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CRVS best-practice and advocacy

ICD-11 and cause of death coding: useability and implications for Bloomberg Philanthropies Data for Health Initiative countries

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CRVS course prospectuses
These resources outline the context, training approach, course content and course objectives for the suite of CRVS trainings delivered through the Bloomberg Philanthropies Data for Health Initiative. Each course focuses on a specific CRVS intervention or concept, and is designed to support countries to strengthen their CRVS systems and data.

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The CRVS Fellowship Program aims to build technical capacity in both individuals and institutions to enhance the quality, sustainability and health policy utility of CRVS systems in Fellows' home countries. Fellowship reports are written by Fellows as a component of the program, and document, in detail, the research outcomes of their Fellowship. Fellowship profiles provide a summary of Fellows' country context in relation to CRVS, an overview of the Fellowship experiences, the research topic and the projected impact of findings.

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Generated through the Initiative, CRVS best-practice and advocacy resources are based on a combination of technical knowledge, country experiences and scientific literature. These resources are intended to stimulate debate and ideas for in-country CRVS policy, planning, and capacity building, and promote the adoption of best-practice to strengthen CRVS systems worldwide.

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Interactive and practical resources designed to influence and align CRVS processes with established international or best-practice standards. These resources, which are used extensively in the Initiative's training courses, aim to change practice and ensure countries benefit from such changes by developing critical CRVS capacity among technical officers and ministries.

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ICD-11 and cause of death coding: useability and implications for Bloomberg Philanthropies Data for Health Initiative countries

This report provides a review of the general and specific features of ICD-11 as advised by the WHO during an ICD-11 training of trainers' course in Geneva in February 2020. The report discusses the useability of ICD-11 and implications for D4H countries, particularly regarding mortality coding.

Key points

- The eleventh revision of the ICD (ICD-11) has been developed and updated to include recent advances in medicine and information technology.
- ICD-11 entities and terms are language independent, allowing the content to be translated into any language. Multilingual browsing is also possible.
- The ICD-11 tooling environment includes a browser that allows coders to search causes using text-based terms and identify all possible cause categories available related to each search term, and the ICD-11 coding tool that allows coders to use single terms or a combination of texts/terms for looking a list of possible matched causes along with clinical details and the matched codes.
- Guidelines and mortality coding rules for ICD-11 remain similar to ICD-10.
- Implications for using ICD-11 for mortality coding differ according to coding practices used. This report discusses the implications for the three potential coding environments: (1) Iris automated coding (2) Decision table based manual coding, and (3) Coding with Start-up Mortality Rules (SMoL).
- While the ICD-11 has kept the current standard set of selection and modification rules to identify the UCOD, it is unclear how to apply these selection rules in automated and decision table based manual coding in the absence of updated coding software and decision tables for ICD-11. Until these tools have been developed (the WHO is currently working with the Iris Institute to do this), the scope of using the ICD-11 coding tool for the purpose of mortality coding is limited.

Background

Under the Bloomberg Philanthropies Data for Health (D4H) Initiative, implementing partners are currently working with governments (at both national and sub-national levels) across a number of low- and middle-income countries to strengthen their public health data and improve the way they use this information to make policy decisions and public health investments. This includes working with countries to produce reliable mortality and cause of death data.

Reliable knowledge on mortality and causes of death in a population is critical for public health policymaking. The single underlying cause of death (UCOD) is identified from death certificates and used for statistical tabulation and public health purposes. The International Classification of Diseases and Related Health Problems (ICD), managed by the World Health Organisation (WHO) provides global standards for identifying, recording, reporting and grouping conditions and factors that influence health. The ICD assists with the translation of the diagnoses written on a death certificate into an alphanumeric code, and includes a set of standard selection and modification rules to help identify an UCOD. The purpose of the ICD is to allow the systematic recording, analysis, interpretation and comparison of mortality and morbidity data collected in different countries or areas and at different times.

The tenth revision of ICD (ICD-10) is currently being used by most countries. The World Health Assembly, however, has approved an eleventh revision of ICD (ICD-11) and all WHO Member States are expected to eventually transition to this version for reporting death and illness.[1] ICD–11 is now available in all six official WHO languages (English, French, Spanish, Russian, Chinese and Arabic).

1 In accordance to an international treaty, the 'WHO Nomenclature Regulations', adopted by the World Health Assembly in 1967.

General features of ICD-11

ICD-11 has been developed and updated to incorporate recent scientific and information technology (IT) developments. ICD-11 is fully digital and able to be implemented through a standard information platform such as the District Health Information Software, Version Two (DHIS2) or EMRS (among others) and be linked with other relevant classifications and terminologies. It is designed to improve usability and is characterised by features that require less training than necessary for earlier versions, including a text-based Google-type search function, the addition of clinical details to aid diagnoses, and automated selection of codes. Users can work with the coding tool either online (through the ICD-11 website) or offline when the tool is downloaded and installed into their information platform.

