI, followed by an equally sudden drop in the number of suicides [Kolmos 1987; O'Carroll 1989].

The specific nature of the formation of mortality from EUI determines the specific nature of its study, which focuses not on the levels and trends in mortality from EUI as such, but rather on relationships with the levels and trends of mortality from external causes of a certain kind: firstly – judging by the English-language literature – from suicides, and secondly from accidents.

The discussion of underreporting suicides has a long history and sheds light on the problem of excessive use of EUI categories in several developed countries. The general consensus is that suicides are underreported. Most studies in developed countries show that, in addition to deaths for which there really is not enough information (“true deaths from EUI”), suicides and accidents

also fall into this block. The percentage of erroneous diagnoses varies from country to country and over time, and it depends on the type of study.

A systematic review of studies of the reliability of suicide statistics published between 1963 and 2009 in English and six other European languages showed that in 52% of the publications underreporting was above 10%, and in 39% of them it exceeded 30% [Tøllefsen, Hem, Ekeberg 2012]. The completeness of suicide reporting depends on the method of suicide: more active methods (e.g. hanging, firearms and cold steel) are reported better than less active ones (e.g. poisoning and drowning).

The accuracy of the diagnosis of suicide is influenced by:

- Competence of forensic experts and coroners (i.e. qualification and training);
- Medical-legal ascertainment practices and procedures [Rockett, Kapusta, Bhandari 2011; Chang et al. 2010], including the percentage of forensic and postmortem studies [Kapusta et al. 2011];
- Regulation of confidentiality compliance procedures, legal restrictions and prohibitions [Rockett, Kapusta, Bhandari 2011];
- Funding and staffing [Whitt 2006];
- Cultural and religious context, i.e., sociocultural condemnation [Rockett, Kapusta, Bhandari 2011], which may include pressure from the authorities and the media [Whitt 2006].

Obviously, these very same factors affect the frequency with which forensic experts turn to the EUI categories. Among the aforementioned factors, a special place belongs to sociocultural censure. This factor, in contrast to others which also affect the accuracy of the diagnosis of suicide, leads to overt manipulation of the data, as an expert may – under pressure from others when assessing the available evidence – reject a harsh verdict (“suicide”) in favour of a mild one (“death of undetermined intent”). In a number of countries, the verdict of “suicide” was, because of cultural and religious traditions, so shameful that it was avoided in any way; sometimes it was outright impossible [Ruzicka 1996: 188]. Social and cultural norms influence the formulation of a diagnosis, even in countries with impeccable mortality statistics. For example, in Sweden, a survey of relatives and friends of the victims, as well as of physicians, together with an analysis of death certificates, revealed that almost two-thirds of all deaths coded as EUI were actually suicides [Horte 1983].

The motives for categorising deaths as EUI when there is evidence of murder as the cause are different, because relatives are hardly interested in such a substitution of diagnoses. Consequently, it is only the authorities involved in the process of establishing the cause of violent death who “fall under suspicion”. In developed countries, the scientific literature rarely touches on this topic, which is not surprising. First of all, intensive research into the underreporting of suicides is limited to a narrow range of countries [Tøllefsen, Hem, Ekeberg 2012] with low mortality rates from homicide, and often from EUI as a whole, so the problem of classifying murders as EUI is not a burning issue. Secondly, it is believed that in democratic countries the practice of manipulating statistics on mortality from homicide is not widespread. In other countries, some research on a wider topic – the accuracy of medical death certificates and coding the underlying causes of death – reveals a number of murders among unspecified accidents and EUI (see, for example, the summary of the article [Drummond et al 1999]). Nevertheless, even in democratic

countries the problem of underreporting murders exists, but it mostly concerns children of early ages and, above all, infants (see for the US [Sorenson, Shen, Kraus, 1997a, 1997b] and for Estonia [Väli et al. 2007]).

EUI also includes different categories of accidents – mainly poisonings, but also drownings, falls, traffic accidents and others.

In the WHO projects “Global Burden of Injuries” [Begg, Tomijima 2003: 2] and “Global Health Estimates” [WHO 2014: 4], deaths from EUI are distributed proportionally among other external causes. This is due to the fact that the EUI code columns are, to use a metaphor introduced in a recent publication by the WHO [2014: 4], “junk codes” of the class of external causes of death. In general, mortality from EUI and its proportion of mortality from other external causes are “technical” indicators which, along with other indicators adopted by the WHO, are characterised by the quality of the statistics on external causes of death. This – not in itself, but in the context of other external causes – is precisely how mortality from EUI is viewed in foreign literature.

The purpose of this article is to describe the overall picture of changes in mortality from EUI since 1956, particularly the current levels and recent trends, as well as to try to answer the questions of how unusual the levels of “technical” indicators reached in Russia are and what is behind the persistent increase in the proportion of mortality from EUI.

## **2. DATA AND METHODS**

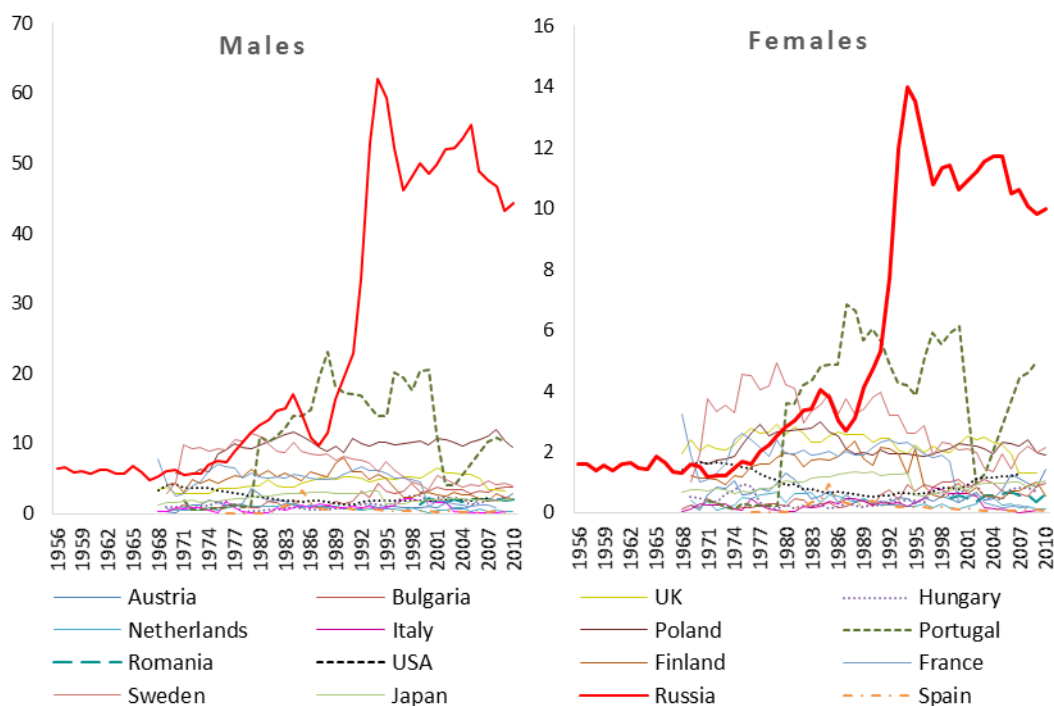
The analysis of mortality from EUI and other causes of death in Russia in 1956-1998 and in 15 developed countries from 1965 uses age-standardised death rates (the WHO European standard population), including all derivatives of these measures (e.g. mortality structure, rate ratios, etc.). Data on causes of death by age and sex in Russia prior to the introduction of the ICD-10 in 1999 result from the reconstruction of series of causes of death [Meslé et al, 1996; Meslé et al. 2003], while those since 1999 were obtained from the national statistical agency Rosstat. For other countries, the analysis relies on data from the WHO Mortality Database using software developed by E.M. Andreev [Andreev 2010]. For the analysis of categories Y10-Y34 for Russia in the 2000s, we used anonymised data from death certificates which, though not official, are not significantly different from the official data, as demonstrated by an analysis of 2011 data.

