

## About Romania Data on Causes of Death

By: Andoria Ionita, Olga Penina

Last updated: 25/04/2016

### General

According to the Law on the organization and functioning of official statistics in Romania, the National Statistical System includes a) the National Institute of Statistics<sup>1</sup> (NIS) (*Institutul Național de Statistică*), its territorial directorates and subordinate institutions; b) the statistical offices of central and local public administration and of other public authorities and institutions; c) the National Bank of Romania. The National Statistical System (except the National Bank of Romania) is coordinated by NIS, a specialized body of central government, with legal status, subordinate to the Government. NIS is the main entity responsible for the production and dissemination of official statistics in Romania.

The central office of NIS is located in Bucharest, the capital of Romania. Eight statistical regional directorates, organized at the level of counties – centres of development regions and 34 statistical county directorates organized at the level of the other counties are subordinated to NIS. NIS is organised and functions based on the Law No 226/2009<sup>2</sup>, with subsequent modifications and additions.

On July 12th, 1859, the ruler Alexandru Ioan Cuza signed the Ordinance on the setting up on Central Administrative Statistics Office. Since that the Romanian central statistical office underwent through different reorganization, successively changing its name but always keeping its main status as the central producer and coordinator of the official statistics.

**Table 1. History of the National Institute of Statistics**

English name	Romanian name	Period
Central Office for Administrative Statistics	Oficiului Central de Statistică Administrativă	1859-1892
State Directorate for General Statistics	Direcția de Statistică Generală a Statului	1892-1925
State Institute for General Statistics	Institutul de Statistica Generală a Statului	1925-1936
Central Institute of Statistics	Institutul Central de Statistică	1936-1951
Central Directorate of Statistics	Direcția Centrală de Statistică	1951-1989
National Commission for Statistics	Comisia Națională pentru Statistică	1989-1998
National Institute of Statistics	Institutul Național de Statistică	1998- present

Source: NIS of Romania

<sup>1</sup> <http://www.insse.ro/cms/en>

<sup>2</sup> Law on the organization and functioning of official statistics in Romania <http://www.insse.ro/cms/en/cadru-legal>

The official cause-of-death statistics is produced through the direct collaboration between NIS and the National Institute of Public Health<sup>3</sup> (NIPH) (*Institutul Național de Sănătate Publică*), in particular the National Centre for Health Statistics and Informatics<sup>4</sup> (NCHSI) (*Centrul Național de Statistică și Informatică în Sănătate Publică*), and their subordinate institutions.

The National Institute of Public Health is a public institution vested with legal personality and subordinate to the Ministry of Health. At the national level, NIPH coordinates its activity via four national centres: National Centre for Health Statistics and Informatics, the National Centre for Supervision and Control of Communicable Diseases, the National Centre for Community Environmental Risk Monitoring, and the National Centre for Evaluation and Health Promotion. At the regional level, NIPH coordinates its activity via six regional centres of public health. Moreover, NIPH ensures the coordination of the 42 district public health directorates (*direcții de sănătate publică*) which are the main public health structures of the Ministry of Health.

The National Centre for Health Statistics and Informatics consists of six subdivisions: a) the department for demographic studies and mortality; b) the department for database management; c) the service of statistics methodology and information system; d) the department for standards and strategies in informatics; e) the bureau of information system and communication statistics; f) department for the archives and medical documentation.

The legal basis for the organization and functioning of NIPH and NCHSI is the Order nr. 261/201 issued by the Ministry of Health.<sup>5</sup>

NCHSI collaborates directly with NIS, NIPH, district public health directorates and public health directorate of Bucharest and some others.

Romania was using disease classifications based on the WHO International classification of diseases (ICD) since at least 1948. The classifications were updated on approximately decennial basis. In 1994, an abridged version of the 10<sup>th</sup> ICD revision was adopted, followed in 1999 by implementation of the detailed 4-digit version of ICD10 (for more detail see section 6).

## Territorial Coverage

The territorial coverage of Romania during the period of observation (1980-2012) did not change.

# Part 0 – vital registration

## 1. Death count data

### Coverage and completeness

Annual death counts, including by causes of death, refer to *de jure* population, i.e. official vital statistics include also deaths of the Romanian citizens with a “permanent residence” in Romania (see section 2) registered abroad. Recently, NIS of Romania published the numbers of deaths counts by sex and age referring to the population with a “usual residence” in Romania, but only for 2012 and 2014 (preliminary data). The difference between the two figures consists 0.8% for males and 0.6% for females. For some age groups, especially for young adult males, it is about 6-8%.

---

<sup>3</sup> <http://www.insp.gov.ro/>

<sup>4</sup> <http://www.insp.gov.ro/index.php/cnsisp>. The previous name of the Centre is the Centre for Computation, Sanitary Statistics and Medical Documentation (*Centrul de Calcul, Statistică Sanitară și Documentare Medicală*)

<sup>5</sup> <http://www.insp.gov.ro/images/documente/organigrama/ordin1363.pdf> and <http://www.insp.gov.ro/images/documente/organigrama/rof.pdf>

**Table 2. Deaths counts by sex and age referring to the Romanian population with a „permanent residence” and „usual residence”, by sex, 2012**

	Permanent residence		Usual residence		Difference (abs)		Difference (%)	
	males	females	males	females	males	females	males	females
0-4	1169	963	1159	958	10	5	0.9	0.5
5-9	131	86	125	84	6	2	4.6	2.3
10-14	199	97	192	94	7	3	3.5	3.1
15-19	376	157	364	149	12	8	3.2	5.1
20-24	722	275	686	260	36	15	5.0	5.5
25-29	695	263	659	246	36	17	5.2	6.5
30-34	1036	402	954	378	82	24	7.9	6.0
35-39	1709	661	1599	627	110	34	6.4	5.1
40-44	3240	1290	3110	1250	130	40	4.0	3.1
45-49	3717	1453	3609	1412	108	41	2.9	2.8
50-54	7090	2863	6967	2806	123	57	1.7	2.0
55-59	11543	4873	11432	4813	111	60	1.0	1.2
60-64	13449	6557	13363	6488	86	69	0.6	1.1
65-69	12736	7531	12683	7472	53	59	0.4	0.8
70-74	17314	13635	17251	13574	63	61	0.4	0.4
75-79	20747	21550	20700	21488	47	62	0.2	0.3
80-84	19581	26209	19542	26147	39	62	0.2	0.2
85+	18053	33167	18013	33062	40	105	0.2	0.3
<b>total</b>	<b>133507</b>	<b>122032</b>	<b>132408</b>	<b>121308</b>	<b>1099</b>	<b>724</b>	<b>0.8</b>	<b>0.6</b>

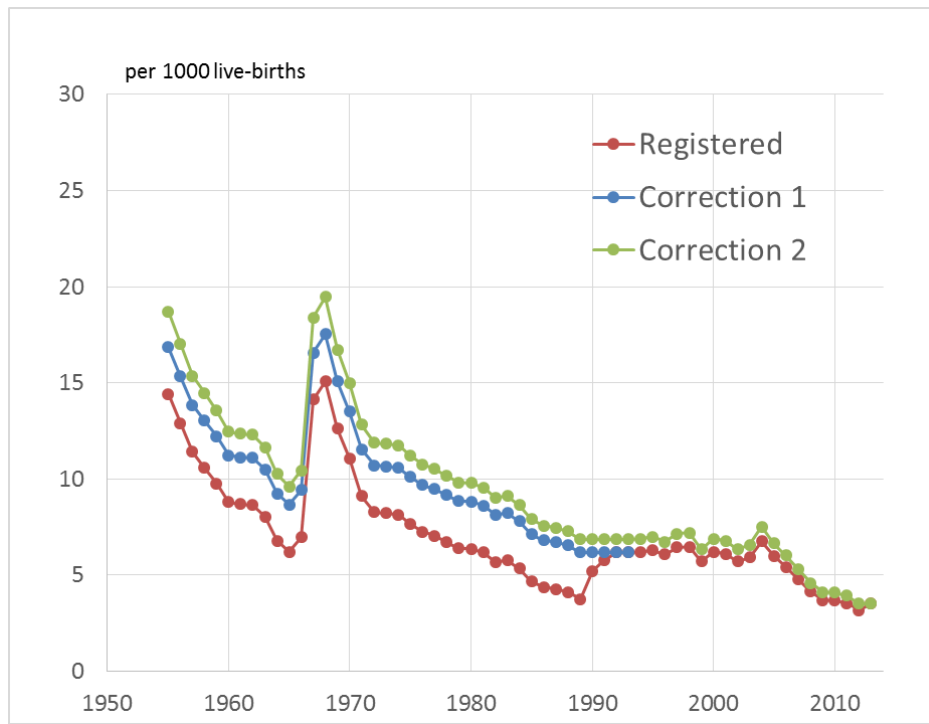
Source: NIS of Romania

### Specific details: infant mortality

The definition of “live-birth” used in Romania is not very clear. According to Gourbin and G. Masuy-Stroobant (1995), in 1991 Romania used WHO definition of “live-birth” with the national restrictions for birth weight. If a live-born child at birth weighted less than 1000 gr., a baby had to survive 15 days, which is a legal delay period for birth registration. If a preterm baby dies within this period, a case of birth and, respectively, a case of death is not registered. We can suppose that this “live-birth” definition was stipulated by the Order of the Ministry of Health accepted in 1968 (Mureşanu 2001). Then, during the communist period the salaries of medical doctors at hospitals were partially linked to the hospital perinatal and infant mortality statistics and after the end of the Ceausescu regime these measures were abolished (Gourbin and Masuy-Stroobant 1995). Indeed, looking at the trend in early neonatal mortality rate for Romania, one can observe an important rise after the 1989 Revolution continued until 1992. Totally, in 1992 compared to 1989, early neonatal mortality rate increased by 1.69 (from 3.75 to 6.19). This rise we attribute to improved registration of infant death in Romania, which we tried to correct by the method of absolute correction used also in case of Moldova (Penina, Meslé, and Vallin 2010) (Correction 1 in Figure 1).

