About Norway Data on Causes of Deaths

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Part 1 – vital statistics and population censuses

General

This background information is relative to cause-of-death data for the period 1951 to the present. For general information about mortality statistics in Norway, the reader should refer to the general Background and Documentation file [http://www.mortality.org/hmd/NOR/InputDB/NORcom.pdf].

1. Death Count Data

Source of data

The processing and distribution of cause-of-death statistics was the responsibility of the Division for Health Statistics at Statistisk sentralbyrå (Statistics Norway) until the end of 2013, when this function was transferred to the Norwegian Institute of Public Health, under the Ministry of Health and Care Services. A single electronic file of aggregated death counts by calendar year of occurrence, sex, age, and medical cause for all years from 1951 to 2012 was provided to the HMD by Statistics Norway. Updated data for years 1996-2012 and new data for years 2013-2016 were downloaded from the World Health Organization Mortality Database (https://www.who.int/data/data-collection-tools/who-mortality-database).

Comparison with the all-cause death counts

Though the source of cause-of-death data and the source of the all-cause mortality data for the general HMD series are the same (i.e. the Division for Health Statistics at the Norway National Statistics Office), there are some discrepancies between the two datasets due to delays in registering the cause of death for a sizeable number of deaths (30 a year on average but up to about 100 in some years – see Appendix 1 for the exact numbers by year). Those are usually deaths requiring an autopsy or legal investigation before an official cause of death can be determined.

Part II –information on CoD coding

The International Classification of Diseases (ICD) was only adopted by Norway in 1951. The ICD was then in its 6th Revision. All of the World Health Organization's rules and guidelines regarding the coding and selection of the underlying cause have been largely followed by Statistics Norway since then (see below, the section on « Other classification changes » for Norway specificities in the classification of causes). Successive revisions of the ICD have been implemented up to ICD-10, which was first used in Norway in year 1996. Table 1 presents the periods of implementation of each ICD revision in the country. A semi-automatic version of ACME has been used by Statistics Norway since 2005, within the IRIS framework since 2011. ACME is the Automated Classification of Medical Entities software developed by the United States to increase unformity in the cause-of-death classification system and to facilitate comparisons within and between countries.

Table 1. Periods of implementation of each ICD revision in Norway

ICD Revision	Years Covered
6th	1951-1957
7th	1958-1968
8th	1969-1985
9th	1986-1995
10th	1996-present

Cause-of-death statistics are compiled from the Cause of Death Registry, which include all deaths registered in the National Population Register. A comparison of the information provided on the death certificate and in the National Population Register (which does not include the medical cause) is performed systematically and discrepancies are investigated. The Register includes all Norwegian residents, whether they died in or outside the country. When occurring abroad, information on the death of Norwegian residents is often conveyed to the Ministry of Foreign Affairs, often with an unknown cause. From the year 2012, the Registry also includes foreigners dying in Norway but information concerning these deaths is published separately and not included in the HMD series. Death statistics are published by the underlying cause of death defined by WHO. The exact definition adopted by the Norway vital statistic system follows international recommandations. It is « (a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury » (World Health Organization, 1975).

Implementation of the ICD was a major advance in the comparison of mortality trends by cause across countries. However, the ICD is periodically revised to account for the identification of new diseases (HIV/AIDS, SIDS, or Alzheimer to mention just a few recent

examples), improved diagnosis and scientific accuracy of disease classification, and progress in medical knowledge. Though undoubtedly necessary, these revisions introduce disruptions in the series of mortality rates by cause, which are at times very significant and independent of changes in the population's underlying health status.