## **3. MAIN FINDINGS**

### ***3.1. Trends in injury mortality from undetermined causes***

Over the past half-century, the standardised mortality rate from EUI in Russia has increased eight-fold among men and seven-fold among women. Following the overall trend in mortality from all causes, including external causes, the changes were uneven, with alternating periods of decrease and growth. The whole time series can be divided into two periods: before and after the start of the growth of mortality from EUI (the end of 1960 for men and the middle of 1970 for women). Three segments in the time series are distinguishable, with a certain degree of conditionality in the second period: growth with some decline in the end of the period up to 1990; a sharp rise after

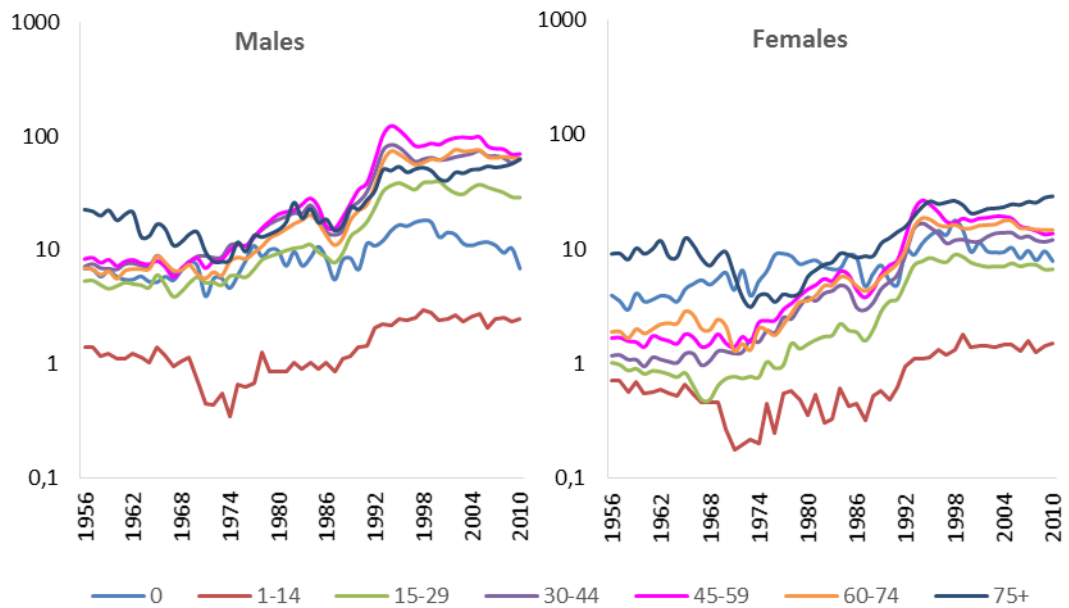
1990, with a peak in 1994; and a subsequent decline, rather modest compared to the growth of the previous period (Figure 1).



**Figure 1. Standardised death rates from EUI in Russia (1956-2012) and in 15 developed countries (late 1960s-2010), per 100,000**

In the 1950s and 1960s, the indicator showed a barely noticeable downward trend, mainly due to the 75 and older age group (Figure 2). During this period and against the background of 15 countries (Figure 1), Russia barely stood out. Since mortality from other external causes in these years increased, the contribution of mortality from EUI to total mortality from external causes – which was already low – decreased, including among both children and older age groups, by a factor of two or more.

The consequent period of changes in mortality from EUI was not uniform, and it can be divided into several stages, including a stage of decline during the anti-alcohol campaign, although overall growth prevailed. Even in the period of decline, the standardised death rate of EUI in 1987 was, among men, 1.7 times and, among women, 2.2 times higher than in 1973 – before the start of the upward trend. The six-fold growth by 1987 and 1994 changed the situation, leading to an unprecedented breakaway from the 14 countries taken for comparison and transforming the age curve of mortality from EUI. Among men there emerged a significant gap in the intensity of mortality between the age of maximum mortality (45-59 years) and other age groups, with the intensity of mortality at age 75 and older being lower than at age 60-74, which was in turn lower than at age 30-44 (Figure 2). Among women, the scale of change was smaller, but mortality in the 45-59 age group also increased more than in all other age groups.



**Figure 2. Standardised death rates from EUI in seven age groups, Russia, 1956-2012, per 100,000, logarithmic scale**

In 1995, a new phase began in Russia: there was a hesitant and much interrupted reduction in mortality from EUI. By 2012, its level had moved away from its peak in 1994, but was still many times higher than in most other countries shown in Figure 1, and higher than the 1992 level. Moreover, mortality from EUI did not decrease in two age groups: in 2012 it approached (for ages 1-14) and exceeded (for ages 75 and older) the maximum values for the previous years (Figure 2). However, the main feature of this phase was the steady decline, begun in 2003 and unprecedentedly long for Russia, in mortality from other external causes, the level of which returned to the values of the mid-1960s. The main problem is that mortality from EUI is now 6-7 times higher than it was half a century ago, and its proportion of all other external causes has been growing since 2003 (Figure 3).

### ***3.2. The proportion of EUI to mortality from other external causes in Russia and in 15 other countries***

The ratio of mortality from EUI to mortality from other external causes (per 100), which for convenience is named here the “proportion of EUI”, characterises the quality of statistics of external causes or “proportion garbage”, using the metaphor introduced by WHO experts [WHO 2014: 4]. The deterioration of the quality of statistics has lasted, with interruptions, since the first half of the 1970s. Since then, the indicator has increased ten-fold, and even more in most age groups. Decisive and roughly equal contributions to the growth of the indicator occurred during two periods: 1988-1994 and 2003-2012. The latter period is of particular interest.

The mirror increase (with respect to mortality from other external causes) in the proportion of EUI since 2003 is a new phenomenon: in the past, a decrease in mortality from external causes did not mean an increase in the proportion of EUI (1985-1987 and 1995-1997). On the contrary, an increase in the proportion of EUI coincided with an increase in violent deaths. The mirror growth of the proportion of EUI since 2003 indicates that the concentration of violent deaths in

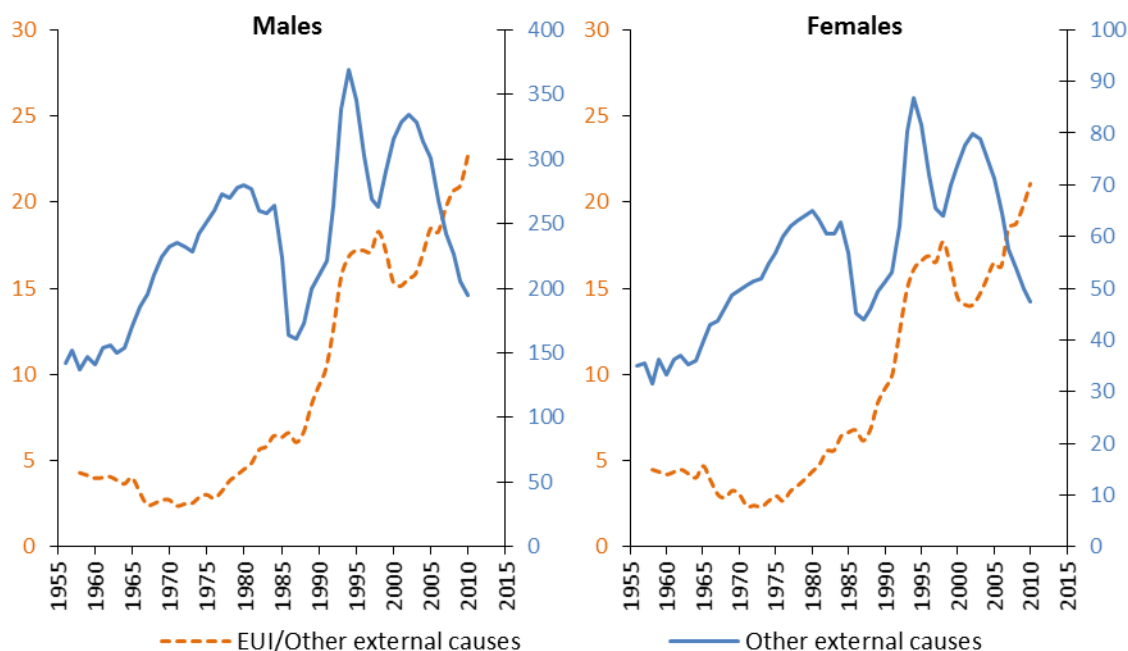
the “trash” block is a very stable trend, which progresses both when mortality from other external causes increases and when it decreases.

Naturally, questions arise. What lies behind such persistent growth in this “technical” indicator? How usual are its current values? Are similar trends encountered in other countries?

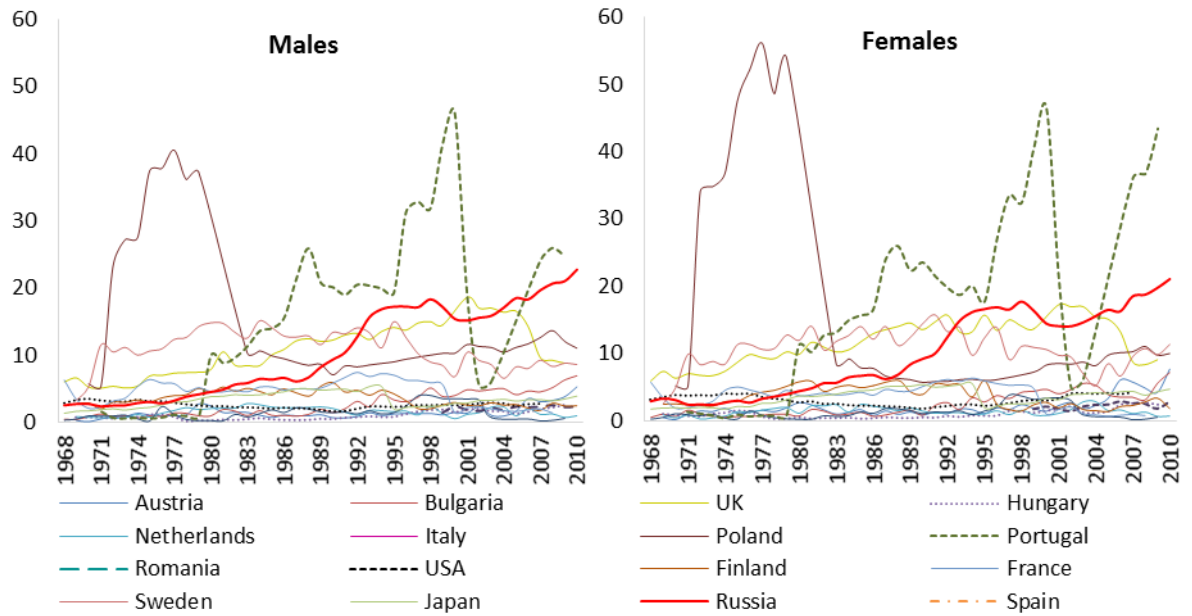
Among the 15 other countries under study, only in Portugal has this indicator been higher than in Russia. But the trend in Portugal, as well as in Poland in the 1970s, was characterised by sharp fluctuations (Figure 4), the causes of which require separate consideration, although the amplitude of huge jumps prompts doubts about this data from the very beginning.