In 2012, the Ministry of Health issued a new Order concerning live-birth definition. It is as well WHO definition, but the legal threshold is now gestational age equal to 24 complete weeks (Ministry of Health of Romania 2012) .

If the gestational age is less than 24 weeks and a baby shows any signs of life, a child had to survive till the end of the legal gestational age threshold, and only in that case birth is officially registered. It means that if a preterm child dies before reaching 24 weeks of gestation, its birth and death is registered only in medical documentation without being included into the official statistics. This change in live-birth definition was accompanied by 11% increase in early neonatal mortality rate in 2013 compared to 2012 and we used a constant 11% adjustment coefficient to the 1955-2012 time series<sup>6</sup> (Correction 2 in Figure 1). The effect of the two corrections on infant mortality rate is 7-8% in the 1960s and 70s, 10-12% in the 1980s and early 1990s, and 3-4% after 1992.



**Figure 1. Early neonatal mortality rate in Romania: registered and after two corrections, 1955-2013**

Definitely, even after this correction of early neonatal mortality rate, the official infant death rates continue to be under-registered, first of all, due to the use of birth counts registered for the Romanian population with a “permanent residence”. The re-estimation of infant mortality rate with respect to the population with a “usual residence” increases infant mortality rate in 2012 by 11% (Table 3). Availability of birth time series for the “usual resident” population for a longer period and more precise documentation about the definition of “live-birth” are important for better estimation of infant mortality in Romania.

**Table 3. Births, infant deaths and infant mortality rate referring to the Romanian population with a “permanent residence” and “usual residence”, both sexes, 2012**

	Permanent residence	Usual residence	Difference (abs)	Difference (%)
<b>Births</b>	201714	180714	21000	10.4
<b>Infant deaths</b>	1812	1806	6	0.3

<sup>6</sup> It was decided to correct neonatal mortality rates at age 0-6 days, but not at age 0 day, due to a very likely exchange of deaths between age 0 day and age 1 day in Romania.

Infant Mortality Rate	9.0	10.0		
-----------------------	-----	------	--	--

Source: NIS of Romania (only data on births and deaths)

## 2. Population count data

### Coverage and completeness

The history of population censuses in Romania is very rich: two censuses conducted in the late 19th century, eight censuses in the 20th century and two censuses in the 21st century. The Population Census conducted in 1930 covered the territory of Bessarabia, which represents most of the part of the Republic of Moldova.<sup>7</sup>

**Table 4. Population censuses conducted in Romania**

Nr.	Census	Intercensal period
1.	Census 1859-1860	
2.	General Population Census 1899, December	40
3.	General Population Census 1912, December 19	13
4.	General Population Census 1930, December 29	18
5.	General Population Census 1941, April 6	11
6.	Agricultural and Population Census 1948, January 25	7
7.	Population and Household Census 1956, February 21	8
8.	Population and Household Census 1966, March 15	10
9.	Population and Household Census 1977, January 5	11
10.	Population and Household Census 1992, January 7	15
11.	Population and Household Census 2002, March 18	10
12.	Population and Household Census 2011, October 20	9

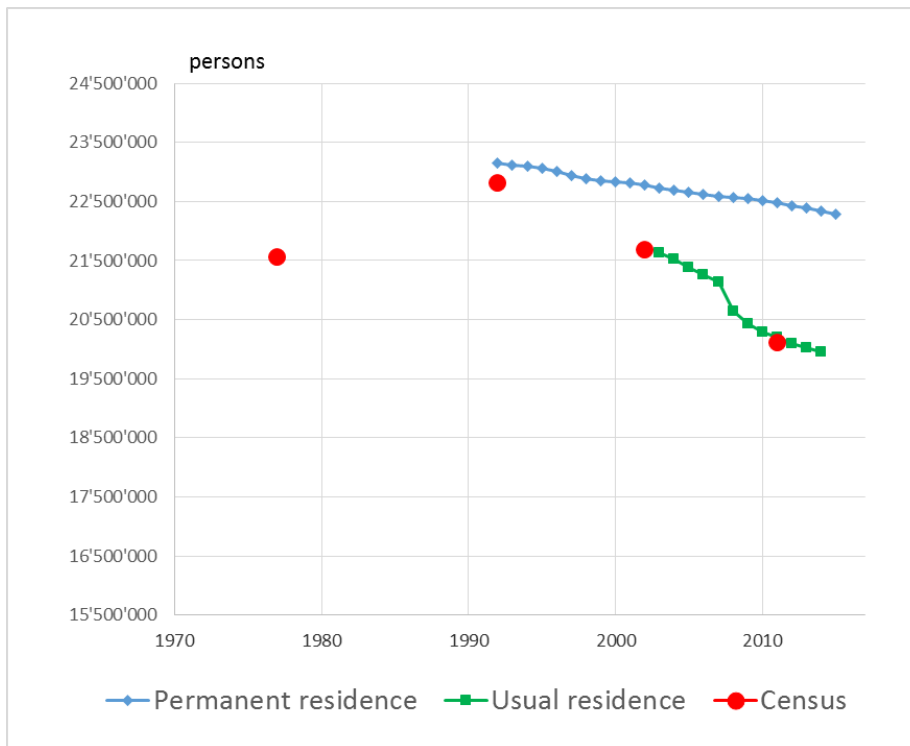
Source: <http://www.recensamantromania.ro/istoric/lista-recensamintelor-populatiei/>

The Romanian statistics distinguish two types of population: “usual resident” (*de facto*) and “permanent resident” (*de jure*). The first type of the population represents all persons of Romanian nationality, foreign or stateless who have their usual residence in Romania and does not include: 1) Romanian citizens, foreigners or persons without citizenship who have the usual residence in Romania and are abroad for the period 12 months and over; 2) foreigners or persons without citizenship who stay in the country for a period less than 12 months. The second type of the population includes all the Romanian citizens with “permanent residence” in Romania. The person’s permanent residence is the address where he/she declares to have the main dwelling, printed as such on its identity card and registered by the administrative bodies of the State.<sup>8</sup> The difference between the two types of the population becomes especially important after December 1989 Revolution, while it should be of minor importance the Soviet period. Population censuses conducted in 1992, 2002 and 2011 are referring to *de facto* population, while for the preceding censuses the data are referring to *de jure* population.

<sup>7</sup> <http://www.recensamantromania.ro/istoric/recensaminte-1859-1990/>

<sup>8</sup> <http://statistici.insse.ro/shop/index.jsp?page=tempo3&lang=en&ind=POP107A>

Figure 2 shows the total population number according to the last four censuses and official annual estimates produced by NIS of Romania for the population with “permanent residence” and “usual residence”. An important decrease in the number of “usual resident” population in 2008 is explained by a jump in the number of out-migrant in 2007 following the entrance of Romania in European Union on January 1, 2007<sup>9</sup> (see Specific details: migration data).



**Figure 2. Total population number in Romania according to the censuses conducted in 1977, 1992, 2002 and 2011 and official annual population with „permanent residence” (1992-20115) and „usual residence” (2003-2014), both sexes**

Source: NIS of Romania

Romanian NIS calculated inter-censal annual *de facto* population counts taking into account the results of the 2002 and 2011 censuses. From 2012, annual *de facto* population data are post-census estimates. The official inter-censal population estimates for the period before 2002 have not been produced. The official inter-censal 2002-2011 population estimates are problematic since they do not reflect correctly the big differences between cohorts caused by the 1967 jump in number of births after the ban of abortion (see section 3). From this point of view, we use the population exposure calculated according to the standard HMD methodology for the period 1977-2011. For the years after 2011, we take the official post-census estimates that appear to be reliable.

At this moment, out-migration for the inter-censal periods are redistributed evenly by year. It is a preliminary step in estimating population exposure for Romania. In the future, inter-censal redistribution of out-migration will take into account the very huge fluctuations reflected in the available migration statistics (Specific details: migration data). Consequently, population estimates will be updated for inter-censal periods.

### Specific details: migration data

Romanian NIS distinguishes two types of migration flows: migration by permanent residence change (permanent migrants) and migration by usual residence change (temporary migrants).

<sup>9</sup> [http://europa.eu/about-eu/countries/member-countries/romania/index\\_en.htm](http://europa.eu/about-eu/countries/member-countries/romania/index_en.htm)

Counts of immigrants and emigrants by *permanent residence change* are used to calculate population figures with “permanent residence”. Table 5 shows this type of migration. In recent years, the corresponding net migration is even positive.

**Table 5. Emigrants, immigrants and net migration by permanent residence change, 1990-2013**

	Permanent emigrants	Permanent imigrants	Net migration (permanent migration)
<b>1990</b>	<b>96'929</b>	<b>0</b>	<b>-96'929</b>
1991	44'160	1'602	-42'558
1992	31'152	1'753	-29'399
1993	18'446	1'269	-17'177
1994	17'146	878	-16'268
1995	25'675	4'458	-21'217
1996	21'526	2'053	-19'473
1997	19'945	6'600	-13'345
1998	17'536	11'907	-5'629
1999	12'594	10'078	-2'516
2000	14'753	11'024	-3'729
2001	9'921	10'350	429
2002	8'154	6'582	-1'572
2003	10'673	3'267	-7'406
2004	13'082	2'987	-10'095
2005	10'938	3'704	-7'234
2006	14'197	7'714	-6'483
2007	8'830	9'575	745
2008	8'739	10'030	1'291
2009	10'211	8'606	-1'605
2010	7'906	7'059	-847
2011	18'307	15'538	-2'769
2012	18'001	21'684	3'683
2013	19'056	23'897	4'841

Source: Romanian NIS

The second type of migration flows is migration by *usual residence change*. This type of migration is used to calculate annual population counts with “usual residence”. Romanian NIS takes these data from different sources: national administrative sources (General Inspectorate for Immigration and others) and statistical sources: Population 2011 Census, data on immigrants provided by statistical offices from Spain and Italy, “mirror” statistics regarding migration flows from EUROSTAT database and econometric model.

