

WHO Application of ICD-10 for
low-resource settings initial
cause of death collection

**The Simple Mortality List
(ICD-10-SMoL)**

V1.03



World Health
Organization



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V1.01: corrected numbering: 5-75 is now “Diseases of skin and subcutaneous tissue” (formerly 5-76; 5-75 was missing); 5-76 is “Diseases of the musculoskeletal system and connective tissue” (formerly duplicate 5-77)

V1.02: reinstated missing codes for ‘syphilis’ and ‘other sexually transmitted diseases’

V1.03: edited main title, aligned death certificate form with the 2016 update of ICD-10, and variables accordingly

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TABLE OF CONTENTS

| | |
|--|-----------|
| INTRODUCTION | 5 |
| THE STRUCTURE | 5 |
| USE OF THE SMOL | 5 |
| PREREQUISITES | 5 |
| DEATHS IN THE HOSPITAL SYSTEM | 7 |
| Investments | 7 |
| Implementing a simple system | 8 |
| Materials | 9 |
| APPENDIX 1 MINIMUM VARIABLES FOR CAUSE OF DEATH COLLECTION | 11 |
| Minimum Hospital Dataset | 11 |
| International Medical Certificate of Cause of Death | 12 |
| Minimum Statistical Dataset recommended for Civil Registration | 13 |
| Optional additional cause of death variables for data quality and epidemiology | 14 |
| APPENDIX 2 – ICD-10 SIMPLIFIED MORTALITY LIST (ICD-SMOL) | 15 |

Introduction

The SMoL has been designed to be in line with the ICD, and informs setting public health priorities and tracking progress towards national and international targets and goals such as the post-2015 health and development agenda. This list is designed to be a first step towards standardized reporting of causes of death.

Countries lacking the capacities to code to ICD 3- or 4-digits should use the Simple Mortality List. Wherever capacity exists or completeness of reporting is sufficient, the full ICD should be used, ideally in combination with electronic coding tools.

The Structure

The SMoL is based on the ICD general mortality special tabulation list, but it includes categories for maternal and perinatal deaths, and some detail proven useful in GBD. Added detail includes: leprosy; syphilis; dengue; hepatitis B; confirmed tuberculosis; confirmed malaria; benign neoplasms; alcohol; other substance abuse; liver cirrhosis; obstructed labour; maternal haemorrhage; maternal sepsis, prematurity; low birth weight; few malformations; poisoning: alcohol, drug, food. Some of the additions are optional. Atherosclerosis has been removed as it is redistributed in all statistics. Users are free to add additional detail as long as that detail allocated within the framework provided by the categories of this simple mortality

Instructions in the SML instruct what to include or exclude in certain categories. These instructions are indicated by the terms “includes” or “excludes”.

Use of the SMoL

The cause(s) of death are reported on a standard WHO medical certificate of cause of death. The underlying cause is coded with the SMoL. Reported causes, age, sex, location and the code of the underlying cause of death are recorded for every individual case.