ICD-11 entities and terms are language independent, allowing the content to be translated into any language. Multilingual browsing is also possible.

ICD-11 is available online at: https://icd.who.int

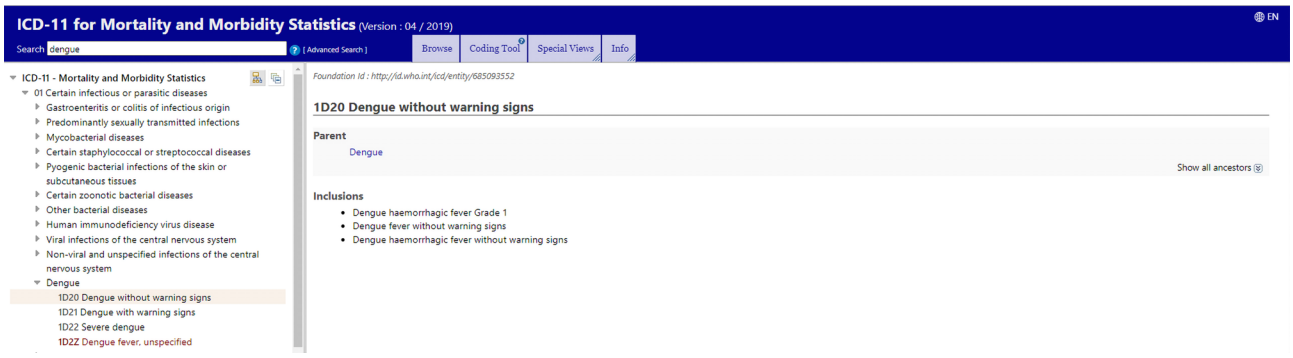
ICD-11 tooling environments

1. ICD-11 browser

Available at: https://icd.who.int/browse11/l-m/en

The browser tool **(Figure 1)** allows coders to search causes using text-based terms and identify all possible cause categories related to each search term. Through the browser, users can also view the clinical details associated with the selected cause.

Figure 1: ICD-11 browser, example cause search (dengue, without warning signs)