The data on migration by usual residence are available from 2004. Numbers of temporary emigrants are by far much more impressive than the corresponding numbers of permanent emigrants (162 thousand *versus* 19 thousand in 2013), but temporary immigration flows registered by Romania are also quite intensive.

**Table 6. Emigrants, immigrants and net migration by usual residence change, 2012-2014**

	temporary emigrants	temporary immigrants	net migration
2012	170'186	167'266	-2'920
2013	161'755	153'646	-8'109
2014 (preliminary)	184'603	142'426	-42'177

Source: Romanian NIS

Table 7 shows numbers of immigrants from Romania taken from EUROSTAT. Most part of emigrants from Romania go to Italy and Spain. Comparison of EUROSTAT data and data from Italian statistical office generally coincide (not presented). According to EUROSTAT data, in 2007 year, when Romania entered EU, a maximum number of immigrants was registered (about 500 thousand). One of the future step of our work is re-estimation of the population exposures taking into account the specific fluctuations in out-migration flows with a special accent on 2007 year and the first years immediately after 1989 Revolution. For that, we will rely on EUROSTAT data (for 2002-2011 period) and official migration data of the population with a “permanent residence” (for earlier period).

**Table 7. Number of immigrants from Romania according to EUROSTAT data, 2003-2013**

	EUROSTAT
2004	191'134
2005	172'038
2006	184'353
<b>2007</b>	<b>507'150</b>
2008	300'614
2009	167'256
2010	166'180
2011	174'579
2012	143'423
2013	119'341

Source: EUROSTAT

### 3. Birth count data

#### Coverage and completeness

Official numbers of live-births are referring to the population with a “permanent residence”, not a “usual residence”. The difference is about 10% (data are available only for 2012 year. See Table 3).

**Medical birth certificate** (*Certificat medical constatator al născutului viu*) is completed by a medical doctor who certified the case of birth. The medical birth certificate includes Personal Identification Number (*Codul Numeric Personal*, PIN) of a new born child and consists of two parts. The detachable part with PIN is given to the family to present it at the district civil registration office.

Like in case of death, the act of birth is drawn up at the district civil registration office in frame of the Public Community Service of Personal Records, or if there are none, at the townhall (*primaria*) of the district where the case of birth occurred. The act of birth is registered based on the medical certificate of live birth issued by a medical doctor who certified the birth. In case of stillbirth, only the act of birth is drawn up based on the medical certificate of stillbirth issued by a doctor who certified stillbirth. The legal period for birth declaration is 15 days for live born child and 3 days for stillborn child. If a live born child dies within 15 days after birth, the birth must



be declared within 24 hours after death. The period includes both the day of birth and the day of declaration. Figure 5 shows the system of birth registration in Romania.

### Specific details

Number of births were re-estimated taking into account the produced two corrections of early neonatal mortality for the period 1980-2012.

## Part I – information on CoD coding

### 4. Death certificate

**Medical death certificate** (*Certificat medical constatator al decesului*) is almost identical to the international form of medical certificate for cause of death recommended by the World Health Organization (WHO) with the only exception that there is no column concerning the interval between the presumed onset of each of the recorded morbid conditions and the date of death. The medical death certificate does not include the 4-digit code of the disease or morbid condition according to the International Classification of Diseases and Causes of Death. **Error! Reference source not found.** The medical death certificate includes Personal Identification Number (PIN) of the decedent and consists of two parts. The detachable part including PIN is given to the relative who must present it at the district civil registration office.

It is important to note that a medical doctor who certifies the death does not codify the medical causes of death in the medical death certificate. The codification of causes of death is produced by the trained staff at the district public health directorate (see Section Coding system).

**Medical certificate of stillbirth** (*Certificat medical constatator al născutului mort*) is completed by a medical doctor who certified the case of stillbirth. In Romania, the medical certificate of stillbirth, elaborated by NCHSI, was introduced in 1993. Before that year, the information about stillbirth was a part of the medical birth certificate. The certificate was introduced together with the statistical stillbirth bulletin designed by NIS of Romania.

Apart from medical death certificate, there are different types of medical and statistical documentation forms referring to the registration of deaths, including by causes of death.

#### *Medical forms for infants, children and pregnant females*

**Infant death form** (*Fișa decesului sub un an*) is completed in case of death under one year, including a case of early neonatal death, i.e. at age 0-6 days. The form is completed by a medical doctor who certified the death. This form includes the information about: 1) identification data of the decedent; 2) data about the evolution of pregnancy and delivery; 3) medical assistance accompanied by a family doctor; 4) disease or morbid condition leading to death; 5) causes of death. Totally, the infant death form includes 44 variables.

**Perinatal death form** (*Fișa decesului perinatal*) is completed in case of stillbirth by an obstetrician who assisted delivery and by a medical doctor who certified death in case of death of a live born at age 0-6 days. This form includes 52 variables providing the detailed information about 1) mother of stillborn child or live born child and died at age 0-6 days; 2) stillborn child or live born child and died at age 0-6 days; 3) causes of death.

In case of early neonatal death, both the perinatal death form and infant death form are compulsory completed.

**Form for death at age 1-4 years** (*Fișa decesului 1-4 ani*) is completed in case of death at age 1-4 years by a medical doctor who certified the death. The form includes 30 variables providing the information about: 1) identification data of the decedent; 2) evolution of health status of the deceased child; 3) medical assistance provided in relation to the disease or morbid condition leading to death; 4) data about causes of death.

**Form for death associated with pregnancy, childbirth and the puerperium** (*Fișa decesului prin complicații ale sarcinii, nașterii și lăuzei*) is fulfilled within 24 hours after death by a doctor who certified the death together with the medical death certificate. It includes 45 different variables.

**Indirect maternal death form** (*Fișa decesului mamei prin cauze indirecte*) is fulfilled for each pregnant woman's death caused by a cause other than complications of pregnancy, childbirth or puerperium (including external causes of death) within 24 hours after death by the doctor who certified the death. It is fulfilled together with the medical death certificate and includes 41 different variables.

#### *Statistical forms*

**Statistical death bulletin** (form nr. 3). The statistical death bulletin is the primary source of the statistical information about deaths, including by cause. The bulletin includes a range of demographic and social variables about the deceased person, including the medical causes of death (totally, 20 items). In accordance with WHO recommendations developed together with the ICD, the part of the statistical death bulletin presenting the information on causes of death is set out in two parts: Ia (direct cause of death); Ib (antecedent cause); Ic and Id (initial morbid condition), and II (other significant morbid conditions).

**Statistical stillbirth bulletin** (form nr. 2). The bulletin was introduced in Romania in 1993 together with the adoption of the perinatal death form by the Ministry of Health. The bulletin includes 21 different social and demographic variables about the still born child, delivery and mother's characteristics. The item referring to medical causes of death includes a) principal disease or morbid condition leading to death of foetus and b) other diseases or morbid conditions contributing to death of foetus. The information about principle and other diseases or morbid conditions of mother is not copied from the medical certificate of stillbirth.

The copies of the medical death certificate (used in the Soviet period and at present) are presented in [Annex 1](#).

## 5. Coding system

In Romania, the death registration system, including codification of causes of death is decentralized. It is performed at the county level (*judete*).

The medical death certificate is given to the deceased's nearest relatives or, if there are none, to the medical unit who both have to present it to the civil registration office of the district where the death occurred. The declaration of death must be made within three days, including the day of death and the day of declaration. In case of non-natural death, or if the identity of the deceased is unknown, the death must be declared within 48 hours.

The act of death is drawn up at the district civil registration office (*serviciul de stare civilă*) in frame of the Public Community Service of Personal Records (*Serviciul Public Comunitar Local de Evidență a Persoanelor*), or in case of its absence, at the townhall (*primaria*) of the administrative-territorial unit where the death occurred. The declarant receives the administrative (civil) death certificate in exchange for the medical death certificate that permits inhumation or incineration of the decedent.

At the district civil registration office, the **statistical death bulletin** is completed in accordance with the technical norms elaborated by NIS.<sup>10</sup> At the level of the district civil registration office, all the information about causes of death (both part I and part II) is copied from the medical death certificate to the statistical death bulletin. Then, the statistical death bulletin is sent to the district statistical directorate (*Direcție județeană de statistică*), where it is checked and processed. Between the district statistical directorate (subordinate to NIS) and the district public health directorate (*Direcția de sănătate publică județeană*) (subordinate to the National Institute of Public health) there is an exchange of information relating to the statistical death bulletin. The trained staff from the district public health directorate is responsible for codifying causes of death according to the 10<sup>th</sup> revision of the

---

<sup>10</sup> Technical Norms about Completion and Transmission of Statistical Bulletins for Birth, Death and Marriage. National Institute of Statistics and Ministry of Interior and Administration Reform, 2008.

International Classification of Diseases and Causes of Death in the statistical death bulletin or statistical stillbirth bulletin.<sup>11</sup> The codification of causes of death is performed at the 4-digit level. Finally, the statistical death bulletin is sent to NIS for producing the official cause-of-death statistics based on the underlying cause of death.

Figure 3 presents the system of death registration in Romania.

In case of death under one year, a medical doctor who certified the death must complete the infant death form and, in case of death at age 0-6 days, the perinatal death form is filled in additionally. These forms are sent directly to the district public health directorates for data processing, including codification of causes of death. In Romania, shortly after the adoption of ICD9 in 1980, the medical perinatal death certificate was introduced by the Ministry of Health in accordance with the WHO recommendations; and in case of death at age 0-6 days, two forms of medical death certificates (medical death certificate and perinatal medical death certificate) had to be completed: (Petru Mureșan, 1983). At present, the perinatal medical death certificate is not used anymore, but in case of early neonatal death, the medical death certificate is completed together with the perinatal death form and infant death form.

In case of death at age 1-4 years, the form for death 1-4 years is completed. Finally, there are two maternal death forms in relation to death associated with pregnancy, childbirth and the puerperium and the indirect maternal death. All these medical forms (infant death form, perinatal death form, 1-4 years death form and two maternal forms) are obligatory completed together with the medical death certificate (or, in case of stillbirth, with the medical certificate of stillbirth). Codification of causes of death in the medical forms is produced at the level of public health directorate.