Prerequisites

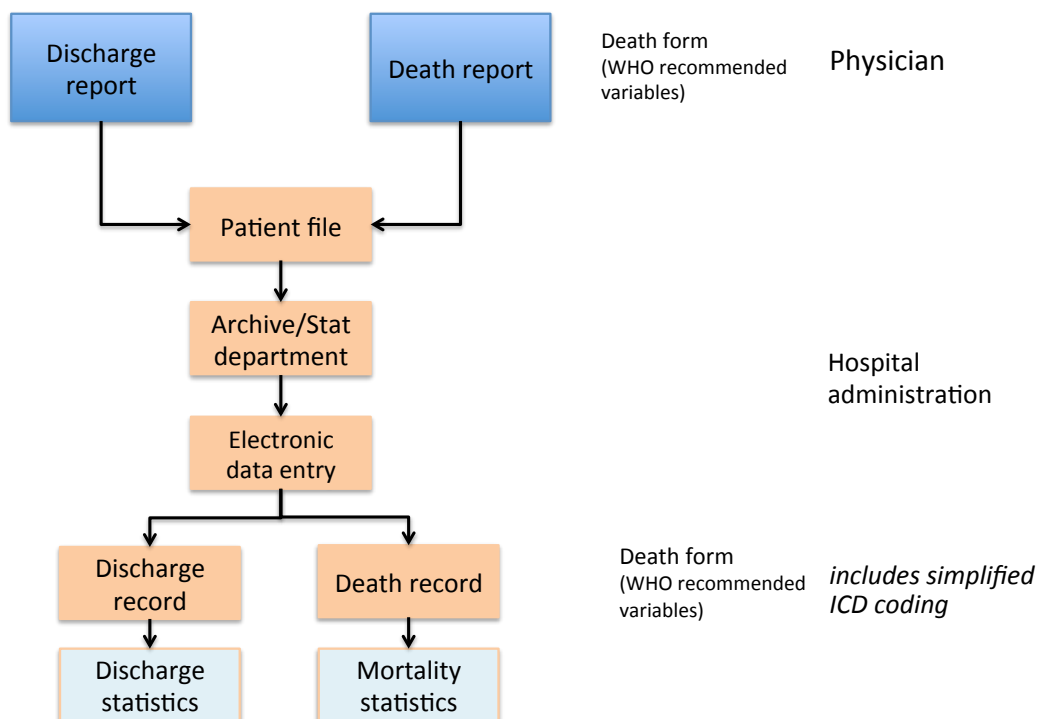
Implement the WHO medical certificate of cause of death.

Physicians are trained in filling in the WHO medical certificate of cause of death.

Ideally, a list of causes reported on local death records is compiled (local index or dictionary) and linked to the SMoL. A coding specialist and a separate ICD correspondence list will help to pre-code the local list of terms with the help of the ICD index.

The workflow for collection of cause of death information is not different from the one for formulating and archiving a hospital discharge report.

Framework - ICD



Deaths in the Hospital System

Health care facilities, especially hospitals, are critical sources of data on mortality by age, sex and cause. These statistics are important markers of quality of hospital care and provide essential inputs for national and subnational health policy and planning. Facility-based mortality statistics should be seen as part of the backbone of a country system of continuous mortality data collection and as key elements of the civil registration and vital statistics (CRVS) system, for example, through notification of deaths and associated characteristics to civil registries.

Hospitals should routinely report diagnoses and deaths for administration and quality assurance purposes. Physicians should be assigned responsibility for certifying deaths and in particular their causes. They should have the training and skills necessary to do so in accordance with global standards, namely the International Classification of Diseases (ICD). Every death can be seen by a physician and has been diagnosed during the stay in the hospital. In addition, the health care system can link to other sources of mortality data, for example mortuary data. Thus, hospital reporting is a good starting point for the collection of statistics on mortality, including causes of death.

Investments

Time, money and personnel are necessary for:

1. **Planning**, national coordination, and ongoing monitoring of the mortality collection system
2. **Sharing Information** about the strategy, the project and its progress with stakeholders and involved parties
3. **Building an infrastructure** that has at least one electronic data collection point per facility
4. **Establishing a process** and an infrastructure that makes sure the reported **information is forwarded** to the subnational and national level.
5. **Ensuring** that data collection and management **personnel** can input data and keep the system functioning at local, subnational and national level
6. **Conducting training** and refresher courses for managers, physicians, data personnel and other involved parties; material needs to be adapted and translated
7. **Analyzing** the data and dissemination of the information
8. **Piloting** tools, training, and workflows
9. **Establishing** and running a national **centre of excellence** that can provide technical support

Implementing a simple system

Implementing a simple system for collection of mortality and causes of death information should be done with scalability and sustainability in mind, in terms of the level of cause specific detail, completeness and timeliness of hospital reporting, and mechanisms for dealing with deaths that occur outside the hospital.

