

Abstract Norway has since 2017 monitored the development of ICD-11 and assessed suitable approaches for providing ICD-11 to the stakeholders presently using ICD-10. Consignments from the Ministry of Health and Care Services were given the last two years to prepare for transition to ICD-11. The work was recently outlined to proceed in the following four tracks of different scope and duration; *Communication with stakeholders, Translation, Interplay between ICD-11, SNOMED CT and other code systems, and Investigation of national use and maintenance of ICD-11*. This poster describes the initial rationale behind these work tracks.

Introduction

ICD-10 was introduced in Norway in 1999 and is now widely used, most importantly within specialized health care, for national and international reporting and partly for financing.

Figure 1 visualizes the value chain of health data for primary and secondary use. The data is for example used for enhancing the health care service and improving quality through analysis and research, and for creating priorities and policies.

More than 50 known entities have integrated ICD-10 in their systems for classifying health data, reporting and analysis (Figure 2).

While recording precise health data is crucial, the ability to share and reuse these data accurately, retaining data integrity, require a framework of careful and competent information management and governance. This is a key priority in all the project work tracks.



Figure 1. Value chain of health data.

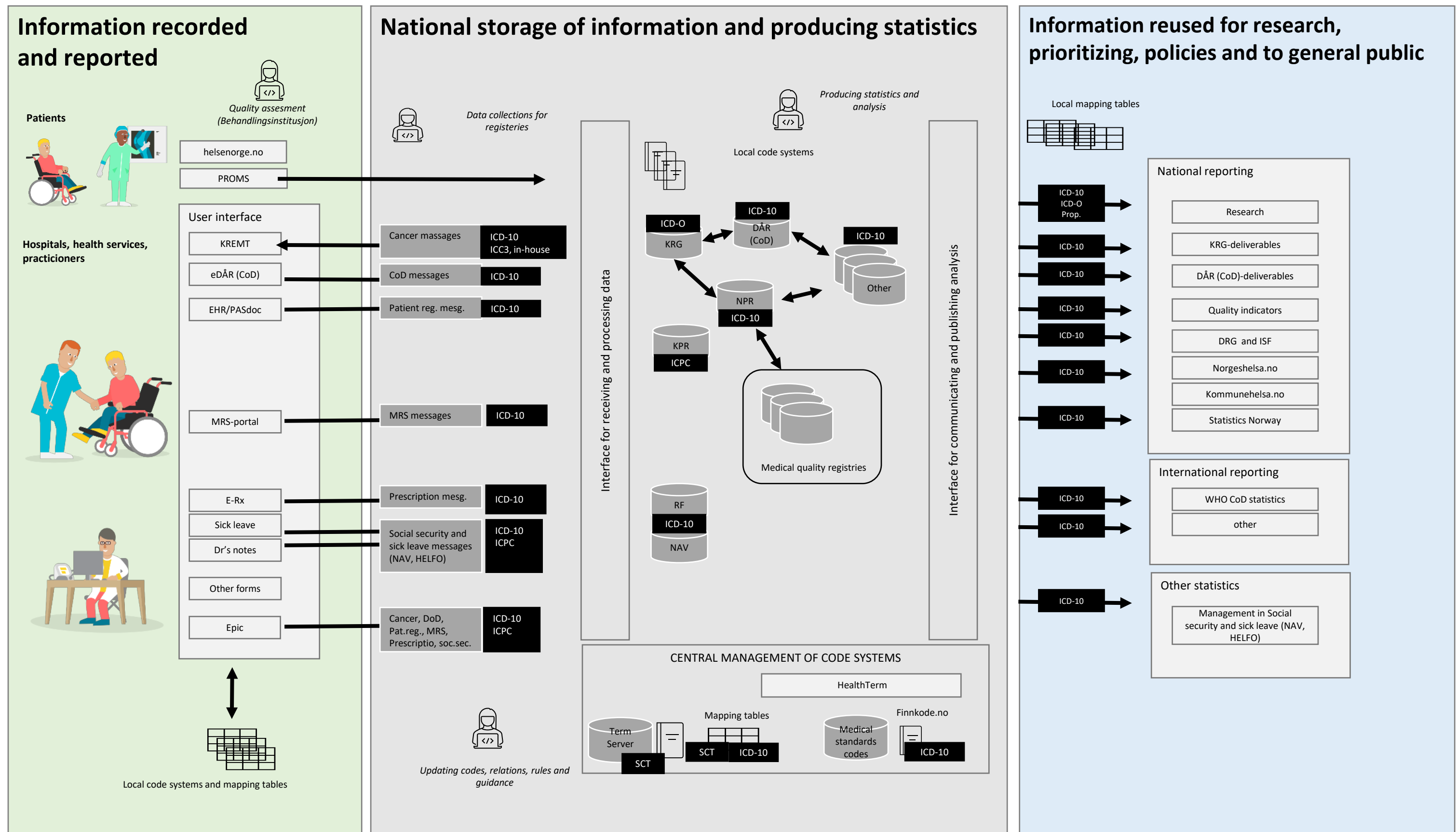


Figure 2. Selected entities where ICD-10 is used in Norway.

Offering an accurate and up-to-date medical classification to health care workers is essential to assure high quality health data. The closed loop in Figure 1 indicates how accurate data can improve health care fit for each patient, and provided at accurate time, place and cost. The demand for transitioning to ICD-11 is now clearly addressed by Norwegian health care workers, stakeholders, authorities and patients.

Communication

The Norwegian Directorate of Health is receiving an increasing number of inquiries on the status of ICD-11 in Norway, both from the public and from medical expertise. The inquiries address the limitations of further usage of ICD-10 and the advantages of ICD-11 as an updated tool for both medical diagnostics and treatment, and reporting of health data.