Figure 4 illustrates the flow of medical and statistical documentation in case of infant death.

## 6. Specific details of ICD revisions and collected data

In Romania, since 1999 the codification of causes of death has been produced according to the detailed list of the 10<sup>th</sup> revision of ICD. In the period 1994-1998, the abridged version of ICD10 was in use. Finally, in the period 1979-1993, Romania adopted the abridged list of ICD9. Earlier ICD revisions used in Romania are presented in the table below.

**Table 8. Revisions of the International Classification of Diseases used in Romania for the Post-World War II period**

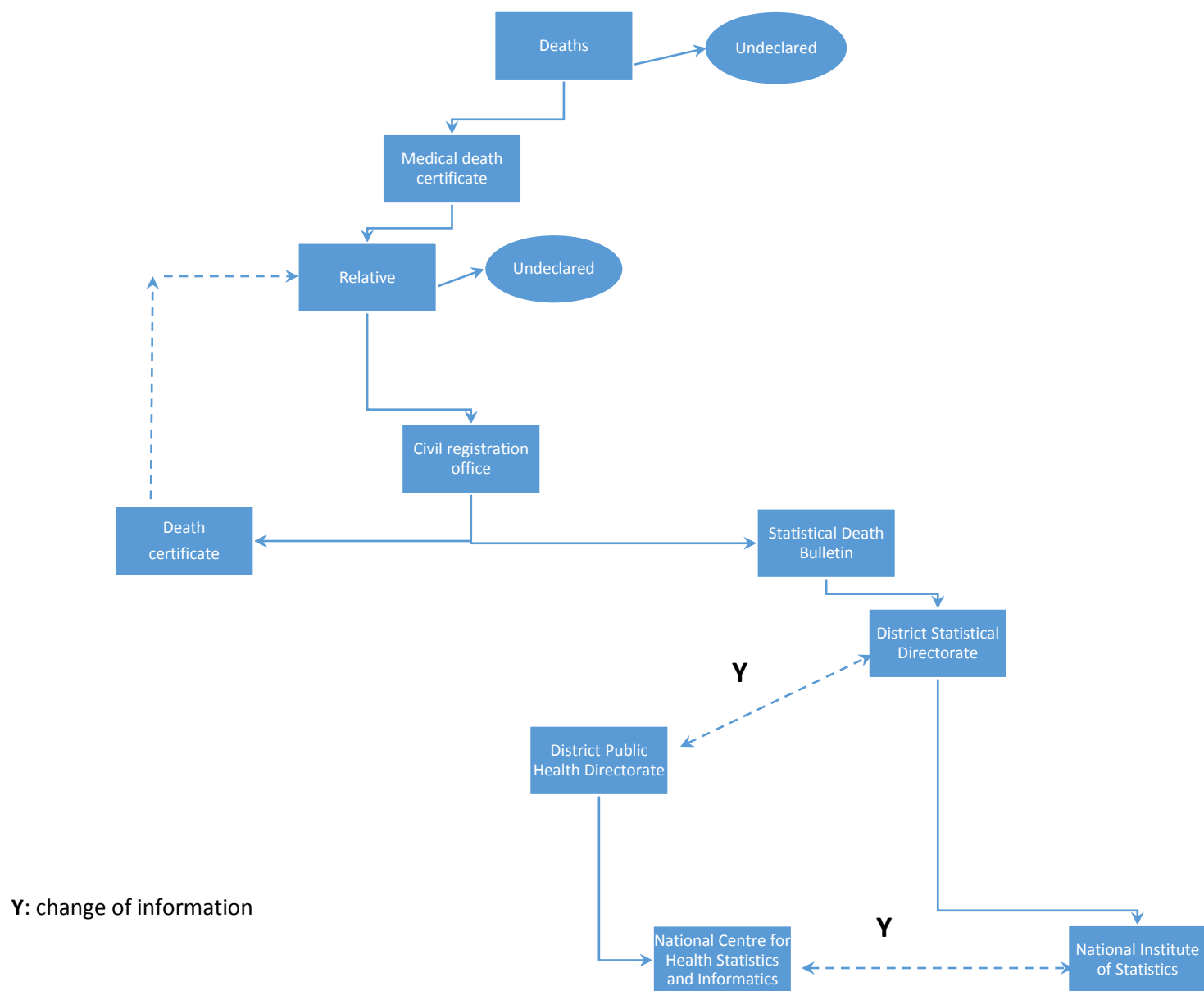
ICD revision	Year of ICD revision	Adopted by Romania
ICD6	1948	1948*
ICD7	1955	1959**
ICD8	1965	1969**
ICD9 abridged list	1975 (detailed)	1979*
ICD10 abridged list	1993 (detailed)	1994
ICD10 detailed list		1999

\* as stated by P.Mureșanu, 2001

<sup>11</sup> ORDIN Nr. 1078 din 27 iulie 2010 privind aprobarea regulamentului de organizare și funcționare și a structurii organizatorice ale direcțiilor de sănătate publică județene și a municipiului București.

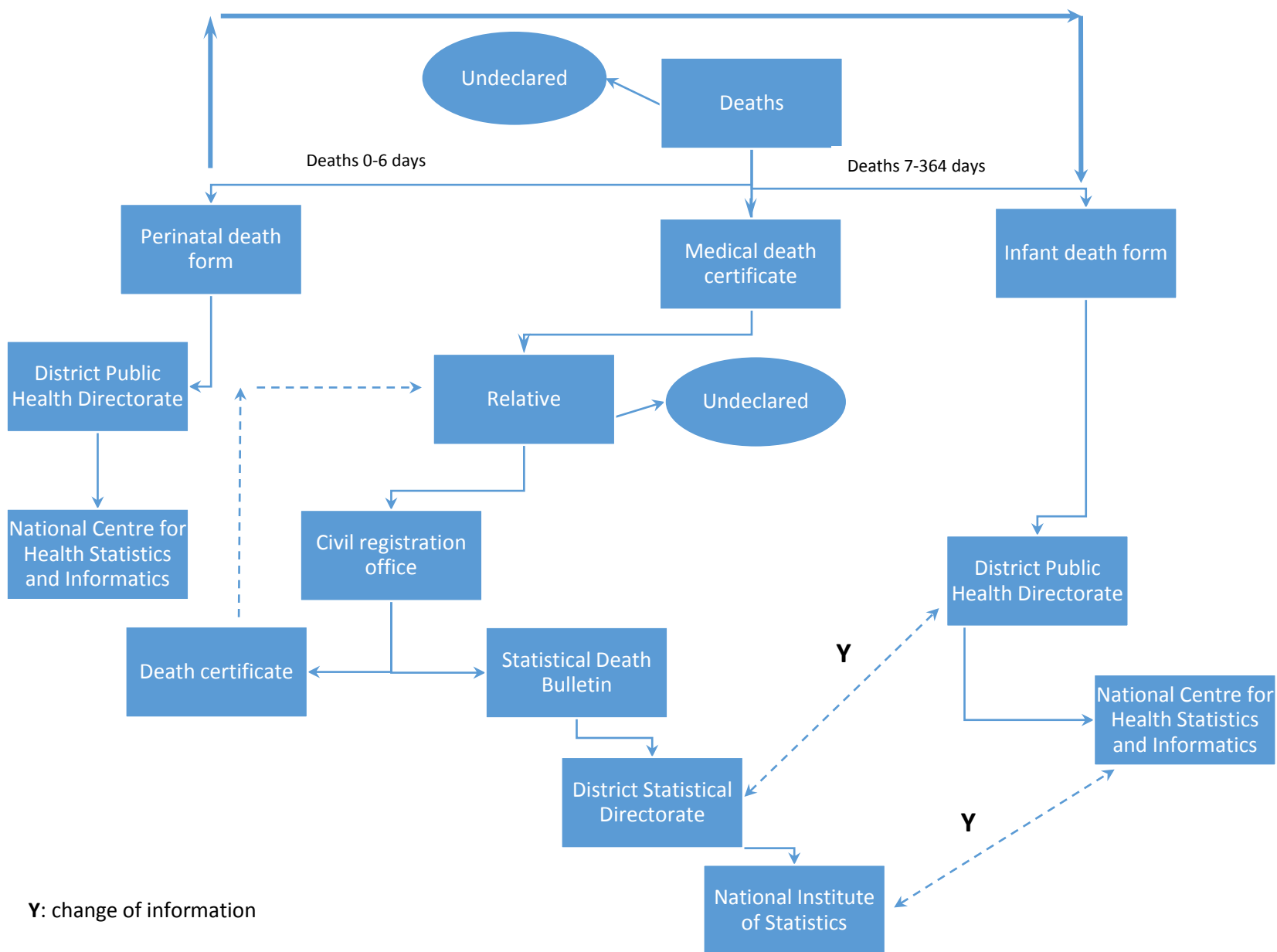
\*\* year given in WHO mortality database ([http://www.who.int/healthinfo/mortality\\_data/en/](http://www.who.int/healthinfo/mortality_data/en/)). For Romania, the first available year in this database is 1959, but we can assume that the adoption of ICD-7 took place earlier.