Some specific aspects that relate to the implementation of a simple system for collection of causes of death are mentioned here:

1. Even in settings where physicians are not always available to ensure medical certification of cause of death, all deaths occurring in hospitals and other health facilities should be reported by age, sex, date of death and location (see also Annex for additional variables).
2. It is essential to be clear that the initial hospital admission diagnosis is not identical with the eventual cause of death. Causes of death must always be reported and stored separately from information on the initial diagnosis and treatments received.
3. Reporting forms for causes of death – whether electronic or in paper – should be in line with ICD standards. In such way, the system can be expanded at later stages without troubling the physicians, and preexisting training material can be easily reused.
4. A simplified list of causes of death (see Annex – Simplified Mortality List) can deliver data in a timely manner and keep the burden of implementing a coding system low in new mortality systems. This list is fully compatible with ICD, so that expansion into more detail at a later stage is easily possible. This compatibility also facilitates comparison of so collected data with other sources.
5. Training of physicians is critical to success. The physicians need to understand the concept of underlying cause of death, the notion of the sequence of events that lead to death, and the importance of reporting complete diagnoses. Good input from certifying physicians at the beginning will result in useful data and simplify the task for statistical coders.
6. The coders need to be able to transform the reported terms into statistical ICD codes; a local index containing all terms that are usually reported will facilitate this task, in conjunction with a set of simplified coding instructions and related training. Later, there may be expansion to centralized coding and use of automated systems.
7. Data analysis and reporting back to the originators allow for quality assurance and motivate the physicians to provide good quality input to the system.

Materials

A set of materials is made available in support of designing the process and conducting training:

1. **Short list of causes** of death that is in line with ICD has been designed by WHO
2. Simple **coding instructions**
3. Instructions for creation a **local or national index**
4. **Training material** for physicians
5. **A template plan for** designing and **rollout** of ICD and cause of death data collection in hospitals.

Appendix 1 Minimum Variables for Cause of Death Collection

Even in settings where physicians are not always available to ensure medical certification of cause of death, all deaths occurring in hospitals and other health facilities should be reported by age, sex, date of death and location.

In case the data collection is expanded to serve also for purposes of civil registration, the dataset recommended by the UN Statistical Division should be included.

In a second implementation step also the optional additional variables about the circumstances of the death may be collected, where possible. They allow for data edits and provide epidemiologically relevant information for maternal and perinatal cases.

Dead on arrival cases should not be included in the data collection.

Minimum Hospital Dataset

Variables that need to be collected for cause of death information are:

1. Hospital ID
2. Case ID
3. Age (for neonates in hours, infants in months, children and adults in completed years)
4. Sex (male, female, undefined)
5. Causes of death (see detail below)
6. Reason for admission to the hospital after assessment
7. Pregnancy status (pregnant, intrapartum/delivery, puerperium, none)
8. Foetal death (yes /no)

International Medical Certificate of Cause of Death

Causes of death should be collected using the international form of medical causes of death wherever possible.

| Medical data | | | | |
|--|-------|--|-----------------------------|-----------------------------------|
| 1 Report disease or condition directly leading to death on line a Report chain of events leading to death in 'due to' order (if applicable) State the underlying cause on the lowest used line | | | Cause of death | Time interval from onset to death |
| | | a | immediate (direct) cause | |
| | | b | due to | |
| | | c | due to | |
| | d | due to | | |
| 2 Other significant conditions contributing to death (time intervals can be included in brackets after the condition) | | | | |
| Manner of death | | | | |
| <input type="checkbox"/> Disease <input type="checkbox"/> Assault <input type="checkbox"/> Could not be determined <input type="checkbox"/> Accident <input type="checkbox"/> Legal intervention <input type="checkbox"/> Pending investigation <input type="checkbox"/> Intentional self-harm <input type="checkbox"/> War <input type="checkbox"/> Unknown | | | | |
| Fetal or infant death | | | | |
| Multiple pregnancy? | | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| Stillborn? | | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| If death within 24h specify number of hours survived (if known) | _____ | Birth weight (in grams) | | _____ |
| Number of completed weeks of pregnancy | _____ | Age of mother (years) | | _____ |
| If death was perinatal, please state conditions of mother that affected the fetus and newborn | | | | |
| For women , was the deceased pregnant? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown | | | | |
| <input type="checkbox"/> At time of death | | <input type="checkbox"/> Within 42 days before the death | | |
| <input type="checkbox"/> Between 43 days up to 1 year before death | | <input type="checkbox"/> Unknown | | |
| Did the pregnancy contribute to the death? | | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |

Not all the detail information asked for may always be available. Hospital records usually will have that information, because this information is also retained for medical purposes.