By strengthening communication and increasing transparency about our work on transitioning to ICD-11, we aim to share and build understanding and knowledge among both stakeholders and the public. Through webpages and other channels, we intend to consecutively share the process on moving from ICD-10 to ICD-11 and on the medical and technical advancements of ICD-11.

Translation

Norway has started piloting the translation process by establishing principal guidelines, workflow, platform uploading and national maintenance. We will build on valuable experience and advice from the Nordic collaborative activities and other European countries. The pilot includes exploration of AI-translation models for efficacy and consistency.

Our translation process will emphasize on securing adequate level of clinical engagement during quality assurance. Local principal guidelines for translation will be established and continuously reviewed throughout the translation period.

While initial piloting will focus on the smaller chapters for gaining insight, translating the mental health related chapters and the CDDR has high priority.

Interplay between ICD-11, SNOMED CT and other code systems

Norway introduced SNOMED CT in 2019, aiming to enhance semantic interoperability within several fields of health care and registry reporting. SNOMED CT is being explored as a medical terminology and has so far been utilized in several use cases including one large scale EHR implementation.

We now aim to define the coordinated use of ICD-11 and code systems in Norway. Code system and terminology experts work together in a collaborate effort to clarify the use case, its interplay and describe the common efforts made from international organizations.

Investigation of national use and maintenance of ICD-11

As illustrated in Fig.2, the Norwegian transition to ICD-11 will affect many stakeholders as ICD codes are vastly used in computer systems and registries. We aim to coordinate changes in the core systems and facilitate collaboration between stakeholders.

This work will include setting up prototype testing of integrations and data management for future implementation and deployment. We will also seek to assess future work processes for healthcare workers including ways to code ICD-11.

Acknowledgements

We would like to acknowledge WHO for the continuous support assisting us with this transition. We also extend our gratitude to the Nordic ICD-11 Task Force for sharing knowledge and helpful material (see also poster "Report from the NordClass ICD-11 Task Force")

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ICD-11 Transition in Sweden - Organisation and Current Status

14-18 October 2024

WHO-FIC

Poster Number
301

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The National Board of Health and Welfare, Stockholm, Sweden

Abstract The Swedish National Board of Health and Welfare has been working on the transition from ICD-10 to ICD-11 since 2019. The overall project has been divided into several sub-projects, including translation into Swedish, IT, education, statistics, and legal issues. Initially, we focused on translation, involving collaboration with a broad range of medical experts, professional translators, and classification specialists. While we have initiated certain projects, the extensive work on communication and implementation in healthcare is still ahead of us.

Project organisation within the Swedish National Board of Health and Welfare

Steering group

Project owner Mona Heurgren, Director at Registries and Statistics; project leader Lotta Trosell Svender.

Strategy group

Overall coordination between the sub-projects and for keeping the transition work together

Subprojects - ongoing

Translation

Translation into Swedish, medical expert review and internal and external audit.

Adaptation of national registers

Reviewing how national registers need to be adapted and how national reporting needs to be adjusted.

Communication

Coordinates the communication that needs to be done in the context of information and training regarding the transition to ICD-11.

IT – system architecture

Working on the national digital environment needed to support the transition to ICD-11.

Education

Preparing the educational efforts needed to ensure high-quality reporting with ICD-11.

Legal issues

Working to ensure that clear rules are in place for reporting to registries using ICD-11, and that these rules are supported by our national laws.