Figure 3. System of death registration in Romania



Source: NCHSI with some modifications

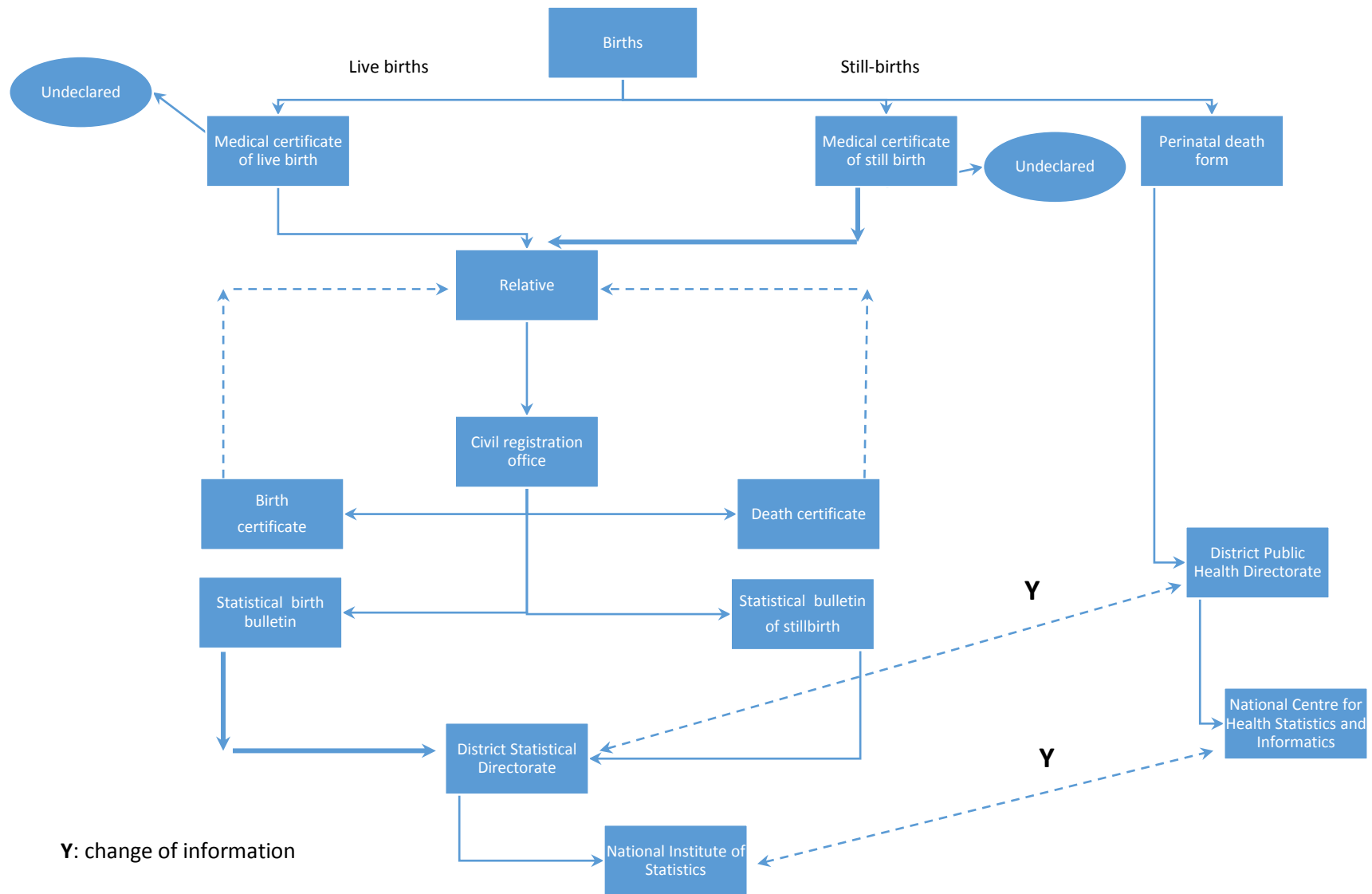
**Figure 4. System of infant death registration in Romania**



Y: change of information

Source: NCHSI with some modifications

**Figure 5. System of birth registration in Romania**



Source: NCHSI with some modifications

### *ICD9 abridged list*

Instead of ICD9 detailed list, ICD9 abridged list was in use for 1980-1993 years. The classification includes 353 causes of death, including 24 external causes under E-classification (see [Annex 2](#) in file **ROU\_list**).

### *ICD10 abridged list*

For 1994-1998 years, ICD10 abridged list was used (see [Annex 3](#) in file **ROU\_list**). The classification covers 895 codes, including 17 codes referring to external causes of deaths.

### *ICD10 detailed list*

In 1999, Romania adopted the detailed 4-digit ICD10 classification. The total number of ever registered codes in Romania during the period 1980-2012 is 4212 (this number includes external causes of death from Chapter XX). Three digit codes are used for some causes of death for which four digit codes exist in the ICD10 revisions. For example, the codes A09, C80, K85, L89, O96 exist in 1992 version of ICD10 as 3-digit codes, while in 2010 version, these codes exist as 4-digit codes.

Romania accepted some specific ICD10 updates. The codes D47.1, D304, K28.1, D72.9, M33.0 do not exist in 1992 version, while these codes appear in 2010 version of ICD10. There are non-existent codes for a few years that had a special treatment (see Section 8).

Certain three digit codes for external causes of death are used together with their corresponding four digit codes for the same year. These three digit codes had also a special treatment (see Section 8).

## **Collected data**

For 1980-1992 years, data on causes of death, including external causes of death by character of trauma, were computerized manually by the NIS personnel. Since 1993, cause-specific ICD9 data exist in a computerized form. The first age group is 0-4 years for 1980-1992 years and 0 year for 1993 year. Data on cause-specific infant mortality, including external causes of death by character of trauma, were provided additionally as separate files for 1980-1992. Data on external causes of death according to E-classification were provided additionally by the NIS as separate files. We used death counts redistributed under this type of classification.

Table below gives an overview of the raw ICD data collected for Romania for 1980-2012 years.

**Table 9. Format of raw data on death counts by sex, age and causes of deaths for Romania**

<b>ICD revision</b>	<b>Period</b>	<b>Number of items</b>	<b>Age groups</b>	<b>Data format</b>	<b>Comments</b>
ICD9 abridged list	1980-1992	353, incl. 24 external causes + 26 external causes by character of trauma	0-4, 5-9, 10-14, ..., 85-99, 100+	Manually computerized by NIS of Romania	Data on infant deaths by cause are provided as separate files; External causes for 1980 and 1988 are missing; Data on external causes for 1982 are incomplete; No information on infant deaths provoked by external causes
	1993	353, incl. 24 external causes + 26 external causes by character of trauma	0, 1-4, 5-9, 10-14, ..., 85-99, 100+	Computerized	
ICD10 abridged list	1994-1998	895, incl. 17 external causes + 97 external causes by character of trauma	0-4, 5-9, 10-14, ..., 85-99, 100+	Computerized	Data on external causes of death (17 causes) are provided as separate files



ICD revision	Period	Number of items	Age groups	Data format	Comments
ICD10 abridged list	1999-2012	4212 ever registered codes, incl. external causes (without external causes by character of trauma)	0,1,2,3,4,..., 100+	Computerized	

## 7. Additional transition documents

We use the correspondence table between the abridged ICD9 list and abridged ICD10 list with corresponding detailed ICD codes elaborated by NCHSI (Mureşanu, 2001). This correspondence table is used for the two transitions (from abridged ICD9 list to abridged ICD10 list and from abridged ICD10 list to detailed ICD10 list).

## Part II – reconstruction information

### 8. Specific treatment of the raw data

Several treatments were applied to raw data before the reconstruction.

#### *ICD9 (1980-1993)*

For years 1980 and 1988 data according to the E-classification are missing. For these years we estimated external death counts by sex, age and causes of death based on the coefficients calculated, respectively, for 1980 and 1987. The choice of 1987 year as a reference year for 1988 year is explained by important fluctuations in mortality from external causes of death in Romania in 1989 provoked by the December Revolution. The coefficients were applied to the total of external death counts codified under the character of trauma in 1980 and 1988.

The important difference between the totals of external deaths codified under E-classification and by character of trauma exists in 1982. External death counts under E-classification are 1044 less than external death counts by character of trauma. The same difference exists for this year at the level of the total of deaths. Examination of annual trends in external death counts did not show any specific single cause of death to which these missing deaths could be attributed. The difference between death counts by character of trauma and under E-classification was redistributed proportionally between all external causes under E-classification in 1982.

The first age group for external causes of death under E-classification is 0-4 year for 1980-1992 and 0 year for 1993. To separate infant deaths from deaths at age group 1-4 years, we used the corresponding coefficients computed for external causes of death by sex and age for 1993. The totals of deaths by causes of death were adjusted to the totals of deaths by age.

#### *ICD10 abridged list (1994-1998)*

Raw ICD10 data according to the abridged list of causes of death were not subject to any specific treatment.

#### *ICD10 detailed list (1999-2012)*

For certain years, non-existent 4-digit codes exist in the raw ICD10 detailed data. These codes are: C14.1; Q63.4; Q90.3; E51.3; O15.3. The total of deaths registered under these non-existent codes is very small (less than 10 deaths for the whole of the observation period), except the code C14.1 (about 100 deaths in 1999-2002). The 3-digit code C14 is referring to *Malignant neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx*. Deaths registered under the non-existent code C14.1 were re-codified into C14.0, *Malignant neoplasm of pharynx, unspecified*. The check of the annual trends in deaths from C14.0 after the recodification did not reveal any inconsistency in time

series. Other non-existent codes were re-codified into the corresponding codes with the 4<sup>th</sup> digit code .9 (unspecified).

For certain external causes of deaths, three digit ICD10 codes exist together with their corresponding 4-digit codes for the same year. These codes are as follows: V03, V05, V43, V66, V89, W01, W11, W18, W19, W20, W29, W55, W69, W70, W74, W79, W80, X09, X31, X59, X66, X68, X69, X70, X77, X78, X80, X91, X99, Y00, Y09, Y34.

The total of deaths codified under these codes is insignificant (less than 10 deaths). We coded these 3-digit codes to their corresponding 4-digit codes with the 4<sup>th</sup> digit .9 (unspecified).

## Reconstruction information

### Transition from abridged ICD9 list to abridged ICD10 list

#### *Correspondence tables*

We used a correspondence table between the abridged list of ICD9 and abridged list of ICD10 produced by NCHSI (Mureşanu, 2001) that also include the corresponding detailed ICD9 and ICD10 codes. We checked the official correspondence table both by new and old classifications and introduced a few modifications due to the omission of certain codes from ICD9 abridged and ICD10 detailed lists. The correspondence table between abridged ICD9 list and abridged ICD10 list is given in [Annex 4](#).