In other countries, the maximum proportion of EUI did not exceed 19 for men and 18 for women, and the average value is 5. For them, a proportion of EUI above 10 can be considered high. These values have been observed for a fairly long time in Sweden and the United Kingdom (UK) – countries with reliable data on the causes of death. Values of the proportion of EUI higher than 15 can be considered very high. Russia reached the mark of 10 in the last year of the Soviet period (1991) and 15 two years later. By the end of the 2000s Russia had surpassed the maximum values for the UK, and in 2012 the values of the Russian indicator came close to those for Portugal.

As for trends, growth in the proportion of EUI lasting one or two decades in various periods is found in many countries. A precise assessment of the duration of the trends is hindered by their instability, but cases of a longer rise in the indicator among the countries under consideration are rare, and such long rises are found nowhere but in Russia. Moreover, in countries where the upward trend of the indicator lasted two or three decades, its level tended to remain quite moderate (except in the UK).



**Figure 3. Proportion of EUI (left axis, per 100 deaths) and standardised death rate from “other external causes”, (right axis, per 100,000)**



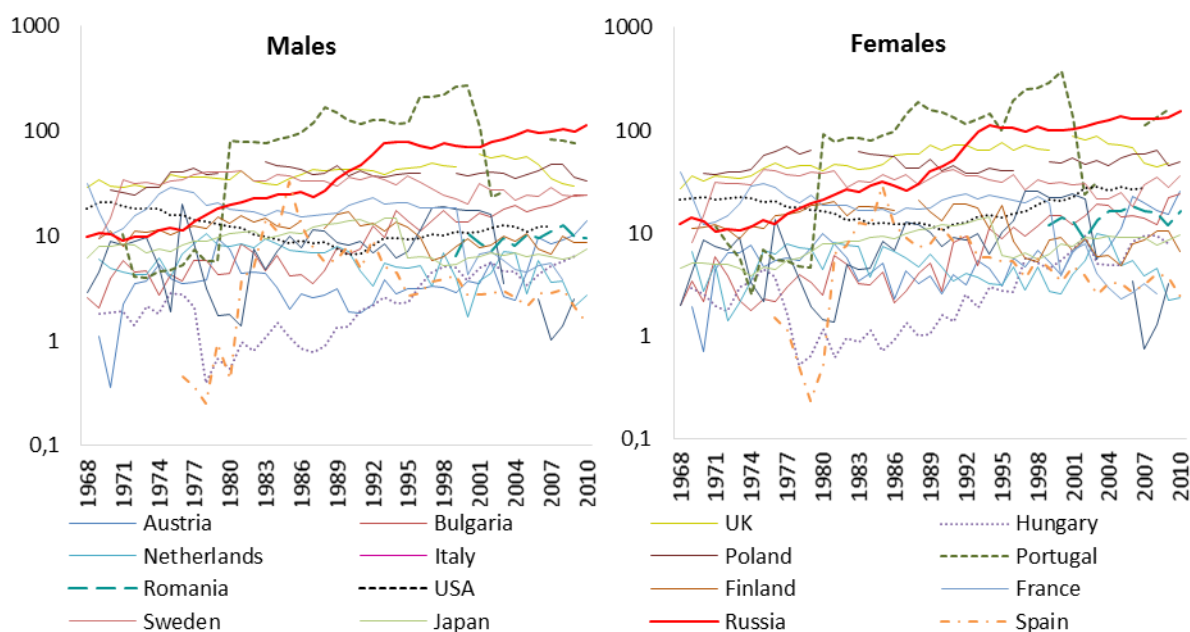
**Figure 4. Proportion of EUI in Russia and 15 countries, per 100 deaths from “other external causes”**

Thus, compared to other countries, Russia stands out not so much for its increasing trend of the proportion of EUI itself (it is rising everywhere) as for its duration and extremely high level.

The proportion of EUI is a measure of uncertainty in the level of mortality from external causes of all blocks, but studies in other countries suggest that the most likely candidates for falling into the category of deaths of undetermined intent are suicides; they therefore apply the indicator of the proportion of EUI to suicides.

In Russia in the late 1960s and early 1970s, mortality from suicide was 10 times higher than the then-low level of mortality from EUI (Figure 5). The dynamics of the index are almost identical to the dynamics of the proportion of EUI relative to mortality from other external causes just considered: since the early 1990s the ratio has changed rapidly in favour of EUI, and Russia emerged to take second place after Portugal. How far Russia’s current ratio is from other countries can be seen in that it is 10-11 times higher than the median, and 5-6 times higher than the upper quartile of the distribution for 15 countries. Only among men and women in Russia (and among women in Portugal) is mortality from EUI higher than mortality from suicide.





**Figure 5. Rate ratios of EUIs to suicides in Russia and in 15 countries, per 100, logarithmic scale**

The level of suicide mortality in Portugal has been in doubt for a long time in terms of its dynamics and in comparison with mortality from EUI. It has been demonstrated that in Portugal in the 1980s a considerable number of suicides were coded as EUI [De Castro, Pimenta, Martins 1989], and the situation has not changed since then. Given that in Russia the ratio is the same as in Portugal, in our country, too, the completeness of suicide recording is suspicious, especially for women.

A high EUI/suicide ratio is also observed in the UK, Sweden and Poland. In the UK and Sweden, the problem of underreporting suicide deaths has been discussed by the scientific community for several decades, though only in recent years in Poland [Hofer et al. 2012]. Not long ago, an effort was made to develop a criterion to characterise the quality of suicide statistics [Värnik et al. 2012]. For the 15 members of the European Union the average level of the mortality rate from EUI and the rate ratio of EUI to suicides were combined into a “2-20 benchmark”, in which the first indicator is 2.0 EUI cases per 100,000 persons, and the second – the proportion of EUI to suicides – is 20%. All three above-mentioned countries, not to mention Russia and Portugal, do not meet the criteria of the quality of data on mortality from suicide.

However, one must admit that the comparison of ratios of mortality from EUI and from self-harm, while relevant for western countries, is less relevant for countries such as Russia, where most of the deaths of undetermined intent are murders, not suicides. The irrelevance of such an approach for Russia did not arise immediately, but increased together with the increase in mortality from assaults and EUI, especially in the period of 1987-1994.

It is even less relevant to analyse Russia’s position among other countries by its EUI/homicide rate ratio, which does not look extraordinary, as in the case of suicides, since mortality from homicide is low in other countries. For example, in the six countries located in Table 1 below Russia, the mortality rate from homicide is not just 3-10 times lower than from EUI,

it is itself very low: 10-50 times lower than in Russia. So the uncertainty of estimates of mortality from homicide in these countries is a problem of a different order of magnitude.

**Table 1. Standardised death rates (SDR) from homicide and rate ratios of EUIs to homicides in Russia and 15 other countries**

Country, year	EUI per 100 homicides				SDR from homicide per 100,000			
	Ratio		Rank		Rate		Rank	
	Males	Females	Males	Females	Males	Females	Males	Females
Spain, 2010	17	12	1	1	0.8	0.5	13	12
Italy, 2009	19	17	2	2	1.2	0.5	10	13
United States, 2007	23	52	3	6	9.5	2.5	2	2
The Netherlands, 2010	31	18	4	3	1.1	0.6	11	7
Romania, 2010	64	45	5	5	3.1	1.3	3	3
Finland, 2010	76	64	6	7	2.9	0.8	4	5
France, 2008	93	44	7	4	0.9	0.4	12	14
Hungary, 2009	139	71	8	8	1.7	1.0	6	4
Bulgaria, 2010	183	140	9	9	2.0	0.7	5	6
Russia, 2010	224	177	10	10	19.8	5.6	1	1
Sweden, 2010	293	380	11	13	1.4	0.6	7	8
Japan, 2010	632	381	12	14	0.4	0.3	16	15
Austria, 2010	667	277	13	11	0.4	0.5	14	9
Poland, 2010	740	374	14	12	1.3	0.5	9	11
United Kingdom, 2009	760	701	15	15	0.4	0.2	15	16
Portugal, 2009	765	978	16	16	1.3	0.5	8	10

*Note: Countries are ranked by the value of the male indicator (column 1) in ascending order.*

Among the 15 countries, perhaps only the US somewhat resembles Russia. Firstly, the US comes immediately after Russia by the level of mortality from homicide, with a relatively small gap between the two and a fairly large gap between the US and other countries. Secondly, in the US, too, there is a fairly large group of people with a high risk of dying from external causes. But the US differs from Russia in that the proportion of EUI to homicides is lower than in Russia, by a factor of 10 for men and 3.5 for women. This difference gives an idea of how questionable the levels of mortality from homicide in modern Russia are.