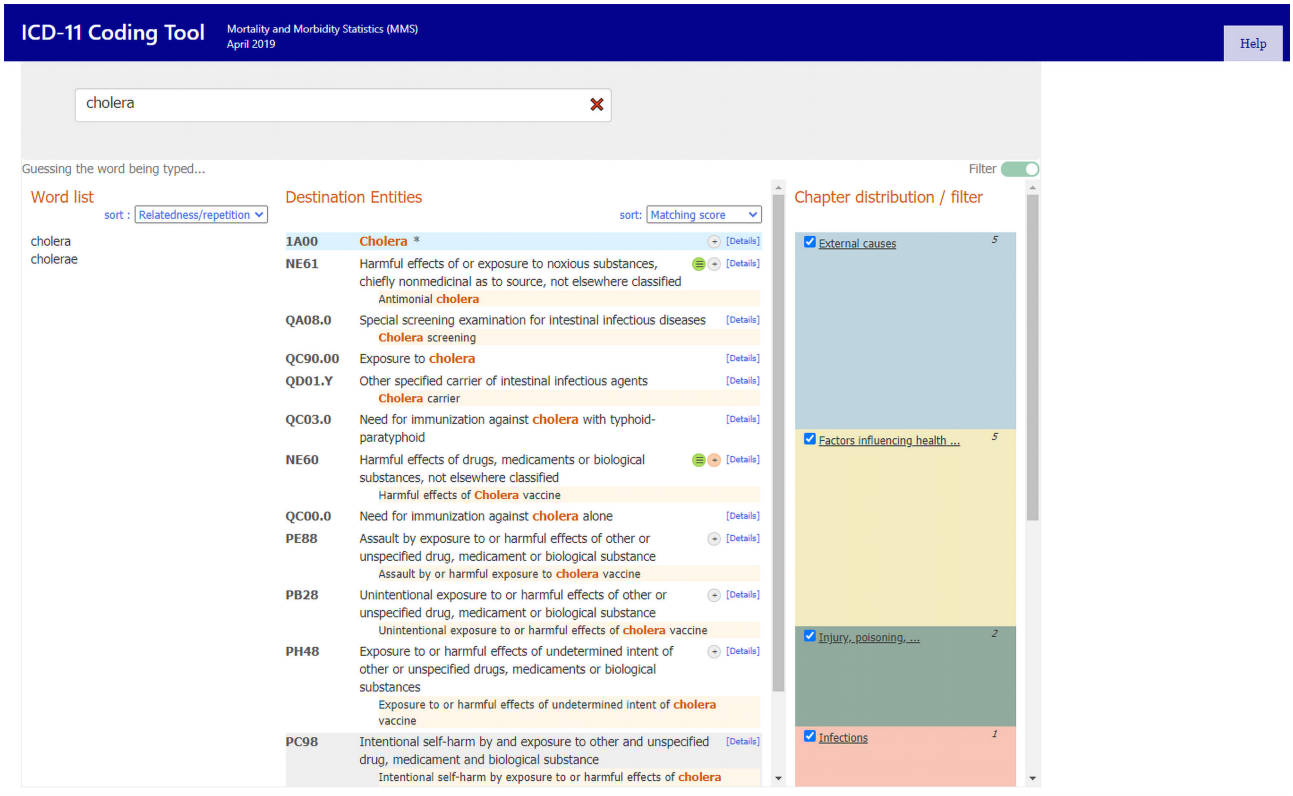


2. ICD-11 coding tool

Available at: https://icd.who.int/ct11/icd11_mms/en/release

The ICD-11 coding tool allows coders to use single terms or a combination of texts/terms to search a list of possible matched causes along with clinical details, with the best ICD fit appearing at the top of the search returns **(Figure 2)**. The key features of coding tool are: (1) searchability of all terms in the ICD-11 foundations and provision of guidance to select the best ICD-11 code fit under the morbidity and mortality classification systems (MMS), (2) suggested clickable word completion and prediction functionality embedded in search function (rather than manually typing the next word/words), (3) smart-search enabled, allowing recognition of partial or related words (e.g. spelling variants such as tuberculosis/ tuberculous, edema/oedema).

Figure 2: ICD-11 coding tool, example code search (cholera)



3. ICD Application Programming Interface (API)

Available at: https://icd.who.int/icdapi

ICD API is a software that allows programmatic access to ICD. ICD API allows users to search and interpret ICD-11 categories and index terms (currently over 105 000 medical diagnostic terms) using an index-based search algorithm, and displays the search results along with selected codes or combination codes.

ICD API is easy to deploy (available online and offline) using 'Docker' container software, for integration into a standard information platform such as DHIS2 or EMIS.

Mortality coding using ICD-11

The guidelines for mortality coding using ICD-11, regarding the selection of a single cause or condition for routine tabulation from death certificates, remain similar to ICD-10. ICD-11 guidelines for the application of the rules in selecting a single UCOD from causes recorded on a death certificate and its coding for tabulation are almost identical to ICD-10. A handful of minor changes have been made to enhance user understanding and application, such as the simplification of language and the presentation of instructions in a template for easier application of the rules.

Every code or code range in the instructions has been reviewed and revised to reflect any changes. As an example, the cumbersome code range specification 'Viral infections of the central nervous system [CNS] (A80-A86) excluding certain atypical virus infections of the CNS (A81.2-9)' is now specified as simply 'Viral infections of the central nervous system (1C80-1C8Z)', with the atypical cases moved to the nervous system chapter. Some code ranges mentioned in the rules now require more detailed specification.

Coding rules have been reviewed against any major structural changes present in ICD-11, for example:

- Change in the axis for road traffic injury events
- Poisoning, an external cause, has been classified in further detail as an injury (see ICD-11 Chapters 22 and 23)
- The clinical definition and the structure of sepsis/septicaemia/SIRS are quite different in ICD-11. Specific types of sepsis now cannot be given a single code, instead sepsis must be coded with an additional code noting the presence or absence of septic shock.
- Anaphylaxis has been reclassified from 'external causes' (ICD-10) to chapter 4 'diseases of the immune system' (ICD-11 Chapter 4)
- Four-character codes for diabetes-related mortality with complications have been eliminated
- Stroke is now classified under 'nervous system' (instead of 'circulatory system')

Implications for cause of death coding practices

Implications for countries looking to transition to ICD-11 differ according to the type of mortality coding practices used, and are discussed below for the following three types of coding practices used: (1) Iris automated coding, (2) Manual mortality coding and decision tables for selecting the UCOD, and (3) Start-Up Mortality List (SMoL) rules for selecting underlying cause of death.

1. Countries using Iris automated coding

In order to revise Iris to work with ICD-11 codes and rules, it is necessary to change an integral part of the software: the decision tables, which contain all the ICD codes and rules. These tables will need to be completely adapted for the ICD-11 coding structure and any changes in coding and selection rules.

The ICD-11 rules for mortality coding will stay much the same as in ICD-10. This will hopefully enable the reuse of much of the current programming of Iris as well as the basic structure of the decision tables.