#### *Fundamental associations of items*

Based on the medical correspondence of items, we produced 289 associations and checked their coherence at the statistical level. For that, we used a statistically oriented method based on prediction of the mortality series and user-defined cut-offs according to the level of statistical significance (Camarda and Pechholdová, 2014). After detecting disruptions in associations, we adjusted the problematic associations accordingly and as a result obtained 240 associations. The distribution of the associations of items by type and number of deaths registered in the first year of transition (1994) is presented in the table below. Fortunately, 131 of the 240 fundamental associations established between ICD9 and ICD10 abridged lists are simple, but they contain only 14% of the total of deaths in the transition year. The two categories referring to the fundamental associations assigned as type splitting (1:n) and merging (n:1) cover 26% and 3%, respectively. The total number of deaths attributed to these two associations is relatively small (10%). Finally, only 17 fundamental associations were built as complex (n:n), but they concentrate the biggest part of the total number of deaths (77%).

**Table 10. Distribution of fundamental associations of items by type and death counts. Transition from abridged ICD9 to abridged ICD10**

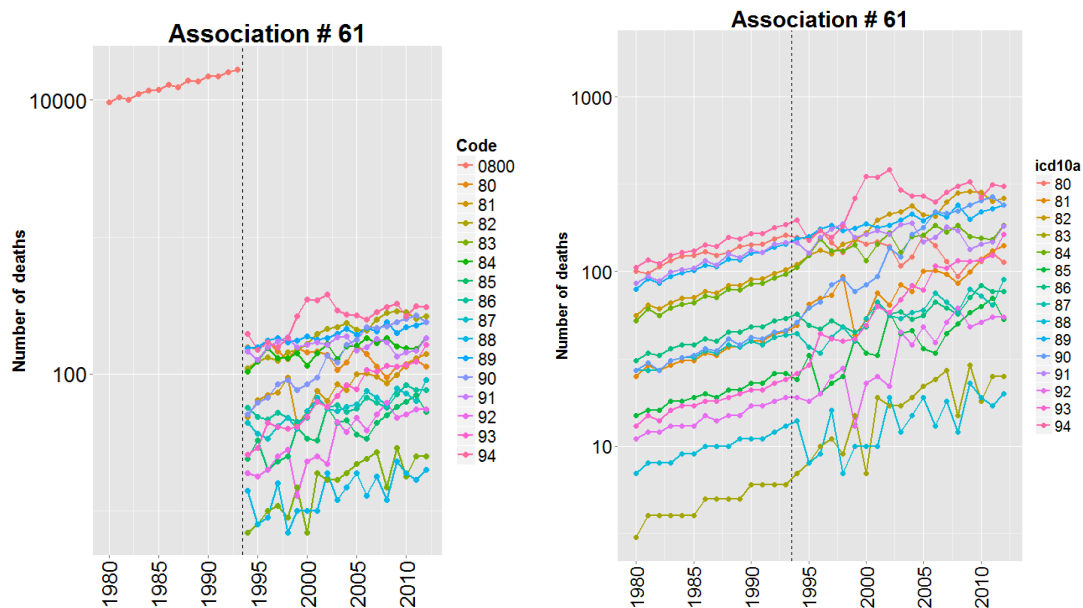
Association type	Abridged ICD10			
	Associations		Deaths (in 1994)	
	Number	Proportion, %	Number	Proportion, %
type 1:1	131	55	36277	14
type 1:n	63	26	23316	9
type n:1	6	3	1412	1
type n:n	40	17	205096	77
Total	240	100	266101	100

Fundamental associations of items built between abridged ICD9 list and abridged ICD10 list are presented in [Annex 6](#). For some associations the first year of the new classification (abridged ICD10 list) is not 1994, but 1995 or 1999 (the first year of ICD10 detailed list).

### Transition coefficients

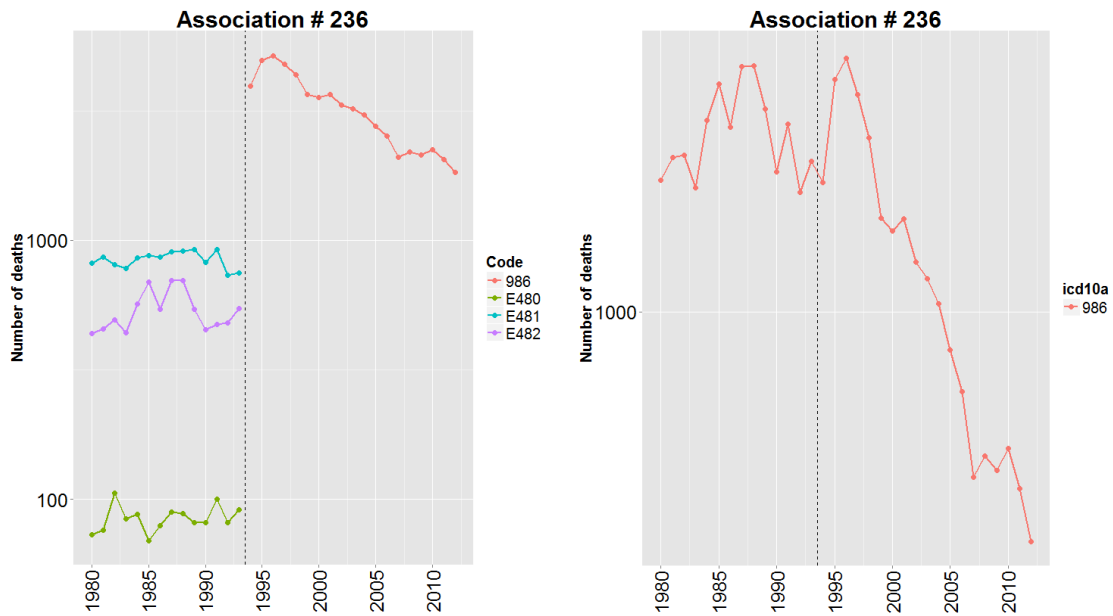
At first, transition coefficients were computed for all ages and applied to 1980-1993 ICD9 deaths time series completed with the 1994-2012 deaths time series according to abridged ICD10 list<sup>12</sup>. After checking the statistical continuity of cause-specific mortality trends by age, we selected 28 associations covering 313 ICD10 codes for which the use of the transition coefficients calculated for all ages resulted in the disruptions in death time series at the moment of transition to the new classification. For these associations, transition coefficients were computed at first for five main age groups: 0-19 years, 20-39 years, 40-59 years, 60-79 years and 80 years and over. For some associations the first age group was split into 0 year and 1-19 years. Then, based on the computed coefficients by the main age groups and the mean age of death for these age groups, the transition coefficients by 5-year age groups were interpolated. As a result, we produced coherent 1980-1998 death time series under the abridged ICD10 classification completed at this stage by 1999-2012 death time series aggregated by abridged ICD10 list.

Figures 6-8 illustrate examples of the transition between ICD9 and ICD10 items for different types of associations before and after applying the transition coefficients. Association 61 is of type splitting (1:n) and refers to *Malignant neoplasm of lip, oral cavity, and pharynx*. Association 236 represent the type merging (n:1) and includes the items related to *Accidental poisoning by and exposure to noxious substance*. Finally, association 65 is an example of a type complex (n:n) with two ICD9 and four ICD10 items concerning *Malignant neoplasm of colon, rectum rectosigmoid junction and anus*.

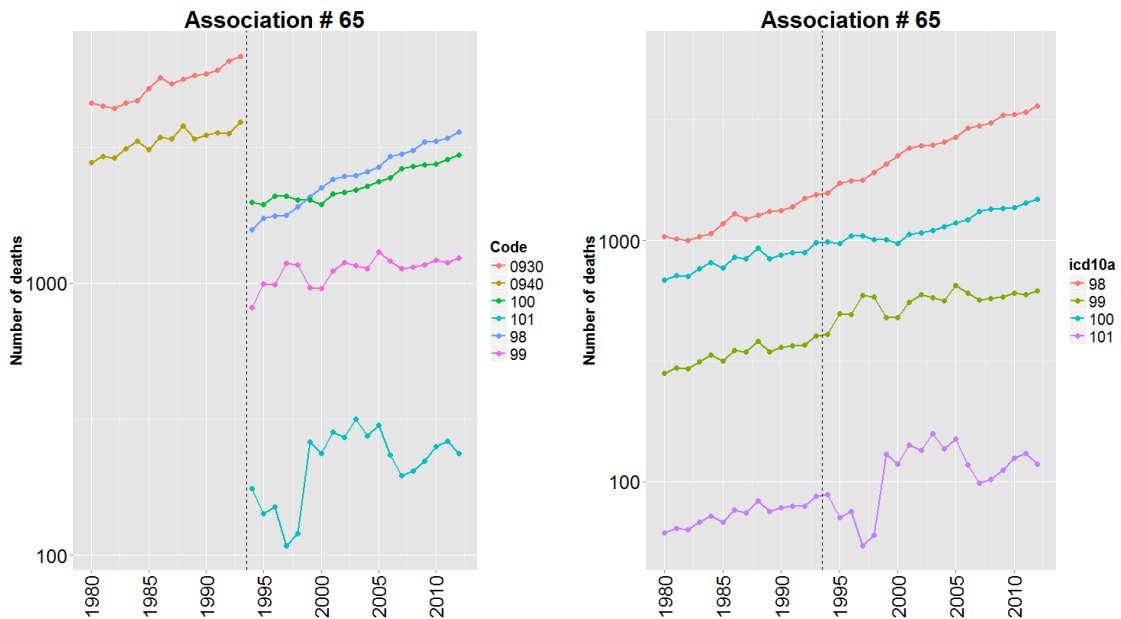


**Figure 6.** Transition from ICD9 to ICD10: annual trends in deaths for *Malignant neoplasm of lip, oral cavity, and pharynx* recorded under ICD-9 and ICD-10: before reconstruction (left) and (right) after reconstruction

<sup>12</sup> Transition coefficients were computed automatically with a help of VBA macro elaborated by V.Bâzgan and O.Penina (2015)



**Figure 7.** Transition from ICD9 to ICD10: annual trends in deaths for *Accidental poisoning by and exposure to noxious substance* recorded under ICD-9 and ICD-10: before reconstruction (left) and (right) after reconstruction



**Figure 8.** Transition from ICD9 to ICD10: annual trends in deaths for *Malignant neoplasm of colon, rectum rectosigmoid junction and anus* recorded under ICD-9 and ICD-10: before reconstruction (left) and (right) after reconstruction

**Annex 8** includes transition coefficients computed between abridged list of ICD9 and abridged list of ICD10.

### Transition from ICD10 abridged list to ICD10 detailed (4-digit) list

*Correspondence table*

We used a detailed ICD10 list especially elaborated by Dr. Pechholdova in frame of the MODICOD/DIMOCHA Project. This list includes two official WHO ICD10 versions: the first one is from 1992 and the other is from 2010. After merging the two versions, the final list covers three types of codes: used in both ICD versions, used only in 1992 version and used only in 2010 version. For Romania, we used the codes that are used in the two versions, only in 1992 version and certain codes from 2010 version.