To shed light on the differences between Russia and the US, as well as other countries, we compare the structure of the EUI block by its items (Table 2). Since mortality from EUI is quite low and can be subject to random fluctuations, for each country other than the US, the standardised coefficients were calculated for the period 2007-2010. Five countries, in which the indicator's values for women were lower than 0.5 per 100,000, were omitted. The structure of the EUI block in Portugal differs from that of all other countries by its simplicity: 80% of deaths fall in the vaguest categories (specified and unspecified events), which once again points to the extremely poor quality of data on deaths from external causes in this country. In the US, the greatest difficulties in determining intent arise with drugs and drug poisoning. A similar pattern is seen in Sweden and among women in the UK. In general, the proportion of drug poisonings and all poisonings taken together is much higher among women, as reflected in the average value for eight countries. However, the average profile in this case is a rather artificial construction because of the significant variety of approaches to coding the causes of death in this block. In Japan, almost 30% of EUI are drownings, in Bulgaria there is an unusually large number of hangings, and in Hungary – with its traditionally high mortality rate from suicide – the structure is the most complex. Furthermore, the categories of specified and unspecified events are used to varying degrees in different countries.

In Sweden, Austria, the UK and the US they are used rarely, but in Poland, Finland and Bulgaria they are used often (33-36%).

Compared to other countries, Russia has fewer poisonings, with completely different kinds of substances predominating, and somewhat more hangings. Both means of death, together with drownings and falls, are much more likely to occur in suicides than in murders. It is considered [Ivanova et al 2013] that deaths categorised as EUI which are caused by contact with a sharp or blunt object are a latent part of murders, and precisely these predominate in Russia. On the other hand, in 15 countries, despite considerable variation in the structure of the EUI, all of them are characterised by a very modest share of deaths from contact with a sharp or blunt object (ICD codes Y28-Y29). The maximum value is observed in Italy (7% in men and 11% in women), but in Italy mortality from EUI is negligible: 0.13 and 0.03 per 100,000 for men and women, respectively.

**Table 2. Structure of the EUI block in Russia (2012), the US (2007) and in a group of eight countries (2007-2010\*), percent**

ICD codes	Cause of death	Males			Females		
		Russia	8 states	US	Russia	8 states	US
Y10-Y11, Y13-Y14	Poisoning by drugs	1	13	30	3	27	48
Y12	Poisoning by narcotics	2	8	31	1	7	27
Y15	Poisoning by alcohol	5	3	3	5	3	1
Y16-Y19	Other poisonings	10	5	3	14	4	1
Y20	Hanging , strangulation	15	10	3	12	7	2
Y21	Drowning	3	14	5	3	13	4
Y22-Y24	Firearm discharge	2	3	7	0	1	3
Y26	Exposure to smoke, fire and flames	3	4	2	3	4	2
Y28-Y29	Contact with sharp and blunt object	31	3	1	28	3	0
Y30	Falls from a height	5	9	1	9	8	1
Y33-Y34	Other specified and unspecified events	20	22	14	19	20	11
Y25, Y27, Y31, Y32	Residuals	1	6	1	2	4	1
Y10-Y34	Total	100	100	100	100	100	100

*\*Unweighted average of mortality rates in eight countries (Austria, Bulgaria, Great Britain, Hungary, Poland, Finland, Sweden, Japan), excluding the maximum value in each category. Portugal (see text) and five countries with the lowest mortality from EUI – Italy, Spain, the Netherlands, Romania and France – have been excluded from the analysis.*

According to Ivanova et al., in Russia a part of deaths from specified and unspecified events (Y33-Y34), when combined with injuries (codes: S00-T14, T90-T98), should also be classified as homicides. The proportion of such cases in 2012 was very high: 95% for unspecified events and about 80% for specified events. If we follow the classification of EUI categories proposed in the article by A.E. Ivanova et al. [Ivanova et al. 2013], then the cumulative proportion of homicides in this block (Y22-Y24, Y28-Y29 and Y33-Y34 in combination with S00-T14, T90-T98) in 2012 was 51% for men and 45% for women.

It is difficult to check whether this conclusion applies to the countries considered herein. If it did, however, this problem would not have gone unnoticed in Portugal, where in 2007-2010 mortality from specified and unspecified EUI was 6-7 times higher than mortality from homicides. In Portugal, however, only underreporting of suicides is discussed. In addition, the structure of the EUI block is largely determined by the structure of other external causes. In 12 countries, including

Portugal, mortality from suicide is higher than from homicide by a factor of 7 for women and 11 for men, whereas in Russia these factors are, respectively, only 1.2 and 2 times (only among American men is this ratio close to Russia's).

Thus, there is good reason to believe that the contribution of homicides to mortality from the block of categories Y10-Y34 in these countries is low and, in comparison with Russia, outright insignificant. Moreover, at the same time, the share of EUI among other external causes in Russia is much higher and continues to grow.

With the exception of specified and unspecified events, all categories contributed to the increase in the proportion of EUI in 2003-2012 in Russia. The largest contribution to the indicator's growth came from the following: contact with sharp or blunt objects (36% for men and 33% for women), hanging (27% and 21%), other poisonings (14% and 17%) and falls among women (14%). Overall, mortality from latent homicides decreased by 1.5 times, and mortality from latent suicides (hangings and poisonings by drugs coded as EUI) increased by the same factor.

Accordingly, the proportion of latent murders in the structure of EUI decreased by 15 percentage points, while suicides increased by 10 percentage points. This resulted mainly from two things: an almost two-fold increase in deaths from hangings, and a 2.3-fold decrease in mortality from specified and unspecified events. The latter testifies to an improvement in the quality of data within the EUI block, because categories Y33 and Y34 – the vaguest unspecified injuries – are in fact unknown external causes, for which neither the intention nor the mechanism of death have been determined.

### ***3.3. Mortality from EUI and from ill-defined causes of death***

The EUI block is not the only “collector” of external causes of death. Some of them, including deaths from EUI, may fall into class XVIII, “Symptoms, signs, abnormal clinical and laboratory findings, not elsewhere classified” (columns R00-R99 in ICD-10), which was also called “garbage”, but for natural causes of death [WHO 2014: 4]. Twelve blocks of this class describe a vague somatic pathology, including “Senility” (R54), and the last – that is, the 13<sup>th</sup> – block (R95-R99), which encompasses “ill-defined and unknown causes of death” and in accordance with its name includes incidents for which the cause of death is most difficult to determine (Table 3). For brevity, we will refer to this unit as “ill-defined and unknown causes” of death (IUC).

**Table 3. Deaths by causes of class XVIII of the ICD-10 and age groups, Russia, both sexes, 2012, percent**

Cause of death	ICD codes	Age groups, years				Total
		0	1-19	20-59	60+	
Sudden infant death syndrome	R95	65.6	0.0	0.0	0.0	0.9
Ill-defined and unknown causes of death	R96-R99	32.4	99.5	99.3	98.2	98.0
Other symptoms and ill-defined conditions	R00-R53, R55-R94	2.0	0.5	0.7	1.8	1.1
All causes for class XVIII, except for R54 (Senility)	R00-R53, R55-R99	100.0	100.0	100.0	100.0	100.0

Although this class should include cases of natural death, some deaths fall into the 13<sup>th</sup> block because their inexplicable or sudden nature can also be the result of unnatural causes.

As has been found in a number of studies [Värnik et al. 2010; Rockett, Kapusta, Bhandari in 2011; Gjertsen, Johansson 2011], some deaths from external causes do indeed fall into this block. For the analysis of mortality from external causes, the important question is whether it happens accidentally, that is, whether it creates a systematic shift in the variation of mortality from external causes in time and space. Studies analysing the reliability of suicide mortality statistics convey, with rare exceptions [Bjorkenstam et al. 2014], the idea that the underreporting of suicides is accidental, hence there is a fairly high probability of assigning them to categories R96-R99. Therefore, some authors have suggested using in international comparisons the ratios of mortality from suicide to mortality from EUI and to mortality from causes within block R96-R99 as indicators of the uncertainty of measurement of the level of mortality from suicide [Rockett, Kapusta, Bhandari 2011].

In Russia, the assumption that a part of violent deaths are registered as ill-defined was made in the 2000s [Semenova, Antonova 2007]. At present, the hypothesis is considered confirmed, and some researchers believe that, similarly to over-reporting of mortality from EUI, this case of purposeful manipulation is to disguise the acute problem of high mortality from external causes [Ivanova et al. 2013].