Other classification changes

In addition to the major changes introduced by new revisions of the ICD, the World Health Organization sometimes updates the selection rule for the underlying cause or the definition of some categories to take into account progress in diagnosis or the need for better specifications. One of these updates took place in 2003 and was implemented by many countries, including Norway. The two changes that had the most impact on cause-specific mortality series in this country were 1) those affecting deaths caused by acute poisoning, coded to ICD-10 categories F10-F19 (when occurring among known substance abusers) and X40-X49 (for others) before 2003 and to the accident chapter starting in 2003 and 2) those affecting the rule to select the underlying cause when pneumonia is mentioned among all multiple causes. While in such instances pneumonia was to be selected as the underlying cause before 2003, other conditions (senile dementia in particular) were deemed preferable.

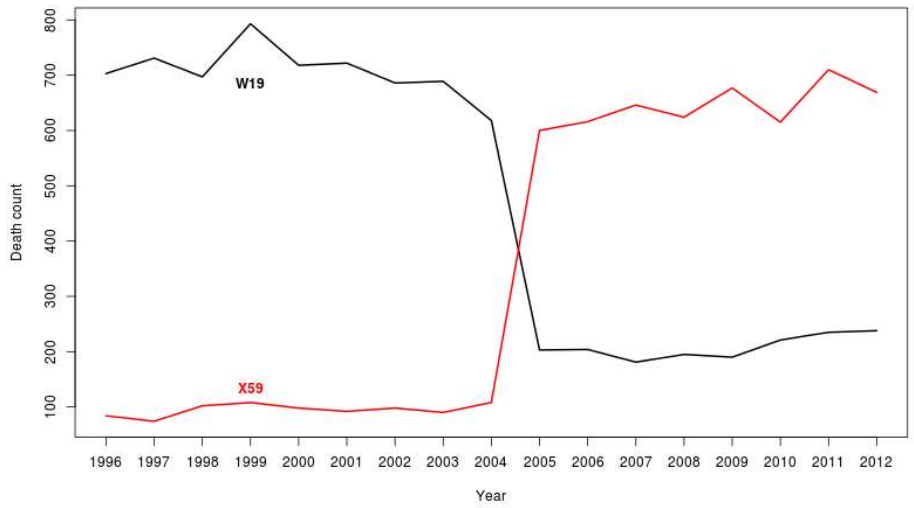
Raw data treatment

Statistics Norway has implemented slightly adapted versions of the 8th, 9th and 10th Revisions of the ICD. These adjustments are typically additional subdivisions of an existing category and have no bearing on the cause-of-death categories defined in the HCD. For instance, the adapted version of ICD-10 added the three following sub-categories to R99 ("Other ill-defined and unspecified causes of mortality"): R99.0 ("Not enough information for the physician to establish the cause of death"), R99.8 ("Cause of death missing from the death certificate"), and R99.9 ("No death certificate"; which indicates that all of the information came from the National Population Register).

The one instance when the adjustment induced a transfer from one cause-of-death category of the HCD to another regards the coding of deaths from hip fracture, coded W19 ("Unspecified fall") up to 2004 and X59 ("Exposure to unspecified factor") from 2005. This change induced a precipitous decline in the number of deaths coded W19 (from over 600 between 1996 and 2004 to less than 250 after 2004) and a symmetric increase in the number of deaths coded X59 (from around 100 to over 600) (Figure 1).

Furthermore, before WHO introduced a specific category for HIV-AIDS in ICD-10, Statistics Norway allocated all deaths from this disease to ICD-9 category 279.1. Such deaths are thus coded to HCD COD category #8.

Figure 1. Total death counts by year for ICD-10 categories W19 and X59, both sexes



Some mistakes were made in the original data that yielded unexpected ICD codes but as these represent only 16 deaths in total over the whole period 1952-2012, these mistakes have hardly any impact on the final HMD cause-specific series.

Finally, the number of non-UCD (underlined causes of death) were recorded into target cause as shown in appendix 3 since these causes may not be considered as principal cause of death.

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Appendexis

Appendix 1. Death data used for the cause-of-death database

Period	Type of Data	Age Grouping	Comments	RefCode(s)†
1951-1995	Annual number of deaths, by sex, five-year age group and medical cause-of-death.	0, 1-4, 5-9, …, 90-94, 95+		30
1996-2016	Annual number of deaths, by sex, age group, and medical cause-of-death coded to the 4th digit of the ICD.	0, 1-4, 5-9, ...,90-94, 95+,unknown		50

† The reference code is used in the raw data files (Input Database) to link data with sources.