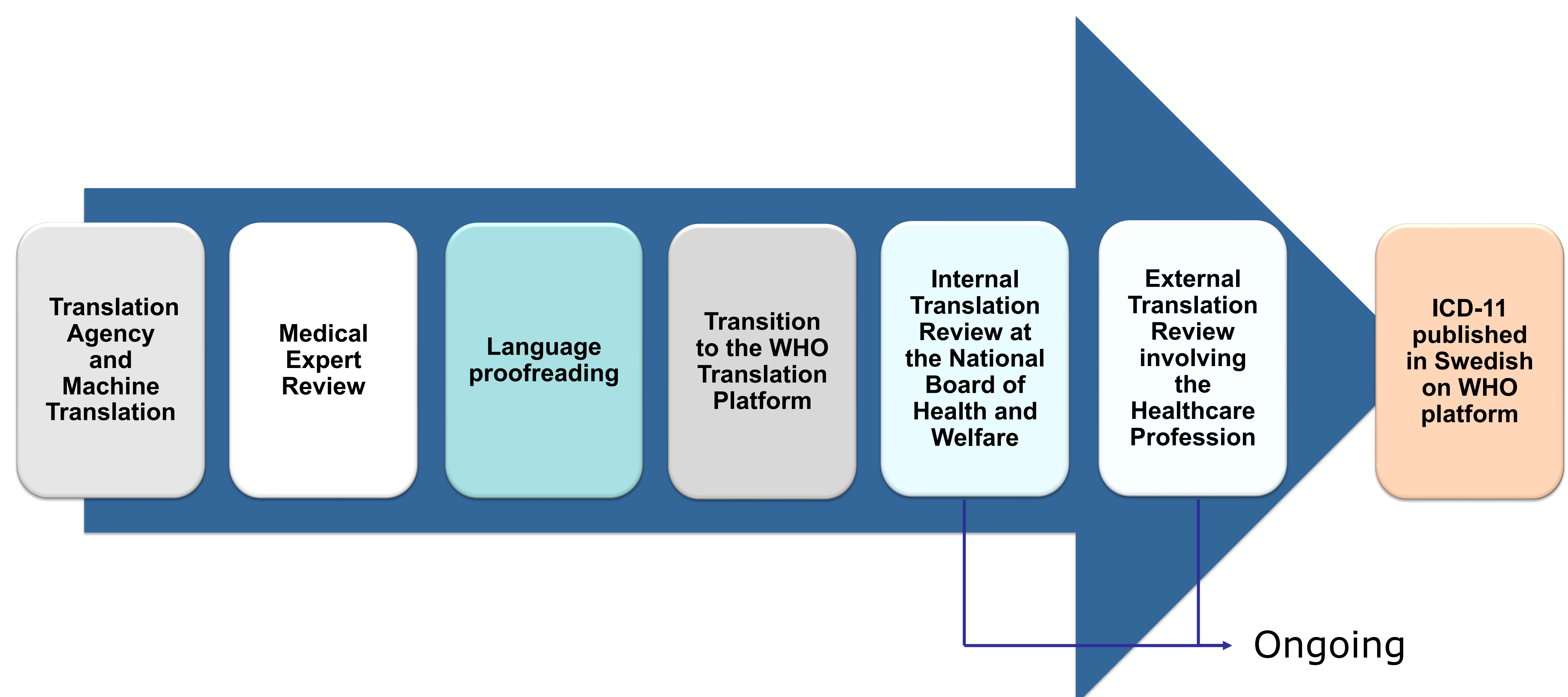
NordDRG

Investigating the impact of the transition to ICD-11 on secondary classification, and adapting systems to ensure a smooth implementation.

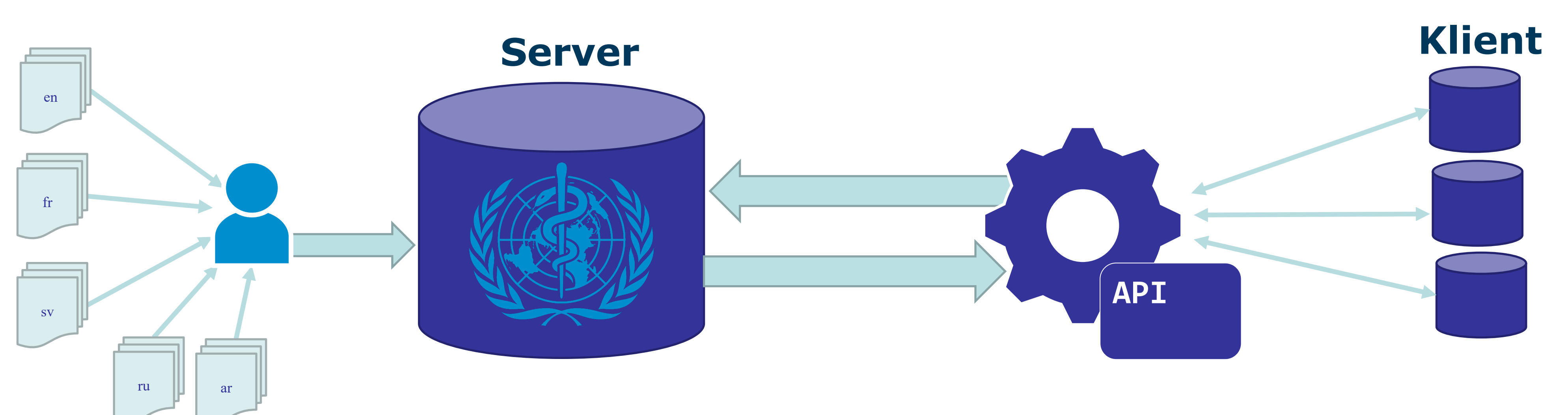
Statistics

Reviewing how to statistically manage ICD-11 in databases and how the transition may affect the continuity of health data reported using ICD-10.

Highlighting the translation process



Highlighting of IT and system architecture



Special concerns

- Mapping of national ICD-10 codes
- Sharp or smooth transition?
- Education for ICD-11 users and system administrators
- Translation of Reference Guide in relation to national adaptations
- Translation of WHO educational tools

International collaborations

- WHO-FIC Network
- Mapping Task Force
- Reference Groups and Committees
- Nordic Collaborating Center
- ICD-11 Nordic Task Force
- Nordic Casemix Center

Report from the NordClass ICD-11 Task Force

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1. The Norwegian Directorate of Health, Norway, 2. The Directorate of Health, Iceland, 3. The Finnish Institute for Health and Welfare, Finland, 4. The Danish Health Data Authority, Denmark, 5. The National Board of Health and Welfare, Sweden

Abstract NordClass is a designated WHO-FIC Collaborating Centre. The NordClass board decided to prioritize the Nordic collaboration on ICD-11 by establishing a specific Task Force aiming to share valuable knowledge and experiences during their national work towards ICD-11 implementation. The Task Force has soon been operating for two years meeting monthly in addition to running workshops and related initiatives. Some experiences from this activity are shared below.

Introduction

In 2021, the NordClass board offered to host quarterly information exchange meetings on ICD-11 between the member countries: Denmark, Finland, Iceland, Norway and Sweden. The meeting series were further developed into a frequent and regular collaboration between core governmental employees working with ICD-11. The NordClass ICD-11 Task Force was formally started in 2023.

The Task Force is aimed to establish detailed and common understanding of topics regarding translation, implementation, data flow and data integrity in relation to ICD-11. This collaboration facilitates common knowledge building, and the reuse of material fit for the Nordic work.

Task Force operation

The ICD-11 Task Force currently meets monthly for mutual updates and advisory. Discussions and information sharing between meetings is possible via a designated Teams channel. Topics for discussion emerge from common needs, dilemmas or discoveries.

The Task Force has proven useful by gathering a common dialogue for efficient communication with other stakeholders, implementers and the WHO.

The Task Force also allows mutual exchange of day-to-day knowledge, communication material, guidelines, regulations, tools and assessments. Reusing relatable material has so far saved substantial time and resources for the participant countries.

In addition to regular meetings, the Task Force has executed several workshops with in-depth topics like translation and registry integration inviting a broader audience involved in the ICD-11 work. The Task Force also reaches out to other countries through collaboration calls. Meetings are presently coordinated by The Norwegian Directorate of Health.