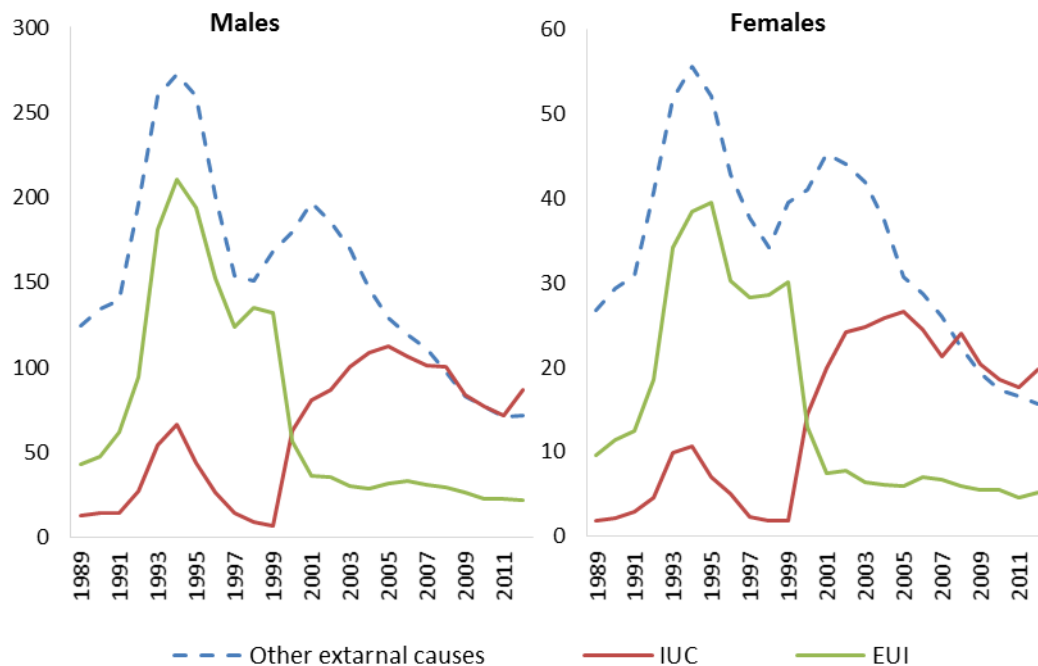
For example, this is how the abrupt change in mortality from EUI and ill-defined conditions (they switched ranks) in 1999-2001 in Moscow (Figure 6) was interpreted [Arhangelsky et al. 2006; Antonova 2007; Semenova, Antonova 2007; Ivanova et al. 2013.; Gavrilova et al. 2008]. It is clear that such a practice could affect the dynamics of recorded violent mortality, particularly the proportion of EUI among “other external causes”.

Of course, not all deaths that fall into the categories of unknown causes, especially in the older age groups, should be considered violent, and violent deaths falling into this category should represent all groups of external causes, not just EUI. However, there is no reason to doubt that in Russia deaths which should be coded in the Y10-Y34 block (EUI) are put into the XVIII<sup>th</sup> class of the ICD-10.

First, of the 13 blocks of class XVIII, only the 13<sup>th</sup> (R96-R99, which accounted for over 98% of deaths in 2012 [see Table 3]) is actually used, and more often than not, only one of its categories is applied. In the regions of Russia, in 2005 [Antonova 2007] and 2010 the choice fell on R99, the least precise category that was often accompanied by the entry “cause of death unknown” [Ivanova et al 2013].

Second, according to currently established practice, the authorities who determine the cause of a violent death give a verdict of “undetermined intent of death”, but forensic experts encode it as R99 instead of Y10-Y34 [Ivanova et al. 2013]. It is no coincidence that the blocks of class XVIII are so unevenly filled in. The somatic categories are empty, since they are filled in by doctors who follow the requirements not to overuse them [Rukovodstvo (Guide) ... 2008: 10; KZ SPb (St. Petersburg): 1997], while the 13th block is filled by forensic experts. Finally, the absence of a break in the dynamics of mortality from other external causes in 2000 (Figure 6) indirectly

confirms that, at least in Moscow and since 2000, it is precisely deaths from EUI that have begun to be encoded as IUC.

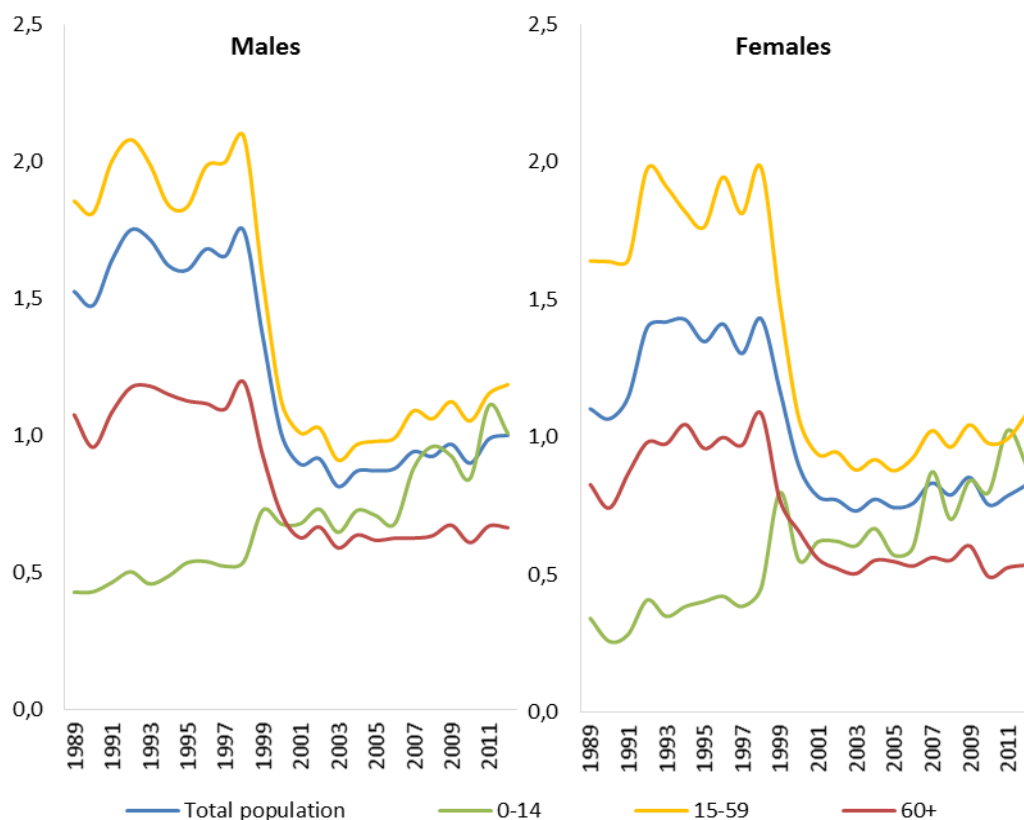


**Figure 6. Standardised death rates from IUC, EUI and other external causes in the age group 15-59 Moscow, 1989-2012, per 100,000**

*Note: The structure of the IUC group has changed over time. Prior to 1999, it totaled all categories of the ICD-9 class “symptoms, signs and ill-defined conditions” (in the brief Soviet nomenclature), except for the rubric “Senility”. In 1999-2010, it included all rubrics of the ICD-10 class XVIII (R00-R53, R55-R94, R96-R99), with the exception of “Senility” (R54) and R95 “Sudden infant death syndrome” (R95). In 2011-2012, IUC included only the rubrics R96-R99.*

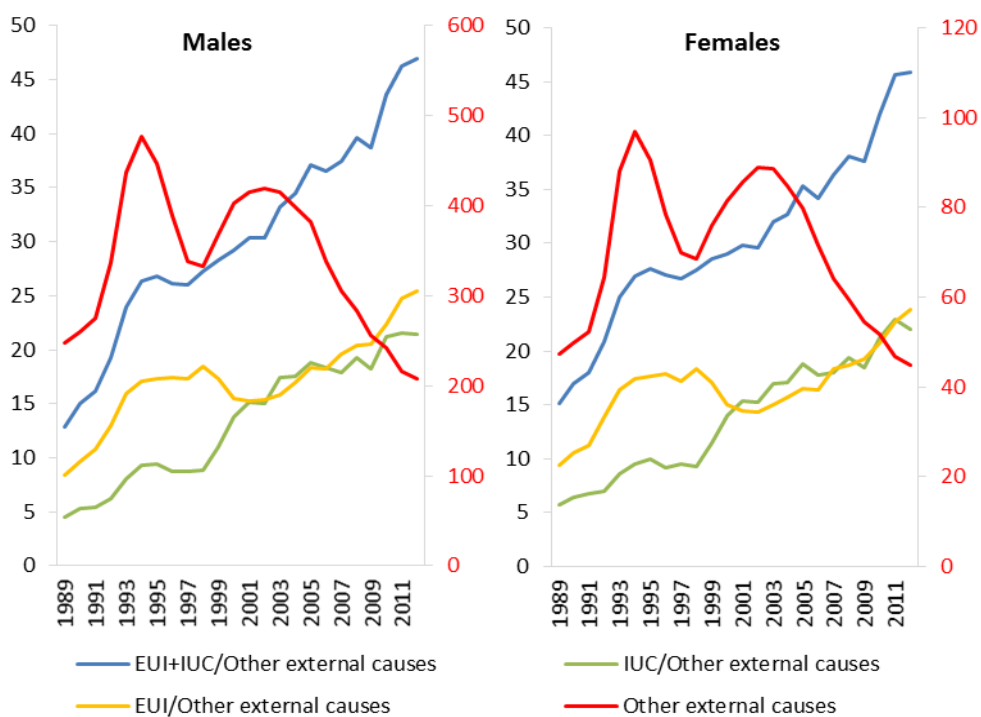
In Russia as a whole (Figure 7), the increase in mortality from IUC and the reduction in mortality from EUI were milder than in Moscow (Figure 6) and began one year earlier. The one-year difference may be due to the fact that it was precisely in 1999 that Russia moved from the ICD-9 to the ICD-10, while Moscow moved later [Danilova, Meslé, Vallin 2014]. In other words, accidentally or not, the change in coding of these causes coincided with the transition to the ICD-10.