Appendix 2. Differences between the all-cause HMD series and the cause-specific series in the raw data

Year	HMD	COD	HMD-COD
1951	27655	27726	-71
1952	28389	28408	-19
1953	28423	28430	-7
1954	29141	29149	-8
1955	29116	29119	-3
1956	29859	29968	-109
1957	30609	30618	-9
1958	31464	31437	27
1959	31754	31754	0
1960	32541	32535	6
1961	33312	33296	16
1962	34310	34299	11
1963	36850	36832	18
1964	35171	35156	15
1965	35316	35282	34
1966	35973	35997	-24
1967	36176	36192	-16
1968	37623	37655	-32
1969	38966	38994	-28
1970	38710	38721	-11
1971	38975	38981	-6
1972	39371	39374	-3
1973	39958	39958	0
1974	39464	39458	6
1975	40061	40061	0
1976	40216	40216	0

Year	HMD	COD	HMD-COD
1984	42581	42580	1
1985	44372	44372	0
1986	43560	43666	-106
1987	44959	44989	-30
1988	45354	45404	-50
1989	45173	45241	-68
1990	46021	46041	-20
1991	44923	44822	101
1992	44731	44736	-5
1993	46597	46623	-26
1994	44071	44076	-5
1995	45190	45182	8
1996	43860	43919	-59
1997	44595	44646	-51
1998	44112	44270	-158
1999	45170	45114	56
2000	44002	44018	-16
2001	43981	43977	4
2002	44465	44401	64
2003	42478	42550	-72
2004	41200	41257	-57
2005	41232	41152	80
2006	41253	41242	11
2007	41954	41963	-9
2008	41712	41716	-4
2009	41449	41342	107

1977	39824	39824	0
1978	40682	40682	0
1979	41632	41629	3
1980	41340	41342	-2
1981	41893	41893	0
1982	41454	41454	0
1983	42224	42223	1

2010	41499	41442	57
2011	41393	41304	89
2012	41992	41913	79
2013	41282	41178	104
2014	40394	40344	50
2015	40727	40686	41
2016	40726	40609	117

Note: The difference between the HMD total death count and the cause-of-death count is positive when the number of deaths which have taken place in years past but which cause has been registered in a later year is higher than the number of deaths which have not been included for that year because of delays in registering the cause. It is negative when the opposite situation occurred.

Appendix 3. Recorded non-UCD codes.

Original cause	Target cause	Type
A09_	A099	obsolete
A90_	A979	obsolete
A91_	A979	obsolete
C80_	C809	obsolete
C832	C839	obsolete
C834	C839	obsolete
C842	C849	obsolete
C843	C849	obsolete
C850	C859	obsolete
C912	C919	obsolete
C945	C947	obsolete
C961	C969	obsolete
C963	C969	obsolete
C97_	C969	non-UCD
D463	D469	obsolete
D752	D759	obsolete
F100	X45_	non-UCD
F110	X42_	non-UCD
F130	X41_	non-UCD
F150	X41_	non-UCD
F160	X42_	non-UCD
F190	X40_	non-UCD
G903	G909	obsolete
I150	I139	non-UCD
I220	I212	non-UCD
I221	I212	non-UCD

I228	I212	non-UCD
I229	I212	non-UCD
I252	I258	non-UCD
I48_	I489	obsolete
I848	K649	obsolete
I849	K649	obsolete
K350	K358	obsolete
K351	K358	obsolete
K359	K358	obsolete
K85_	K859	obsolete
L89_	L899	obsolete
M725	M729	obsolete
N180	N189	obsolete
N188	N189	obsolete
P709	P969	non-UCD
R501	R509	obsolete
R95_	R959	obsolete