Figure 4. The ICD-11 Task Force members

Sharing knowledge

All Nordic countries have now initiated translation of ICD-11. We have shared models of workflow, language guidelines, translation methods and experiences of quality assurance. A designated full day workshop was created to allow for detailed presentation and discussion on useful experiences. Some of the core knowledge is exemplified below:

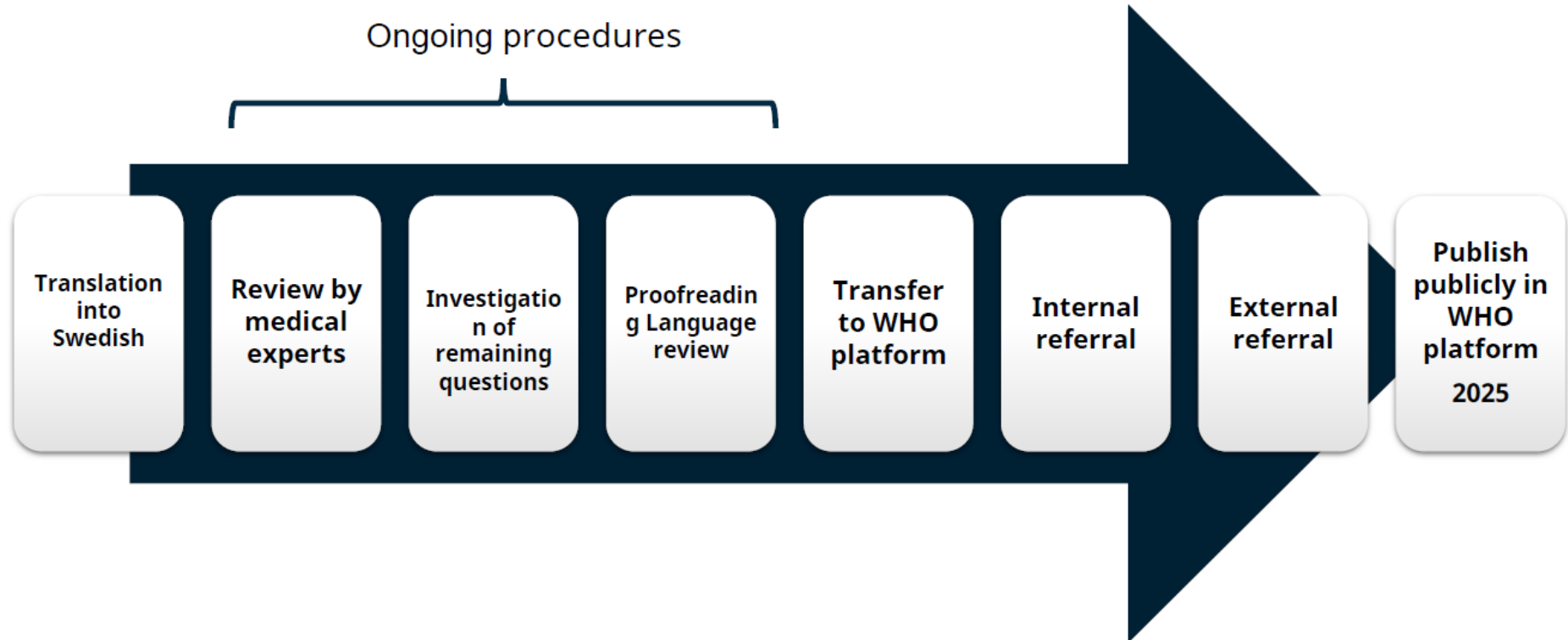


Figure 1. Sweden's translation process



Figure 2. Finland's translation process

	Translation made by clinicians	Translation by DeepL
Correct clinical language	😊	😞
Misleading translation	😊	😞
Consistency	😊	😞
Formatting (in Word)	😊	😞
Deviations from WHO source text (additions and omissions in the translation)	😊	😞
Typos, grammatical errors and similar	😊	😞
Resources (staff, time, coordination, bottlenecks...)	😊	😞

Figure 3. Denmark's comparison between manual and AI-based translation

Language guidelines: a tool for both initial translation and maintenance – prioritized principles in Norway:

1. The term should be compliant with the official spelling
2. Precision
3. Usage in clinical setting
4. Consistency
5. Self-explanatory terms
6. Norwegian words («karveords»)

Language guidelines needs maintenance

Figure 4. Norwegian work on common translation guidelines.

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Reusing insight/products

The frequent meetings enable each country to share detailed gains and issues on regulatory concerns, stakeholder maturation and organizational setup. By pooling these experiences, we have so far been able to reuse communication templates, workflow setup and translation guidelines. The recent renewal of the Norwegian translation guideline has depended heavily on existing work from Denmark, Finland and Sweden.

We aim to make a common contact channel with WHO for requests and comments, allowing for effective replies and feedback. Valuable insight has been communicated on translation submission and quality assurance by WHO through a designated workshop.

Staying updated on AI/LM-based translation models and software has been a core topic as possibilities and quality is developing rapidly. New possibilities arise continuously improving both specificity and effectiveness. Nordic countries will consider common usage of tools customized for classification translation and quality assurance workflow.

Future perspectives

The Task Force initiative will keep focusing on topics of common interest regarding preparations, translation, education and implementation. In addition to sharing knowledge towards improved interoperability, we will work to understand common stakeholders' needs. We will also share experiences on interplay with other classifications and terminologies. For Nordic countries that share common languages, we will consider reusing translations and definitions.

The next upcoming Task Force workshop will be held this winter, on the topic ICD-11 integration between registries, patient systems and terminology servers.

Acknowledgements

Regards to the board of NordClass for establishing and supporting the work of the Task Force.