Converting part of the deaths from EUI to IUC could explain the “abnormal” decrease in the proportion of EUI against the backdrop of an increase in mortality from other external causes in 1999-2002, but does not account for the period since 2003. In 2003, mortality from other external causes began to decline, while that from EUI continued to rise for another three years, and in general there was a mirror growth in the proportion of EUI in 2003-2012. Within the framework of the hypothesis of a “conversion” of violent deaths into IUC, this could have occurred if, starting in 2003, the transferred diagnoses had come mainly from other external causes.



**Figure 7. Rate ratios of EUI to IUC (EUI/IUC) in 1989-2012 by age groups and for total population, by sex**

Notes: see the note to Figure 6.



**Figure 8. Standardised death rates from external causes other than EUI (per 100,000, right axis) and three rate ratios: EUI, IUC and EUI+IUC to external causes other than EUI (per 100, left axis), at age 15-59, by sex**

Be that as it may, the change in the encoding of causes in 1999-2001 affected the level of mortality from EUI and IUC, but not total mortality from these groups of causes, which grew faster in these years than mortality from other external causes. The steady increase in the ratio of mortality from both categories of uncertain causes to the rest of external causes continued thereafter. As a result, as shown in Figure 8, the reduction in mortality from accidental injuries, homicides and suicides in the last decade was accompanied by an increase in the proportion of both EUI and IUC – that is, by an even greater uncertainty about the true level of mortality from external causes. It is also worth noting that more or less coordinated changes in mortality from causes in EUI and IUC since 2000 may point to common factors behind these changes.

#### ***4. The increased concentration of violent deaths in EUI categories and its factors: Discussion***

The increased concentration of violent deaths in EUI categories deserves a separate discussion. As shown above, the problem of high mortality from EUI in Russia has existed for a long time, but it became particularly acute in the post-Soviet period, when its level exceeded the level of mortality from homicides and suicides, and its ratio to other external causes became disproportionately large compared to other countries.

What is more, the ratio is probably underestimated: firstly, because some causes of death which should be coded in categories Y10-Y34 are classified as ill-defined (R96-R99); and secondly, because of categories from the block of sequelae of injuries that in some countries supplement codes Y10-Y34. In the US National Violent Death Reporting System (NVDS), codes Y89.9 “sequelae of unspecified external causes” and Y87.2 “sequelae of events of undetermined intent” are included in EUIs. In Sweden and in the WHO “Global Health Estimates” project [WHO 2014: 4], only code Y87.2 is added. In Russia, these causes are not treated separately. By 2011, they had become part of a group of “all other events, accidental and of unspecified intent, sequelae of external causes of mortality”, along with sequelae of intentional self-harm (Y87.0) and assaults (Y87.1). Since 2011, together with “accidental exposure to other and unspecified factors” (X58-X59), they form the group “impact of factors other than those listed elsewhere”. According to available data, in 2000-2002 the share of deaths coded as Y87.2 and Y89.9 in block Y10-Y34 was only 1.4%, but in 2003 it began to grow, reaching 5% in 2010-2012, which is not negligible, especially when it comes to estimating the share of EUI in mortality from “other external causes”.

The high level of violent deaths of undetermined intent and its trends require explanation. One of the main questions is the following: to what degree do the statistics of mortality from EUI reflect reality? There is practically no research that would not call this into doubt, and the prevailing view is that the errors in estimating mortality from EUI are mainly due to homicide.

In one of the first papers examining simultaneous, abrupt increases in mortality from violence of undetermined nature and mortality from homicides in 1987-1993, it was hypothesised that some of the murders were recorded under this heading [Meslé et al 1996: §4.5]. This hypothesis was later reapplied to a longer trend [Chervyakov et al. 2002]. In the same vein, D. Bogoyavleskiy interpreted a strong correlation of the temporal and spatial distribution of mortality from homicide and EUI [Bogoyavlensky 2000: 88, 2006: 352]. Likewise, referring to the regional differentiation of mortality, other researchers have spoken out: “Starting in 1985, the growth rate



of mortality from unspecified injuries has outpaced the growth in mortality from homicide; in Russia, maximum levels of mortality from [unspecified] injuries are often recorded in the areas with minimal levels of mortality from homicide” [Semenova et al 2004: 13].

The assumption expressed by D. Wasserman and A. Värnik is that the increase in the concentration of violent deaths in the EUI block at the beginning of the 1990s was at least partly true. It was based on Värnik’s experience as a forensic expert who led the psychiatric forensic service in Estonia, as well as on 12 interviews with experts in the field of diagnosis and coding of violent deaths. According to [Wasserman, Värnik 1998], in Soviet times mortality from EUI was overseen by the state, and the failure of a pathologist to attribute a true death from EUI to other causes was criticised; in cases where it was necessary to cover up “surplus” murders, the homicides were coded as suicides [Andreev, Zhdanov, Shkolnikov 2007]. But during Gorbachev’s *perestroika* there was an increased degree of freedom of decision-making in the professional field, and after the collapse of the Soviet Union control and pressure on experts eased, and the “art” of coding deaths as EUI was no longer in demand. A similar view is held by E.M. Andreev et al. [2007], who consider the weakening in the early 1990s of the pressure on doctors by the statistical authorities, which sought to minimise unspecified diagnoses, as one of the growth factors of mortality from undetermined injuries, whether accidental or purposely inflicted.

Note that, due to the increased control over mortality from EUI during the Soviet period, its level at the time must be recognised as true or even understated, but not inflated. Therefore, neither its growth (including murder) nor the high – compared to other countries – values achieved by the mid-1980s should cause any doubts.

The hypothesis of weakening control over recording of external causes of death does not contradict the assumption that the rise of violent mortality of an unspecified type in the post-Soviet period is associated with an increase in mortality from homicide. One of the factors of this process was the explosion of crime and a sharp increase in the number of deaths from external causes. The increased burden on the police, investigative agencies, pathologists and forensic experts, together with their low pay and general scarcity of material and human resources [Chervyakov et al. 2002; Pridemore 2003; Wasserman, Värnik 1998], meant that when resources were lacking to conduct the investigation or expertise, external causes of death of a specified type were coded as EUI [Wasserman, Värnik 1998]. In this context, the hypothesis of a deliberate distortion of the statistics of mortality, especially murders, under pressure from the local police or authorities [Wasserman, Värnik 1998; Pridemore 2003; Värnik et al. 2010] looks logical. But both forced and intentional manipulations are possible when there is weak control over the actions of doctors and procedural persons combined with gaps in the organisation of the registration of violent deaths and in its regulatory framework. Imperfect legislation boosted the number of undetermined events [Andreev, Zhdanov, Shkolnikov 2007: 118]. Moreover, within the system of registering violent deaths current in the 1990s, estimates of the number of murders and suicides produced by statistical offices were higher than those compiled by the law enforcement agencies, but lower than forensic data [Porodenko 1999]. In other words, even if forensic experts, deliberately or involuntarily, abused EUI codes, some of the cases in which the manner of death was determined were not reflected by statistical authorities.

Thus, in contrast to the previous period, the rapid growth of mortality of an unspecified manner in the 1990s was partly falsified, that is, it included erroneous deaths from EUI – mostly homicides, as most researchers believe.

Because all of these studies dealt with aggregated data, the degree of falsification is not clear, and therefore it is not clear whether the concentration of violent mortality in the EUI block would have increased without “special tricks”. Theoretically, based on the idea that the marginalisation of the population is accompanied by an increase in mortality of undetermined intent [Meslé et al. 1996: §4.5], it is quite possible that the concentration of mortality of the EUI block could have grown “all by itself”. Indirectly, this idea is supported by the fact that whenever life expectancy was increasing in Russia, the rate of increase was higher in regions where life expectancy was lower [Andreev, Vishnevsky 2000: 93-94; Andreev, Kvasha, Kharkova 2013: 398-399].