Major changes in medicine over the past two decades have greatly affected the content and structure of the ICD-11 codes. In addition, the ICD-11 structure will promote the use of multiple codes to represent a single disease description. This has the potential to impact the structure of decision tables as well.

In order to evaluate the impact of ICD-11 on Iris and the decision tables, the Iris Core Group has agreed to initiate an evaluation project to assess the best way to adapt Iris for use with ICD-11 and to estimate the resources needed to fully translate Iris to an ICD-11 based version. This project will also address possible enhancements to the Iris software due to the new IT-infrastructure of ICD-11. Country-specific needs in the realm of possible future implementation of ICD-11 and Iris are not a focus of the project.

The evaluation has been financed by the Australian Bureau of Statistics (ABS) to be conducted by the University of Udine (UNIUD) and the Italian National Institute of Statistics (Istat).

Countries who currently use ICD-10 based Iris automated mortality coding system (e.g. the Philippines) can continue to do so. However, they may consider upgrading their system to the most recent version of Iris (currently Version 5.7). Iris Version 5.7 uses the Multicausal and Unicausal Search Engine (MUSE) for the use of decision tables and application of mortality coding rules. Upgrading to the latest version of Iris may be helpful for the future transition into ICD -11.

2. Countries using manual mortality coding and decision tables

Countries under this category train mortality coding staff in the application of ICD selection and modification rules to select the UCOD using mortality decision tables. Coders using mortality decision tables must first code all the causes recorded on the death certificate into ICD codes, and then use the decision tables to understand causal relationships and apply mortality coding rules to select a final UCOD.

Although the WHO technical team have kept the ICD-11 coding rules the same as ICD-10, they have significantly changed the structure of the ICD-10 codes. The Iris Institute, who is now in charge of the maintenance of mortality decision tables, is yet to release an update with ICD-11 codes. This is currently in progress.

In the absence of decision tables for ICD-11, the only option available is to manually code mortality without the help of mortality decision tables. This option is only possible, however, with well experienced coders with a sound medical background.

For any country under intense pressure to move to ICD-11 coding at the earliest possibility (for example, in situations of political pressure or where there is an intention to imminently switch to electronic medical records and electronic death certificates), there are three possible options (although none of them ideal):

1. Coders apply mortality coding rules manually without the help of the mortality decision tables as described above, coding the selected UCOD in ICD-11. This has been the practice in many countries predating the introduction of MMDS tables.
2. Continue ICD-10 MMDS decision table-based mortality coding practices, translating or mapping the ICD-10 underlying cause of death codes into ICD-11.
3. Switch to SMoL rules to identify the UCOD, using this text to get the ICD-11 codes from the ICD-11 coding tool. A note that this is not a recommended option for countries using the full version of ICD-10.

With the unavailability of ICD-11 updated Iris mortality coding and mortality decision tables, at this stage, the University of Melbourne's D4H technical team do not advise D4H countries to use ICD-11. Countries should continue with their current practice of using ICD-10 decision tables to select an UCOD

3. Countries using the SMoL rules for selecting underlying cause of death

SMoL rules have been designed to align to ICD for use in low-resource settings to report and track progress towards national and international targets and set public health priorities. SMoL rules are a set of simplified rules in selecting an UCOD. For this category of countries wishing to switch to ICD-11, the WHO recommends using SMoL rules for the selection of the UCOD and then coding the selected conditions using ICD-11 coding tool.[2]

Conclusion

ICD-11 is the new global standard for recording, reporting and measuring health and health services. The electronic coding tool component of ICD-11 and its improved features, including the Google-like search functionality and automated selection of codes, make this a unique tool for searching and allocating an alphanumeric code for reporting and analysing data. ICD-11 is its present form is a user-friendly method for coding, particularly for morbidity. Mortality coding is a more complex process that requires coding all causes recorded on death certificates and then identifying a single UCOD. Although the ICD-11 has kept the current standard set of selection and modification rules to identify the single UCOD, it is unclear how to apply these selection rules in the absence of updated decision tables for ICD-11. The WHO is currently working with the Iris Institute to develop an automated coding strategy to select the UCOD. Until these tools have been developed, the scope of using the ICD-11 coding tool for the purpose of mortality coding is limited.

2 For more information, visit: https://www.who.int/healthinfo/civil_registration/ICD_10_SMoL.pdf?ua=1

Bloomberg Philanthropies DATA FOR HEALTH INITIATIVE

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The program partners on this initiative include: The University of Melbourne, Australia; CDC Foundation, USA; Vital Strategies, USA; Johns Hopkins Bloomberg School of Public Health, USA; World Health Organization, Switzerland.

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