ICD-11 Planning in Australia



Authors: Breanna Harnetty and Vicki Bennett,
Australian Institute of Health and Welfare, Australian Collaborating Centre

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WHO-FIC

Poster Number
303

Abstract Australia has been working towards a decision regarding implementation of ICD-11 for a number of use cases. This poster presents an update on the activities undertaken and progress towards implementation.

Introduction

The Australian Institute of Health and Welfare (AIHW) is leading efforts to identify and coordinate activities in collaboration with government agencies and jurisdictions to support a decision on implementing ICD-11 in Australia. Currently, ICD-10 and its Australian Modification are used for mortality statistics, admitted care and emergency department reporting, and activity-based funding. While Australia has not yet set an implementation date, the country is working towards making ICD-11 the standard in health data reporting by 2031.

ICD-11 FAQs

The ICD-11 Frequently Asked Questions (FAQs) were initially drafted by the AIHW in December 2023, based on inquiries received regarding ICD-11. These FAQs were subsequently submitted to the Australian ICD-11 Task Force (AITF) for review in June. The FAQs cover a range of topics, from broader implementation questions like "Has a decision been made to adopt ICD-11 in Australia?" to more technical concerns such as "What will happen to the current Australian Coding Standards and National Coding Advice?".

Assessment of the Current Australian Healthcare Environment

The planning and evaluation stage of the Roadmap focuses on analysing the current healthcare environment. Jurisdictions have contributed to the Roadmap deliverables, enabling a thorough assessment of the benefits, challenges, and readiness for the new classification system.

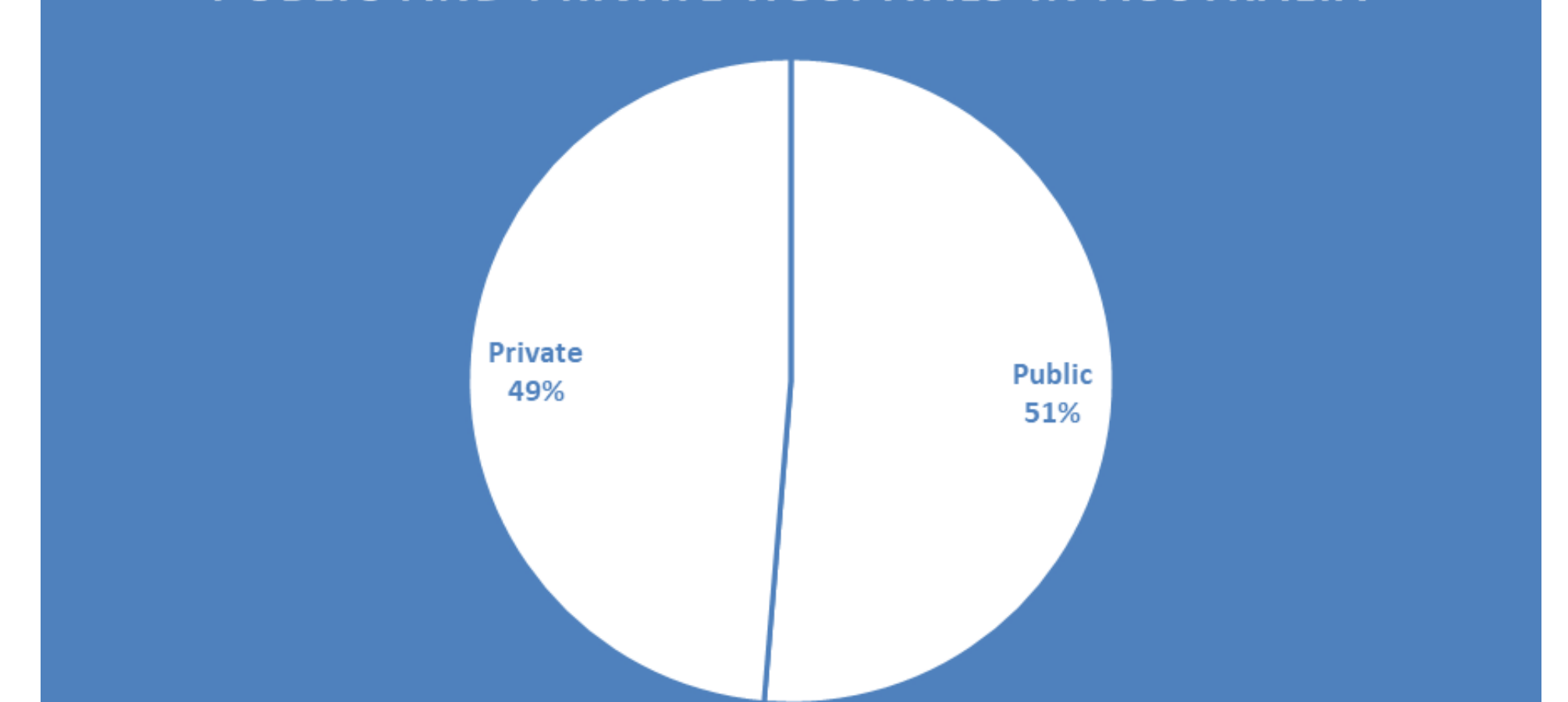
DIGITAL READINESS OF HOSPITALS

This deliverable identifies planned digital initiatives at both the national and jurisdictional levels, ensuring these initiatives consider the potential adoption of ICD-11. Current results indicate that **4 out of 8 jurisdictions either have or are in the process of implementing a statewide electronic medical record (EMR)** for their public hospitals. A statewide EMR will simplify the rollout of a new classification system within a jurisdiction.

PRIVATE HEALTH SECTOR INFRASTRUCTURE

This assesses the data and operational arrangements within the private health sector in each jurisdiction, evaluating their preparedness for ICD-11 implementation. Currently there are **approximately 693 public hospitals and 657 private hospitals in Australia**. Engaging the private healthcare sector in adopting ICD-11 will be essential to ensure health data comparability across the public and private systems.