Published explanations of the dynamics of mortality from EUI or its proportions after 1994 do not exist, or in any case we have not found them. However, based on the hypothesis of the “natural” origin of the accelerated growth of mortality from EUI in 1987-1994, one would expect that in the years of declining mortality from external causes, the proportion of EUI would not grow. Indeed, in 1995-1998 that was the case. But a significant drop in 2003 in the number of deaths from other external causes, which should have led both to a reduction in the proportion of “marginal” deaths and to a reduction in the overall workload of pathologists, forensic experts and other procedural persons, was – contrary to expectations – accompanied by an increase in the proportion of EUI.

The lack of an explanation of the dynamics of mortality from EUI after 1994 is probably not accidental. This may have been helped by the fact that, in this period, a trend towards reduced mortality from external causes became dominant. In addition, the focus of research has shifted to the study of the nature of the categories of block Y10-Y34 based on an analysis of medical death certificates. In the works of the last decade, almost all major aspects of the practice of coding external causes associated with EUI have been examined. Perhaps their main achievement has been the results of testing the hypothesis about a part of the EUI categories belonging to other blocks of external causes. An analysis of the regional differentiation of external causes and ill-defined conditions revealed the extreme diversity in the practices of coding and their chaotic variation (volatility) over time. In addition, shortcomings were identified in the regulatory framework which had facilitated the over-concentration of violent mortality from undetermined manner.

This work has resulted in an assessment of the latent cases of murder, self-harm and accidents hidden in the Y10-Y34 categories which confirmed the assumptions made previously about the predominance of latent murders in mortality from EUI. However, the question about the factors behind the dynamics of mortality from EUI in recent years has not been raised. Meanwhile, the explanation of the mirror growth of the proportion of EUI since 2003 is of special interest, particularly because it is at odds with the hypotheses allowing us to explain the tendency of growth of this indicator in previous years by “natural” factors, without resorting to a concept of “manipulation” of the data. Thus, according to the “resource hypothesis”, the drop in the number of violent deaths in 2003-2012 should have led to a decrease in the workload of forensic experts

and other procedural persons and an improvement in the quality of the statistics of mortality from external causes. However, it follows from the same research that one of the main factors to be considered consists of organisational problems in collecting and processing data on external causes of death.

The way mortality statistics are organised and any changes therein can play a significant role in determining the levels and trends of mortality from “unknown” causes, including EUI. As examples, one can refer to the aforementioned rapid decline in mortality from “ill-defined conditions” in the 1960s and to the sharp shift in rate ratios of IUC and EUI to other external causes in 1999-2001. In addition, it is known that one of the decisions made by the Board of the USSR Ministry of Health in the spring of 1989 to improve the provision of medical care to those suffering from cardiovascular diseases led to increased mortality from unknown causes in 1989-1990 [Meslé et al. 1996: Chapter 3] and in the following years [Antonova 2007; Gavrilova et al. 2008].

The organisational changes of the post-Soviet period began with the decentralisation of encoding of the causes of death. Before, coding had been carried out in regional statistical offices. Order #398 of the Ministry of Health of the Russian Federation<sup>1</sup> imposed a duty on physicians from medical institutions and hospitals to implement coding as of 1 January 1997.

The transfer of this function from one department to another, and from regional administrations to medical personnel, has created “significant challenges due to the lack of appropriate technical instructions”.<sup>2</sup> Alongside the function of coding the causes of death, statistical departments also lost the function of verifying completeness, correctness and coding of medical death certificates by the main cause of death.

This reorganisation could potentially have led to breaches of time series of data on the causes of death and to the deterioration of their quality. However, the effect of innovations should have had a lesser impact on the recording of deaths from external causes because the procedural persons were involved. But since at that time the legislation entrusted physicians with the task of determining, or in any case recording on the medical certificate, an external cause of death from injury or poisoning [Bogoyavlensky 2000: 88; Andreev, Zhdanov, Shkolnikov 2007: 118], such a reorganisation could have had implications for the recording of mortality from external causes, including mortality from EUI. In particular, it could have had an effect during the transition to the 10th revision of the ICD in 1999-2001, generating the notorious conversion of a part of EUI to categories of ill-defined conditions.

As evidenced by international experience, the transition to the ICD-10 could itself have affected the dynamics of the percentage of mortality from EUI. A study in Italy found that the transition to the ICD-10 strongly affected 8 of the 15 categories of external causes, even though there was no interchange between the large blocks (accidents, homicides and suicides) [Gjertsen et al. 2013]. On the other hand, abrupt changes in the level of EUI mortality often coincide with the year of the transition to a new revision of the ICD. For example, in Japan the share of EUI in

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<sup>1</sup> The Ministry of Health of the Russian Federation. Order dated December 4, 1996 № 398 “On coding (encryption) of causes of death in the medical records.”

<sup>2</sup> Healthcare Committee of St. Petersburg. Order dated March 18, 1997 №98 “On the introduction of instructional and methodological materials for coding causes of death in the medical records.”

mortality from other external causes had been increasing for many years, but in 1995 it dropped almost three-fold, and since 1996 it has resumed growth: from 1995 to 2010, its value increased two-fold among men and 2.5 times among women. A fall in the indicator was observed in nine of 14 countries (not counting Romania, for which the time series begins with the introduction of the ICD-10), with the steepest declines occurring in Portugal, Japan, France and Italy.

In Russia, the introduction of the ICD-10 in 1999 did not cause sharp fluctuations in the level of mortality from EUI, but it was precisely in that year that it unexpectedly began to decline against a backdrop of increased mortality from other external causes, which, as mentioned above, may be due to the attribution of deaths from EUI to unknown causes of death. This coincidence was noticed by O.I. Antonova [2007: 105] and, with regard to children, by I. Shurygina [2013]. Although this is an open question, it still appears that the coincidence was not accidental, and that it resulted, in addition to the transition to the ICD-10 itself, from the way in which this transition was carried out.

During the transition to the ICD-10, alongside the introduction of a new form of medical certificate of death,<sup>3</sup> the instructions for filling it out and issuing it, which had been in force since 1984, were canceled, with no subsequent approvals of new ones. The instructions, or rather, recommendations, appeared ten years later, in January 2009.<sup>4</sup> They regulate the procedure for issuing preliminary and final death certificates, as well as the submission of the final verdict for statistical processing. According to S. Nikitina and G. Kozeeva [2006], due to the absence of such instructions there was a drop in the quality of filling out medical certificates and coding causes of death, the definitive medical certificates took longer to complete and, most importantly, the definitive certificates not only no longer reached the statistical agencies, but were no longer issued at all, which had a serious impact on the statistics of external causes of death. Thus, the data on deaths from alcohol poisoning in 2000-2005 processed by Mosgorstat (The Statistical Department of Moscow city) and the data on the same topic compiled by the Moscow Bureau of Forensic Medicine differ by 4-6 times, with the difference steadily increasing during that period [Nikitina, Kozeeva 2006: Table 2].

However, the return of instructions and the publication in 2008 of guidelines for coding the causes of death in compliance with the ICD-10 did not affect the dynamics of either mortality from EUI and other external causes or their ratio. In addition, analysing medical certificates of death for 2010 for the age group 15-59 for Russia as a whole, A.E. Ivanova et al [2013] found a similar problem: the true causes of death established during the examination were not submitted for statistical processing. A further investigation in 2011 showed that it was not so much that a final (instead of a preliminary) medical certificate was not issued, as that not even a preliminary one was issued. The study's authors see the source of this neglect in the country's prevailing legal framework, namely, in order 161 of the Ministry of Health of the Russian Federation from 24.04.2003 "On approval of the instructions on organising and conducting of expert studies in the Bureau of Forensic Medicine". Paragraph 2.2.7.2 is particularly ambiguous:

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<sup>3</sup> The Ministry of Health of the Russian Federation. Order dated August 7, 1998 №241 "On improving the medical records certifying births and deaths in connection with the transition to ICD-10."

<sup>4</sup> The Ministry of Health and Social Development of the Russian Federation. Letter dated 19 January 2009 №14-6 / 10 / 2-178 "On the procedure for issuing and filling in medical certificates of birth and death."

- On the one hand, if laboratory tests are needed to establish or clarify the cause of death, a preliminary death certificate is to be issued, and immediately after the tests are conducted, the final certificate is to be issued in lieu of the preliminary certificate;
- On the other hand, the impossibility of establishing the manner of death or the circumstances and place of the injury at the time of issuance of the death certificate does not constitute the reason for the issuance of a preliminary certificate; in this case, “manner of death not determined” is underlined in the form.

This second possible interpretation is the main factor due to which the intent of death determined in the course of the investigation is not submitted for statistical processing, which in turn explains the high proportion of the Y10-Y34 block in mortality from external causes. It should be emphasised that the ambiguity of interpretation is supplemented by the ambiguity of the situation after the cancellation in 2010 of order 161.<sup>5</sup> This order would seem to have lost its power, but another order,<sup>6</sup> promulgated a little earlier, approved, in place of *instructions*, a *procedure* for organising and conducting forensic examinations, and perhaps therefore does not regulate the issuance of either type of death certificate. Thus, the practice of issuing not a preliminary, but immediately a final death certificate with an open verdict continues to this day.