Minimum Statistical Dataset recommended for Civil Registration (UNSD)

This detail is the minimum mortality dataset to be collected for statistical purposes in civil registration recommended by the United Nations Statistical Division. Many will be also routinely collected as part of the facility or community cause of death collection. WHO recognizes that not all data may be able to be collected in emerging systems.

For all deaths:

(i) Characteristic of the event

1. Date of occurrence
2. Place of occurrence
3. Place of registration
4. Cause of death
5. Certifier

(ii) Characteristics of the decedent

1. Date of birth
2. Sex
3. Marital status
4. Place of usual residence
5. Place of usual residence of the mother (for deaths under one year of age)

For foetal deaths add the following:

(iii) Characteristics of the mother

1. Date of birth
 2. Date of last previous live birth
 3. Previous live births
 4. Previous stillbirths
 5. Previous abortions
 6. Date of marriage
 7. Place of usual residence

(iv) Characteristics of the father

1. Date of birth
2. Place of usual residence

Optional additional cause of death variables for data quality and epidemiology that are not part of the SMoL certificate of cause of death

This detail may improve the quality of coding, and can also be input in existing automated coding tools. WHO recognizes that not all data may be able to be collected in emerging systems.

1. Surgery

- a. Date of surgery
- b. Reason for surgery

2. Autopsy

- a. Findings included

3. External cause description

- a. Date of injury, place of occurrence of external cause
- b. Whether or not coronial investigation ordered

4. Perinatal

- a. Age of mother
- b. Birth weight

5. Maternal

- a. Time of death in relation to delivery birth
- b. Pregnancy contribution to death

6. Maternal monitoring

- a. Previous live births
- b. Previous stillbirths
- c. Previous abortions
- d. Antenatal care
- e. Attendant at birth
- f. Place of delivery
- g. Delivery type

Appendix 2 – ICD-10 Simplified Mortality List (ICD-SMoL)

For neonatal and maternal cases, look up the neonatal and maternal section first.

Follow the exclusions at the beginning of the sections. Injuries are coded to the originating external cause.

Note: There is no reference to chapter 19 of ICD-10, because in single cause tabulation the external cause is tabulated, and not the injury.

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-----------------------------|--------|---|---|--|
| ICD-10 chapter 1 | | Certain infectious and parasitic diseases | | excludes respiratory infections not listed here |
| | 5-1 | Cholera | | |
| | 5-2 | Typhoid and paratyphoid | | |
| | 5-3 | Other and unspecified diarrhoeal diseases | | includes gastroenteritis |
| | 5-4 | Tuberculosis | | excludes HIV disease, with tuberculosis |
| | 5-4.1 | | Respiratory tuberculosis, confirmed bacteriologically or histologically | |
| | 5-4.9 | | Other tuberculosis | |
| | 5-5 | Plague | | |
| | 5-6 | Leprosy | | |
| | 5-7 | Tetanus | | |
| | 5-8 | Diphtheria | | |
| | 5-9 | Whooping cough | | |
| | 5-10 | Meningococcal infection | | includes meningococcal meningitis, excludes unspecified meningitis (see nervous section) |
| | 5-11 | Septicaemia | | |
| | 5-12 | Infections with a predominantly sexual mode of transmission | | |
| | 5-12.1 | | Syphilis | |
| | 5-12.9 | | Other and unspecified infections with a predominantly sexual mode of transmission | |
| | 5-13 | Acute poliomyelitis | | |
| | 5-14 | Rabies | | |
| | 5-15 | Dengue | | |
| | 5-16 | Yellow fever | | |
| | 5-17 | Other viral haemorrhagic fevers | | |
| | 5-18 | Measles | | |