PUBLIC AND PRIVATE HOSPITALS IN AUSTRALIA



STAKEHOLDER IDENTIFICATION

This deliverable maintains a comprehensive record of Australian stakeholders involved in ICD-11 implementation, including decision-making bodies, key government entities, advisory groups, and potential supporters, emphasising ICD-11's role in fostering an interconnected health system.

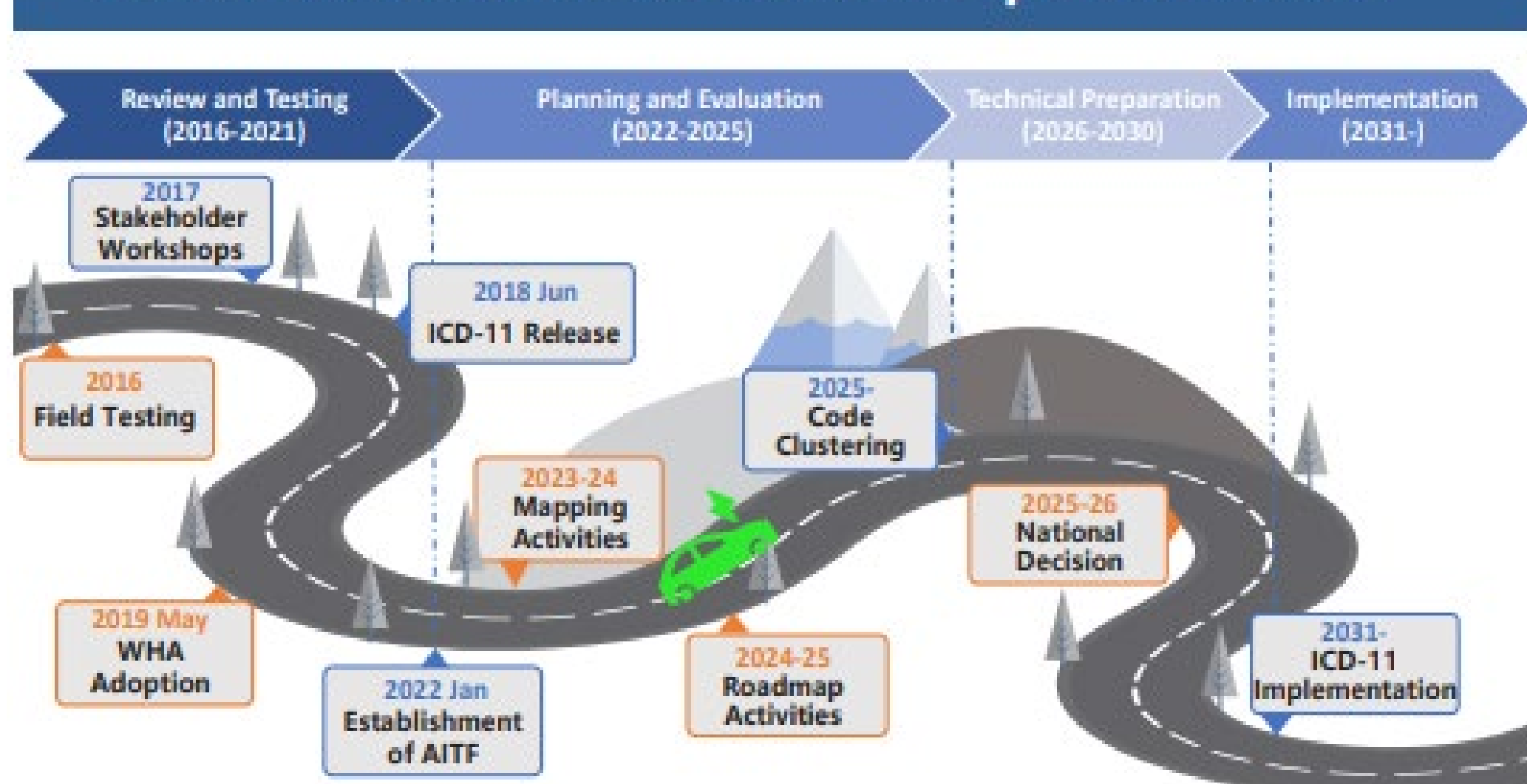
ASSESSMENT OF ALTERNATIVE CLASSIFICATIONS

This task involves identifying existing classifications in use across Australia that could be replaced by ICD-11, excluding ICD-10(-AM). Current results indicate that **13 classifications are in use across jurisdictions at varying levels, which could potentially be replaced by ICD-11**.

The Australian ICD-11 Task Force (AITF)

The AITF is currently in the 'planning and evaluation' phase of the Roadmap of activities they have determined will be necessary to inform decision-making on ICD-11 and anticipates these activities to be completed by the end of 2025. Since the beginning of 2024 the AITF has been doing the following tasks:

National Decision on ICD-11 Implementation



COMMUNICATIONS STRATEGY

The Communications Strategy Task Group was formed in May 2024. This sub-group's deliverables are as follows:

- The communication requirements to support decision makers when they consider the question of implementation of ICD-11.
- Stakeholder communication, including key messages and clarity about the roles of various parties in this process.

EDUCATION NEEDS ASSESSMENT

The AITF has begun to assess the education needs related to ICD-11. The aim of doing this is to understand what education programs are currently in place using ICD-10 and the Australian Modification (ICD-10-AM) and who is providing them, what revision efforts will be required, and the resources and timelines needed.

INDICATOR ANALYSIS

The aim of these activities is to review national and jurisdictional health indicators to identify whether they use ICD-10(-AM) or not, and if so, whether the equivalent codes exist in ICD-11. For indicators where ICD-10(-AM) codes are not used, we are assessing whether these could be reported using ICD-11. The final aim is to identify gaps in information needs that ICD-11 could address.