The release of this instruction coincided with the beginning of the current phase of the “mirror-growth” of the proportion of EUI relative to other external causes. It is possible that it is precisely the release of the instruction that contributed to the reduction in recorded mortality from external causes (which began in 2003) and to the continuation of the growth of mortality from EUI until 2005. It is also reasonable that the instruction itself is one of the factors maintaining this relationship.

Immediate issuance of a final medical death certificate in cases where a preliminary one would be warranted, and the failure to submit a final (instead of preliminary) certificate for statistical processing constitute a fundamental flaw in the organisation of recording of mortality from external causes. Little is known about the other flaw – using mortality indicators from specific categories of external causes as criteria for evaluating the work of certain institutions or territorial administrative authorities. Usually it is implicit in arguments about the social significance of the statistics of mortality from homicide, suicide, poisoning, alcohol and drugs. Its role is more obvious for monitoring the implementation of programmes aimed at combating mortality from specific classes and causes of death, including external ones such as traffic accidents and alcohol poisoning. Many such programmes were developed after the approval in 2007 of the Demographic Policy Concept of the Russian Federation, and sometimes this led “to suspiciously strong declines in the coefficients of mortality” [Kvasha, Kharkova 2011].

In and of itself, the use of an indicator of mortality from this or that cause as a criterion is natural, but when there is a lack of control it creates a motive for data manipulation. This

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<sup>5</sup> The Ministry of Health and Social Development of the Russian Federation. Order dated 4 June 2010 №423n “On invalidating the Order of the Russian Federation Ministry of Health on April 24, 2003 №161 ‘On approval of the Instruction concerning the organisation and conducting of forensic examinations in the Bureau of Forensic Medical Expertise.’”

<sup>6</sup> The Ministry of Health and Social Development of the Russian Federation. Order dated 12 May 2010 №346n “On approval of the organisation and conducting of forensic examinations in state forensic research in the Bureau of Forensic Medical Expertise.”

hypothesis is well entrenched in Russian demographic literature, which in particular explains the extremely high percentage of deaths of undetermined intent. One of the clearest examples of such manipulations is cited by Ivanova et al. [2013]: mortality from accidental alcohol poisoning (H45) in Russia is a socially important indicator that is monitored by both regional and federal authorities, and the conversion of these losses into a latent form (in particular, to EUI, Y15) makes it possible to significantly improve the indicators of mortality from alcohol poisoning, without making any effort to actually improve the situation.

Overall, we can conclude from the above analysis of the organisation and normative regulation of the collection and processing of statistics of external causes of death that these factors provide the basis for intentional and unintentional distortion of the statistics of mortality from external causes. This, in turn, is likely to support the recent trend towards an increase in the already high degree of uncertainty about the true level of mortality from homicide and self-injury. But are these factors the only possible explanation? Could it be that the mirror growth of the proportion of EUI in 2003-2012 is a natural phenomenon?

To some extent this can be clarified by reformulating the question: were similar periods typical for countries where, contrary to Russia, there are no problems with statistics of external causes?

We have already mentioned that among countries selected for comparison in this paper, an increasing concentration of deaths from external causes in the EUI block over two decades is not uncommon. In most of them, the prevailing trend is towards reduction in mortality from external causes. Therefore, periods of mirror growth of the proportion of EUI are observed in a number of countries: Austria, Bulgaria, Hungary, the UK, Poland, the US, Sweden and Japan. Taking into account the high prevalence of this phenomenon in countries where the problem of abuse of categories of the EUI block is not as acute as in Russia, it can be assumed that the increase in the proportion of those causes is natural. But what accounts for this trend? Let's start from the fact that the risk of mortality from external causes (primarily from suicide, homicide and EUI) is concentrated in socially vulnerable population groups, which is consistent with research on social differentiation of mortality. It follows that the increase in the proportion of causes of undetermined manner in these countries may mean that the reduction of mortality from external causes affects these groups less than the others.

In Russia, where income inequality is more pronounced, mortality from EUI is concentrated in the marginal segments of the population [Ivanova et al. 2004], and the problem of marginalisation is bigger and aggravated by excessive consumption of alcohol. Therefore, if our hypothesis is correct, the growth of the proportion of EUI in Russia in the presence of the reduction in mortality from other external causes may have the same roots, and the proportion itself should be higher than in compared countries. However, a direct analogy with the situation in the eight developed countries cannot be fully justified: in Russia, in the structure of the Y10-Y34 block, an important role is played by categories relating to murder and not, as in these countries, to suicide and accidents. Therefore, although the experience of many developed countries shows that the mirror growth in the proportion of EUI is not the result of manipulation of statistics, the question of its nature in Russia requires further analysis.

## 5. CONCLUSION

Analysis of long-term trends in mortality from EUI in Russia shows that the distinguishing feature of the periods of increased mortality from external causes was the rapid growth of mortality from EUI and, accordingly, its share in violent deaths. In turn, the unusually high proportion of EUI led to an increase in “uncertainty” as to the true level of mortality from intentional and unintentional events. Since 2003, the ongoing reduction in mortality from external causes has not stopped this trend. Moreover, the reduction strengthened the trend: in 2010, the standardised mortality rate from EUI exceeded mortality from suicide. Now the problem is not that mortality from EUI continues to push mortality away from other external causes, as is observed in other countries, but that this is occurring when the proportion of mortality of undetermined manner has already reached extremely high values.

The proportion of deaths of an unknown manner has increased not only due to injuries of undetermined intent, but also due to “other ill-defined and unspecified causes of death” (R00-R99 in block 13 of class XVIII) According to abundant indirect evidence, deaths belonging to external causes, mainly EUI, are classified as such in some regions [Ivanova et al. 2013]. Thus, a peculiar system of regulation of statistics of mortality from external causes is apparent: deaths from socially significant external causes of death are recorded as events of undetermined intent, some of which (one might say, true deaths of an unknown manner) are displaced from the class of external causes. This phenomenon, called “the conversion of socially significant causes into a latent (Y10-Y34, R96-R99) form” [Ivanova et al. 2013], has important implications for the implementation of programmes aimed at combating high mortality from external causes in Russia, and should be taken into account in their design and implementation.

However, similar problems in the statistics of external causes of death are found in other countries. Sometimes they are objective (difficulties in determining the intention of drowning, poisoning, falls, etc.) and in other instances they result from national peculiarities of coding. In particular, we can point to disproportionately high mortality rates from ill-defined conditions in some European countries [Rockett, Kapusta, Bhandari 2011] and a high proportion of deaths from EUI in external causes in some countries of the European Union. Identification of violent causes of death in infants and one-year-olds is a separate problem. A very high (higher than in Russia) proportion of EUI (in Estonia in 2001-2005 it reached 26%) is due to negligence in the investigation, that is, with no regard to details of the circumstances of the case, sometimes even with no examination of the place of death [Väli et al. 2007]. There is good reason to believe that there is a significant percentage of latent murders among such incidents. For example, over 40% of deaths from EUI among infants and young children in the US (California 1961-1991) resembled murders [Sorenson, Shen, Kraus 1997a], which largely stems from the difficulty of investigating deaths resulting from improper care of young children. Just as in Russia, there are states in the US where the practice of coding external causes varies substantially and changes unpredictably over time, which make the situation even more like Russia’s [Breiding, Wiersema 2006]. In the US, too, there exist organisational flaws in the coordination between different departments, which can lead to different recoding of the very same death in different departments; for example, a coroner/forensic expert records a murder, a police report states an accident, and a medical certificate of death classifies it as EUI [Parks et al. 2014]. There are even precedents of pressure from the authorities which lead to a sharp reduction in mortality from suicide and a sharp rise from

accidental poisoning, as occurred in the 1980s in New York City [Whitt 2006]. Finally, according to the analysis of long-term trends in the 14 countries, sudden changes in the level of mortality from EUI in the transition to a new revision of the ICD are not all that rare.

At the same time, similarities are not as important as differences. In most developed countries, statistics on the causes of death are more detailed and more accessible to researchers than in Russia. Working with multiple causes of death, especially in combination with socio-demographic characteristics and – in countries with a population register – with other data, greatly expands the possibilities of monitoring and correcting data on death causes. Studies are being conducted in which information from the medical certificate of death is compared with forensic data. Further measures are being introduced to improve the identification of violent causes, such as psychological autopsy and autopsy narrative (in the UK), and – most importantly for Russia – systems are being created for monitoring external causes of death. For example, systems for reporting mortality from violence in the US (NVDRS), Australia and New Zealand (National Coronial Information System, NCIS) are being combined and systematised in a single database of information from police homicide departments, crime labs, coroners' reports, forensic experts, and death certificates.

In Russia, statistics on causes of death have been moving in the same direction in recent years. But what mainly distinguishes Russia are the scale and the historical roots of the problem. William Pridemore, having found that in the 1990s the number of murders reported by the Ministry of Internal Affairs was lower than that in the Ministry of Health data, formulated the hypothesis that the Ministry of Internal Affairs could not cope with the high level of violence, and in many cases simply did not act. According to him, "Given the history of falsification of crime data within the country, together with ... the pressure to reduce crime rates, this is not difficult to believe" [Pridemore 2003: 1350]. There is reason to extend this observation to the statistics of mortality from external causes.

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