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-------------------------------------|--|---|--------------------------------------|---|
| ICD-10 chapter 1 - continued | Certain infectious and parasitic diseases | | | excludes respiratory infections not listed here |
| | 5-19 | Viral hepatitis | | |
| | 5-19.1 | | Hepatitis B | |
| | 5-19.8 | | Other viral hepatitis | |
| | 5-19.9 | | Unspecified viral hepatitis | |
| | 5-20 | Human immunodeficiency virus [HIV] disease | | |
| | 5-20.1 | | HIV disease with tuberculosis | |
| | 5-20.2 | | Other and unspecified HIV disease | |
| | 5-21 | Malaria | | |
| | 5-21.1 | | Malaria, parasitologically confirmed | |
| | 5-21.9 | | other and unspecified malaria | |
| | 5-22 | Leishmaniasis | | |
| | 5-23 | Trypanosomiasis | | |
| | 5-24 | Schistosomiasis | | |
| | 5-25 | Other and unspecified infectious diseases | | |
| ICD-10 chapter 2 | Neoplasms | | | includes all neoplasms (cancer) of all organ systems |
| | 5-26 | Malignant neoplasm of lip, oral cavity and pharynx | | |
| | 5-27 | Malignant neoplasm of Oesophagus | | |
| | 5-28 | Malignant neoplasm of stomach | | |
| | 5-29 | Malignant neoplasm of colon, rectum and anus | | |
| | 5-30 | Malignant neoplasm of liver and intrahepatic bile ducts | | |
| | 5-31 | Malignant neoplasm of pancreas | | |
| | 5-32 | Malignant neoplasm of larynx | | |
| | 5-33 | Malignant neoplasm of trachea, bronchus and lung | | |
| | 5-34 | Malignant melanoma of skin | | |
| | 5-35 | Malignant neoplasm of breast | | |
| | 5-36 | Malignant neoplasm of cervix uteri | | |
| | 5-37 | Malignant neoplasm of other and unspecified parts of uterus | | |
| | 5-38 | Malignant neoplasm of ovary | | |

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-------------------------------------|--|---|----------------------|---|
| ICD-10 chapter 2 - continued | Neoplasms | | | includes all neoplasms (cancer) of all organ systems |
| | 5-39 | Malignant neoplasm of prostate | | |
| | 5-40 | Malignant neoplasm of bladder | | |
| | 5-41 | Malignant neoplasm of meninges, brain and other parts of central nervous system | | |
| | 5-42 | Non-Hodgkin lymphoma | | |
| | 5-43 | Multiple myeloma and malignant plasma cell neoplasms | | |
| | 5-44 | Leukaemia | | |
| | 5-45 | Other and unspecified malignant neoplasms | | |
| | 5-46 | Benign neoplasms | | |
| ICD-10 chapter 3 | Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism | | | excludes neoplasms (cancers) |
| | 5-47 | Anaemias | | |
| | 5-48 | Other diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism | | |
| ICD-10 chapter 4 | Endocrine, nutritional and metabolic diseases | | | excludes neoplasms (cancers) |
| | 5-49 | Diabetes mellitus | | |
| | 5-50 | Protein-energy malnutrition | | |
| | 5-51 | Other and unspecified endocrine, nutritional and metabolic diseases | | |
| ICD-10 chapter 5 | Mental and behavioural disorders | | | |
| | 5-52 | Alcohol use disorders | | |
| | 5-53 | Drug use disorders | | |
| | 5-54 | Other mental and behavioural disorders | | |
| ICD-10 chapter 6 | Diseases of the nervous system | | | excludes neoplasms (cancers) |
| | 5-55 | Meningitis | | |
| | 5-56 | Alzheimer's disease, dementias | | |
| | 5-57 | Other diseases of the nervous system | | |