IDENTIFICATION OF AUSTRALIAN STAKEHOLDERS AND USE CASES

The AITF has identified stakeholder groups and use cases for ICD-11 in Australia. Stakeholder profiles will be developed to outline the benefits and considerations of transitioning to ICD-11 for each group. These lists of use cases and associated stakeholder groups are essential for informing decision-makers about the considerations and steps required for these transitions.

Plans for 2025

The Roadmap for Implementation Decision in Australia encompasses a comprehensive set of tasks designed to ensure a smooth and effective transition to ICD-11. These tasks include:

- Cost and benefit analysis
- Evaluating the broader system enhancements required to support ICD-11
- Identifying and assessing the impacts on IT systems and infrastructure
- Workforce Strategy development
- Mappings and Dual Coding studies.



ICD-11 implementation activities for mortality statistics in England and Wales

14-18 October 2024

WHO-FIC

Poster Number 29

304

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Office for National Statistics, England and Wales

Abstract The Office for National Statistics (ONS) are responsible for processing and reporting mortality statistics for England and Wales, based on death registrations data. ONS continue to work on activities relating to the pre-bridging coding phase of our ICD-11 implementation plan for mortality statistics. This poster presents an overview of an ICD-11 manual coding exercise completed in 2024.

Introduction

The Office for National Statistics (ONS) are continuing to work on a variety of activities to support ICD-11 implementation in mortality statistics for England and Wales. A major activity during 2024 has been the completion of a manual ICD-11 coding exercise, based on a sample of death registrations. The manual coding exercise was conducted by two cause coders between May and July 2024, with one additional cause coder conducting quality assurance.

For ICD-10, ONS uses Iris cause of death coding software which achieves an automated coding rate of approximately 80% of non-inquest deaths, with the remaining 20% requiring manual intervention by a cause coding team. All inquests are manually coded. Inquests are deaths where the coroner has opened an investigation. Inquests must be opened for deaths with unknown causes, unnatural or violent deaths or deaths in prison or police custody. ONS receives inquests in a different format to other death registrations and are therefore processed differently.

- The purpose of this exercise was to:
- Provide cause coders with ICD-11 cause coding experience on a representative sample of records
 - Understand our level of confidence in using the ICD-11 classification and Reference Guide to assign underlying causes of death, for the ONS mortality use case
 - Explore ICD-11 coded data
 - Identify examples of extension code use, options for stem code clusters and ICD-11 coding of specific causes e.g. external causes.

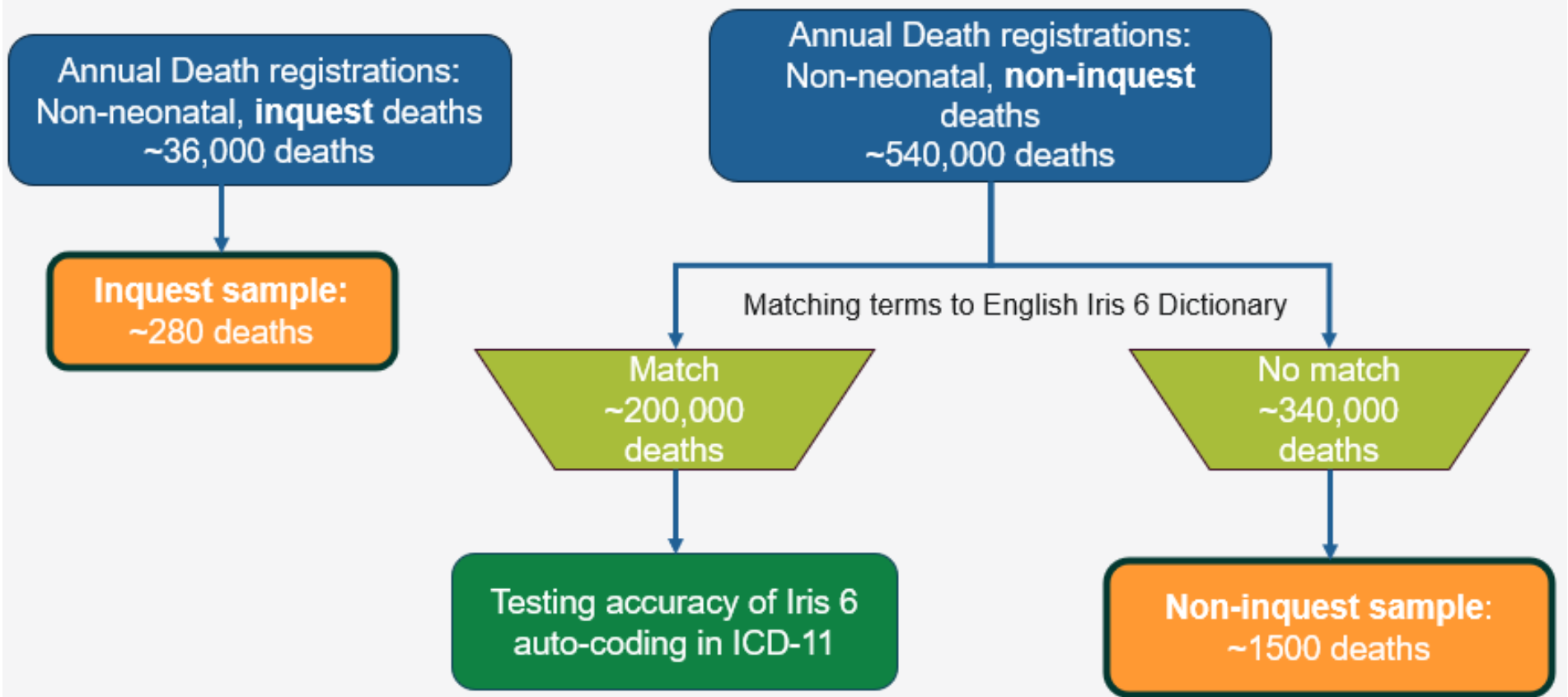
We hope this exercise will inform internal, UK-level and international discussion (via MRG) of how to use ICD-11 for the mortality use case.