The codes from 2010 version are probably added ones and for Romania we used only those codes that were ever registered. These are only six codes: D471, D304, D729, K281, M330, V850. Totally, the detailed ICD10 list includes 10195 codes, while the number of ICD10 codes ever registered in Romania is 4212.

The correspondence table between abridged ICD10 list and detailed ICD10 list is given in [Annex 5](#).

#### *Fundamental associations of items*

Based on the medical correspondence of items we produced totally 895 associations, i.e. at this moment, all the fundamental associations of items belonged to the type splitting (1:n). However, their examination revealed a few cases of statistical disruptions which were eliminated by producing the complex associations of items. Thus, we obtained 795 associations, among which 106 or 13% are simple (1:1), 45 or 6% are complex (n:n), and the rest belongs to the type splitting (1:n) which represent almost 80% of the associations. However, 50% of deaths is concentrated in the complex associations produced on the basis of the statistical correspondence of items. Thus, the transition from the abridged ICD10 to detailed ICD10 was by far much more complex as one might have expected, and it was accompanied by some changes in the codification process independent of the theoretical definitions of items.

**Table 11. Distribution of fundamental associations of items by type and death counts. Transition from abridged ICD10 to detailed ICD10**

Type of associations	ICD10			
	Associations		Deaths (1999)*	
	Number	Proportion, %	Number	Proportion, %
type 1:1	106	13	56908	22
type 1:n	644	81	75629	29
type n:1	0	0	0	0
type n:n	45	6	131992	50
Total	795	100	264529	100

\* For certain ICD10 detailed items, the transition year is other than 1999.

The fundamental associations of items built between abridged list of ICD10 and detailed list of ICD10 are presented in [Annex 7](#).

#### *Transition coefficients*

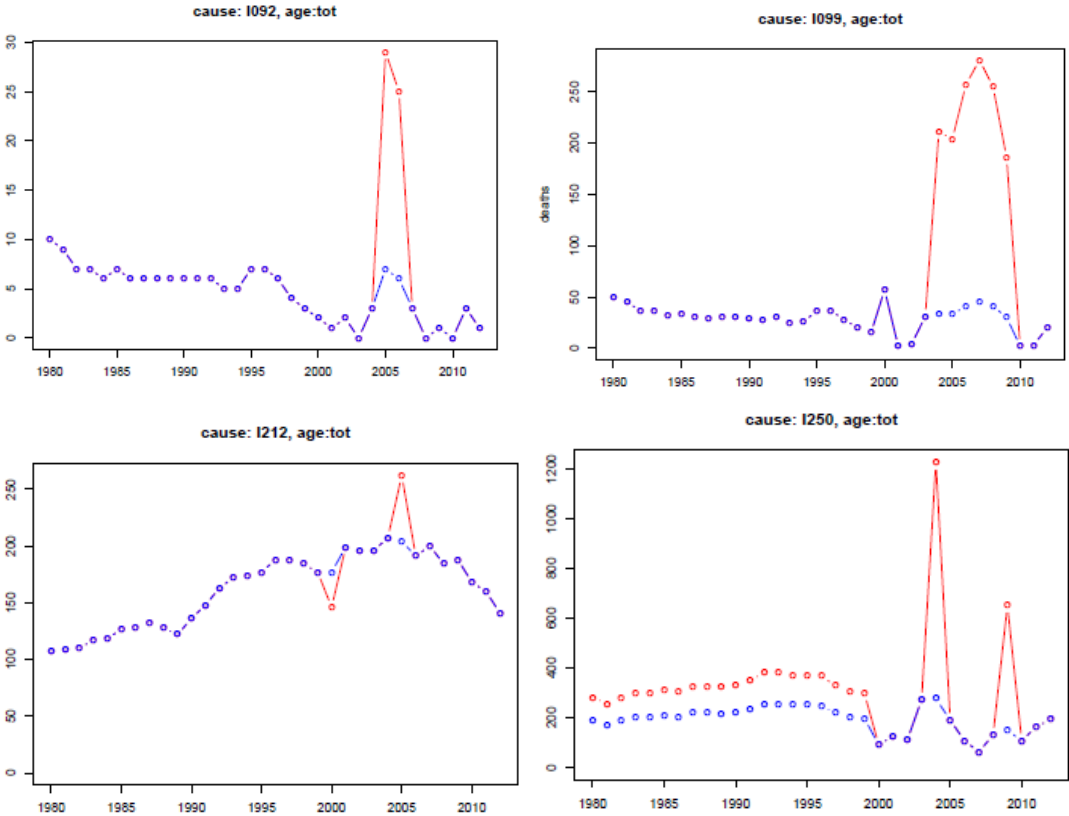
Like at the previous step of the reconstruction, transition coefficients were calculated at first for all ages and then we determined the ICD10 codes for which it was necessary to refine the coefficients by age. Totally, we selected 50 associations of items covering 3668 detailed ICD10 codes and 100 ICD10 codes under the abridged list. For these items we estimated transition coefficients by 5-year age groups using the same technique described above for the first transition.

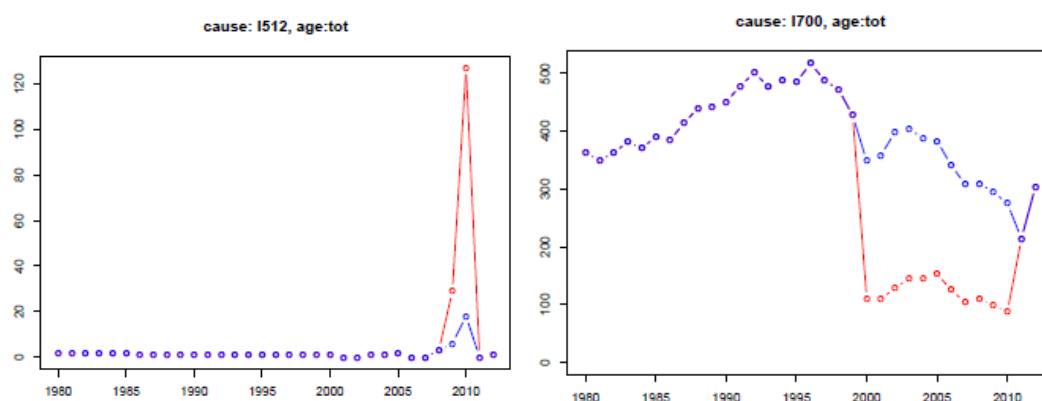
Transition coefficients computed between abridged list of ICD10 and detailed list of ICD10 are presented in [Annex 9](#).

***A posteriori corrections***

This type of correction was produced after every transition from an old classification to a new one, i.e. in two rounds. After reclassifying the 1980-1993 data in accordance with ICD10 abridged list and adding them to the 1994-1999 data set, we made the first round of *a posteriori* corrections. The second one was produced after reclassifying 1980-1998 death time series under the detailed ICD10 list and adding the reconstructed data to the raw 1999-2012 death time series.

Figure 9 shows some examples of *a posteriori* corrections applied to certain detailed ICD10 cardiovascular items. It appears that NIS of Romania introduced some important changes concerning codification of diseases of the circulatory system in the recent years. Some of these changes in codification practice were abolished shortly after their introduction. For example, this is the case of Item I092 *Chronic rheumatic pericarditis* or Item I512 *Rupture of papillary muscle, not elsewhere classified*, for which we can observe an unexpected jump in deaths for a year or two.





**Figure 9.** Annual trends in number of deaths for certain detailed ICD10 items referring to the diseases of cardiovascular system before (red line) and after (blue line) *a posteriori* corrections.

The proportions of deaths transferred *a posteriori* between abridged list of ICD10 (the first round) and detailed list of ICD10 (the second round) can be found in [Annex 10](#) and [Annex 11](#), respectively.

*Specific correction: ICD10 codes not to be used as underlying*

For Romania, we adopted a list of ICD10 codes not to be used as underlying (non-UCD) from WHO ICD10 manual (WHO, 2016, pp. 98–99) presented in the Table 13 **Error! Reference source not found.** In most cases, the total number of deaths from these causes is rather small, especially for those codes that were coded to R99, *Other ill-defined and unspecified causes of mortality*.

Deaths registered under the code C97 - *Malignant neoplasms of independent (primary) multiple sites*, were redistributed proportionally between the codes C00-C76 and C81-C96.

Although WHO recommends not to use F10.0 - *Mental and behavioural disorders due to use of alcohol, acute intoxication* – as the underlying cause of death, and code it to external causes of deaths provoked by alcohol intoxication (X45, X65, X85 or Y15), we decided to keep this code for Romania.

We treated non-UCD codes as an additional step after producing death time series under the detailed ICD10 list. This is mostly explained by the fact that the treatment of the raw ICD10 data was complicated due to the period of use of the abridged ICD10 list.