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-----------------------------|------|---|----------------------|---|
| ICD-10 chapter 7 | 5-58 | Diseases of the eye and adnexa | | excludes neoplasms (cancers) |
| ICD-10 chapter 8 | 5-59 | Diseases of the ear and mastoid process | | excludes neoplasms (cancers) |
| ICD-10 chapter 9 | | Diseases of the circulatory system | | excludes neoplasms (cancers) |
| | 5-60 | Acute rheumatic fever and chronic rheumatic heart diseases | | |
| | 5-61 | Hypertensive heart diseases | | |
| | 5-62 | Ischaemic heart diseases | | includes myocardial infarction |
| | 5-63 | Other heart diseases | | |
| | 5-64 | Cerebrovascular diseases | | |
| | 5-65 | Other and unspecified diseases of the circulatory system | | |
| ICD-10 chapter 10 | | Diseases of the respiratory system | | excludes neoplasms (cancers) |
| | 5-66 | Influenza | | |
| | 5-67 | Pneumonia | | |
| | 5-68 | Other acute lower respiratory infections | | excludes infections specified in the infectious disease section |
| | 5-69 | Chronic lower respiratory diseases | | includes chronic obstructive lung disease, asthma |
| | 5-70 | Other and unspecified diseases of the respiratory system | | |
| ICD-10 chapter 11 | | Diseases of the digestive system | | excludes neoplasms (cancers) |
| | 5-71 | Gastric and duodenal ulcer | | |
| | 5-72 | Appendicitis | | |
| | 5-73 | Liver cirrhosis | | |
| | 5-74 | Other diseases of the digestive system | | |
| ICD-10 chapter 12 | 5-75 | Diseases of the skin and subcutaneous tissue | | excludes neoplasms (cancers, melanoma of skin) |
| ICD-10 chapter 13 | 5-76 | Diseases of the musculoskeletal system and connective tissue | | excludes neoplasms (cancers) |
| ICD-10 chapter 14 | | Diseases of the genitourinary system | | excludes neoplasms (cancers) |
| | 5-77 | Glomerular and renal tubulo-interstitial diseases | | includes pyelonephritis |
| | 5-78 | Other and unspecified diseases of the genitourinary system | | includes urinary tract infection, excludes pyelonephritis |

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-----------------------------|------|---|----------------------|--|
| ICD-10 chapter 15 | | Pregnancy, childbirth and the puerperium | | excludes tetanus, external causes |
| | 5-79 | Pregnancy with abortive outcome | | |
| | 5-80 | Maternal hypertensive disorders | | |
| | 5-81 | Obstructed labour | | |
| | 5-82 | Maternal haemorrhage | | |
| | 5-83 | Maternal sepsis | | |
| | 5-84 | Other direct obstetric deaths | | excludes tetanus |
| | 5-85 | Indirect obstetric deaths | | |

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-----------------------------|---|---|----------------------|---|
| ICD-10 chapter 16 | Certain conditions originating in the perinatal period | | | excludes tetanus, external causes, malformations, neoplasms, endocrine diseases (e.g. diabetes mellitus) |
| | 5-86 | Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery | | |
| | 5-87 | Disorders relating to length of gestation and fetal growth | | |
| | 5-87.1 | | Prematurity | |
| | 5-87.2 | | Low birth weight | |
| | 5-88 | Birth trauma | | |
| | 5-89 | Intrauterine hypoxia and birth asphyxia | | |
| | 5-90 | Other and unspecified perinatal conditions | | |
| ICD-10 chapter 17 | Congenital malformations, deformations and chromosomal abnormalities | | | |
| | 5-91 | Congenital hydrocephalus and spina bifida | | |
| | 5-92 | Congenital malformations of the heart | | |
| | 5-93 | Down syndrome and other chromosomal abnormalities | | |
| | 5-94 | Other and unspecified congenital malformations | | |
| ICD-10 chapter 18 | 5-95 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified | | includes cause of death not specified, only respiratory arrest or cardiac arrest specified |

| Reference to ICD-10 chapter | Code | Cause of death | Optional subcategory | Coding hints |
|-----------------------------|---|--|---------------------------------|--|
| ICD-10 chapter 20 | External causes of morbidity and mortality | | | |
| | 5-96 | Road traffic accidents | | |
| | 5-97 | other transport accidents | | |
| | 5-98 | Falls | | |
| | 5-99 | Accidental drowning and submersion | | |
| | 5-100 | Exposure to smoke, fire and flames | | |
| | 5-101 | Exposure to forces of nature | | includes earthquake, tsunami, storm and flood |
| | 5-102 | Accidental poisoning by and exposure to noxious substances | | |
| | 5-102.1 | | Alcohol poisoning | |
| | 5-102.2 | | Drug poisoning | |
| | 5-102.3 | | Food poisoning | excludes foodborne infections (see infectious diseases) |
| | 5-102.9 | | Other and unspecified poisoning | |
| | 5-103 | Intentional self-harm | | |
| | 5-104 | Assault | | |
| | 5-105 | Conflict and war | | |
| | 5-106 | Other and unspecified external causes | | |