**Table 12. List of ICD10 codes not to be used as underlying code**

ICD10 codes not to be used as underlying code	Coded to
R572, R650, R651, R659	A419
B956-B958	A490
B950, B951, B952, B953, B954, B955	A491
B963	A492
B960	A493
B961, B962, B964, B965, B966, B967, B968, B980, B981	A498
B970	B340
B971	B341
B972	B342
B973, B976	B343

ICD10 codes not to be used as underlying code	Coded to
B977	B344
B974, B975, B978	B348
C770, C771, C772, C773, C774, C775, C778, C779, C780, C781, C782, C783, C784, C785, C786, C787, C788, C790, C791, C792, C793, C794, C795, C796, C797, C798	C80
C97	Proportional redistribution between C00-C76 and C81-C96
I152	E349
I230, I231, I232, I233, I234, I235, I236, I238, I220, I221, I228, I229, I240	I219
I252	I258
I650, I651, I652, I653, I658, I659, I660, I661, I662, I663, I664, I668, I669	I639
I151	N289
O080, O081, O082, O083, O084, O085, O086, O087, O088, O089	O069
O800, O801, O808, O809, O810, O811, O812, O813, O814, O815, O820, O821, O822, O828, O829, O830, O831, O832, O833, O834, O838, O839, O840, O841, O842, O848, O849	O759
P703, P704, P708, P709, P710, P711, P712, P713, P714, P718, P719, P720, P722, P728, P729, P740, P741, P742, P743, P744, P745, P748, P749	P969
B900, B901, B902, B908, B909, B91_, B92_, B940, B941, B942, B948, B949, E640, E641, E642, E643, E648, E649, E68_, G09_, I690, I691, I692, I693, I694, I698, O97_, Y850, Y859, Y86_, Y870, Y871, Y872, Y880, Y881, Y882, Y883, Y890, Y891, Y899, E890, E891, E892, E893, E894, E895, E896, E898, E899, F03_, F04_, F050, F051, F058, F059, F060, F061, F062, F063, F064, F065, F066, F067, F068, F069, F070, F071, F072, F078, F079, F09_, F700, F701, F708, F709, F710, F711, F718, F719, F720, F721, F728, F729, F730, F731, F738, F739, F780, F781, F788, F789, F790, F791, F798, F799, F800, F801, F802, F803, F808, F809, F810, F811, F812, F813, F818, F819, G970, G971, G972, G978, G979, G810, G811, G819, H590, H598, H599, G820, G821, G822, G823, G824, G825, H950, H951, H958, H959, G830, G831, G832, G833, G834, G838, G839, I150, I158, I159, H540, H541, H542, H543, H544, H545, H546, H547, H900, H901, H902, H903, H904, H905, H906, H907, H908, H910, H911, H912, H913, H918, H919, N46_, N970, N971, N972, N973, N974, N978, N979, O300, O301, O302, O308, O309, I970, I971, I972, I978, I979, P070, P071, P072, P073, P080, P081, P082, J950, J951, J952, J953, J954, J955, J958, J959, K910, K911, K912, K913, K914, K915, K918, K919, M960, M961, M962, M963, M964, M965, M966, M968, M969, N990, N991, N992, N993, N994, N995, N998, N999, R69_	R99
F130, F150	Y119
F110, F120, F140, F160	Y129
F180	Y169
F170, F190	Y199

## Redistribution of ill-defined causes

At the final step of the reconstruction, we redistributed ill-defined causes of deaths (items R00-R94, R96, R98, R99 under ICD10) proportionally between all other causes of death.

## 10. References

Camarda Carlo Giovanni, Pechholdová Markéta, 2014, "Assessing the presence of disruptions in cause-specific mortality series: A statistical approach", MODICOD and DIMOCHA Joint Seminar, Paris, INED, October 2014.



Decret nr. 278 din 23 iulie 1960 cu privire la actele de stare civila [*Decree nr. 278 from 23 July 1960 about civil registration*] <http://www.monitoruljuridic.ro/act/decret-nr-278-din-23-iulie-1960-cu-privire-la-actele-de-stare-civila-emitent-marea-adunare-nationala-publicat-n-141.html>

EUROSTAT. National Institute of Statistics - Romania. Brief description.  
[http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/documents/RO\\_description%20of%20NSI\\_amended.pdf](http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/documents/RO_description%20of%20NSI_amended.pdf)

Gourbin C, Masuy-Stroobant G., 1994. Are live births and stillbirths comparable all over Europe? Legal definitions and vital registration data processing. *Technical papers* (58), August, 1994. International Institute for Vital Registration and Statistics, Maryland, USA. 45 p.  
[http://www.cdc.gov/nchs/data/isp/058\\_Are\\_Live\\_and\\_Stillbirths\\_Comparable\\_All\\_Over\\_Europe\\_Legal\\_Definitions\\_and\\_Vital\\_Registation\\_Data\\_Processing.pdf](http://www.cdc.gov/nchs/data/isp/058_Are_Live_and_Stillbirths_Comparable_All_Over_Europe_Legal_Definitions_and_Vital_Registation_Data_Processing.pdf)

Gourbin C., Masuy-Stroobant G., 1995, "Registration of Vital Data: Are Live Births and Stillbirths Comparable All over Europe?", *Bulletin of the World Health Organization*, 73(4), p. 449.

Legea nr. 226 /2009 privind organizarea si functionarea statisticii oficiale in Romania [*Law no. 226/2009 on the organization and functioning of official statistics in Romania*]

Mureșan Petru, 1983. Reglementările privind Clasificarea și Codificarea Cauzelor de Deces. [*Regulations regarding Classification and Codification of Diseases and Causes of Death.*] Editura Medicală, București, 1983. 83 p.

Mureșan Petru, 2001, *Reglementările privind clasificarea și codificarea cauzelor de boală și de deces, Revizia a 10-a OMS [Regulations concerning classification and codification of diseases and causes of death according to the 10th Revision of ICD]*, Ministerul Sănătății și Familiei, Centrul de Calcul, Statistică Sanitară și Documentare Medicală, Bucharest, Editura Medicală, 192 p. +annexes

National Centre for Health Statistics and Informatics. Official website  
[http://www.ccss.ro/public\\_html/?q=content/cnsisp](http://www.ccss.ro/public_html/?q=content/cnsisp).

National Institute of Statistics and Ministry of Interior and Administration Reform of Romania, 2008. Norme tehnice privind completarea și transmiterea buletinelor statistice pentru naștere, deces și căsătorie [*Technical Norms about Completion and Transmission of Statistical Bulletins for Birth, Death and Marriage*].

National Institute of Statistics of Romania. Official web site. <http://www.insse.ro/cms/en/cadru-legal>

National Institute of Statistics. Informare pentru lămurirea "Diferințelor între datele de populație" gestionate de Institutul Național de Statistică (INS) și cele gestionate de Direcția pentru Evidența Persoanelor și Administrarea Bazelor de Date (DEPABD) din cadrul Ministerului Administrației și Internelor [*Information for clarifying „the difference between population data” produced by the National Institute of Statistics (NIS) and by the Directorate for Personal Records and Database Administration (DPRDBA) in frame of the Ministry for Administration and Interior*].  
<http://www.insse.ro/cms/files/diferente%20INS%20vs%20DEPABD%20.pdf>

National Institute of Statistics. Population and Household Census.  
<http://www.recensamantromania.ro/>

Ordin Nr. 1078 din 27 iulie 2010 privind aprobarea regulamentului de organizare și funcționare și a structurii organizatorice ale direcțiilor de sănătate publică județene și a municipiului București [*Order nr. 1078 from 27 July 2010 about approval of the regulations regarding the organization and functioning of the organizational structure of the district public health directorate and the public health directorate of municipiu Bucharest*]. <http://www.dspb.ro/legislatie/documente/ordin-1078.pdf>

Ordinul Nr. 359/2012 privind criteriile de inregistrare si declarare a nou-nascutului [*Order nr. 359/2012 about criteria of the registration and declaration of a newborn*].  
<http://www.legalis.ro/2012/04/11/declararea-si-inregistrarea-nou-nascutilor/>

Ordonanța Nr. 9 din 7 august 1992 privind organizarea statisticii publice [*Ordinance Nr. 9 from August 7 about the organization of the public statistics*].  
[http://www.cdep.ro/pls/legis/legis\\_pck.htp\\_act\\_text?id=7116](http://www.cdep.ro/pls/legis/legis_pck.htp_act_text?id=7116)

Penina Olga, Ionita Andoria. *Reconstructing continuity of cause-specific mortality trends for Romania* (35 diapos). Paper presented at the Seminar “Demographic statistics in Romania: where are we, what are we moving towards?” organized by the National Institute of Statistics of Romania, Buchuresti, 11 January, 2016.

Paraschiv Pețu, Elena Velicu, Viorel Mardare, 2004 – Starea civilă mijloc de identificare a persoanei fizice [*Identifying Natural Person via Civil Registration*]. Ediția a II-a- revăzută și adăugită. Editura Detectiv București, 2004. <http://www.scribd.com/doc/26879912/Starea-Civila-Ed-II-Revizuita>

WHO, 2016, *International Statistical Classification of Diseases and Related Health Problems. 10th Revision, V.*

## 11. Annex

1. Medical and statistical documents (certificates)
2. Romanian abridged ICD9 list
3. Romanian abridged ICD10 list
4. Correspondence table between abridged ICD9 list and abridged ICD10 list
5. Correspondence table between abridged ICD10 list and detailed ICD10 list
6. Associations between abridged ICD9 list and abridged ICD10 list
7. Associations between abridged ICD10 list and detailed ICD10 list
8. Transition coefficients between abridged ICD9 list and abridged ICD10 list (column ‘icd9a’ corresponds to abridged list of ICD9; column ‘icd10a’ corresponds to abridged list of ICD10 )
9. Transition coefficients between abridged ICD10 list and detailed ICD10 list (column ‘icd10a’ corresponds to abridged list of ICD10 )
10. *A posteriori* coefficients between abridged ICD10 list
11. *A posteriori* coefficients between detailed ICD10 list

## 12. List of acronyms

NIS - National Institute of Statistics

NIPH - National Institute of Public Health

NCHSI - National Centre for Health Statistics and Informatics