Manual coding exercise: Method

The manual coding exercise focused on non-neonatal deaths and was divided into two samples of non-inquests and inquests.

- To ensure the exercise focused on records we expect to require manual intervention, one year of non-inquest death registrations were sorted into:
1. Records expected to achieve 100% auto-coding in Iris. These were deaths where all medical terms on the certificate could be found in the ONS English ICD-11 dictionary.
 2. Records expected to require manual cause coding.

Figure 1: Sorting death registrations for a manual coding exercise



Approximately 200,000 non-inquests were filtered out of the sampling frame for Iris testing. The remaining 340,000 records were used to select a sample of non-inquests for manual ICD-11 coding. The two samples selected were:

- 1,534 non-inquests
- 278 inquests

The sample size needed to be representative of different causes of death, but small enough for cause coders to complete the exercise within three months.

- To balance these requirements, we:
- Stratified the sample by underlying cause of death ICD-10 code
 - Conducted over and under sampling to obtain as large a distribution of underlying cause of death as possible
 - ICD-10 codes for underlying cause of death, where the frequency of deaths reported in the sampling frame were less than 25 are not represented.

Figure 2: Stratified sampling by underlying cause of death

Non-inquest sample: 1,534 deaths		Inquest sample: 278 deaths	
Number of deaths with ICD-10 underlying cause of death code	Sample size	Number of deaths with ICD-10 underlying cause of death code	Sample size
5000 and over	0.2%	1000 and over	0.3%
100-4999	0.5%	100-999	0.5%
50-99	1%	25-99	2%
25-49	2%	Less than 25	0%
Less than 25	0%		

Iris 6 was the user interface for the manual coding exercise. Non-inquests were split into two batches by ICD-10 chapter. Two cause coders completed half the sample, but each had the opportunity to code records from each ICD-10 chapter. A random sample of 490 non-inquests were completed by a third cause coder, for quality assurance.

Two cause coders each coded all 278 inquests. We expected the records to be more complex to code therefore consistency checking across the coders was important. A further benefit of this approach was that the exercise meant more than one cause coder learnt about coding inquests in ICD-11.

Manual coding exercise: Findings

Non-inquests:
The majority of records (93.3%) were marked as “Complete”, meaning an underlying cause of death could be assigned. Although most records were completed with no reported challenges, 7.3% were reported as difficult to code, and 6.8% were reported with Iris decision table queries. A small number of records had an “imperfect code” assigned (58 records, 3.8%) or could not be coded at all in ICD-11 (45 records, 2.9%).

Figure 3: Manual coding outcomes – Non-inquests

Outcome	Deaths	Percentage
Complete	1431	93.3
Complete, no reported challenges	1214	79.1
Complete, difficult	112	7.3
Complete, Iris 6 decision table query	105	6.8
Imperfect code	58	3.8
Cannot code	45	2.9
Total	1534	100

Once the coding outcome was reported, cause coders were asked to categorise any issues experienced during ICD-11 coding. Over one quarter of records had an issue reported (28.1%). Record level data with specific issues reported have been extracted for further investigation and discussion with Iris Core Group and MRG.

Of the 490 records that were quality assured, 454 were marked as “Complete” both in the original exercise and by the quality assurance coder. Of these, 81.5% matched on ICD-11 underlying cause code (full code) and 88.8% matched on the ICD-11 underlying cause code (stem code only).

It is possible to produce some basic tabulations of ICD-11 coded data based on all the records in the non-inquest sample that were “Complete” (1431 records).

Figure 4: Non-inquests reported as “Complete” by ICD-10 and ICD-11 Chapter

ICD-10 Chapter	ICD-11 Chapter	ICD-10 Deaths	ICD-11 Deaths
I Certain infectious and parasitic diseases	01 Certain infectious and parasitic diseases	31	43
II Neoplasms	02 Neoplasms	400	398
III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	03 Diseases of the blood or blood-forming organs	10	8
	04 Diseases of the immune system		11
IV Endocrine, nutritional and metabolic diseases	05 Endocrine, nutritional or metabolic diseases	60	61
IX Diseases of the circulatory system	11 Diseases of the circulatory system	336	240
V Mental and behavioural disorders	06 Mental, behavioural or neurodevelopmental disorders	47	37
	07 Sleep-wake disorders		3
VI Diseases of the nervous system	08 Diseases of the nervous system	83	196
X Diseases of the respiratory system	12 Diseases of the respiratory system	163	163
XI Diseases of the digestive system	13 Diseases of the digestive system	132	118
XII Diseases of the skin and subcutaneous tissue	14 Diseases of the skin	13	2
XIII Diseases of the musculoskeletal system and connective tissue	15 Diseases of the musculoskeletal system or connective tissue	26	17
	16 Diseases of the genitourinary system	53	50
XIV Diseases of the genitourinary system	19 Certain conditions originating in the perinatal period	1	1
XVI Certain conditions originating in the perinatal period	20 Developmental anomalies	10	8
XVII Congenital malformations, deformations and chromosomal abnormalities	21 Symptoms, signs or clinical findings, not elsewhere classified	12	21
XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	23 External causes of morbidity or mortality	17	17
XX External causes of morbidity and mortality	25 Codes for special purposes	37	37
XXII Codes for special purposes	Total	1431	1431

Comparisons of underlying cause of death codes in ICD-10 and ICD-11, use of extension codes, stem codes and residual codes have also been explored during analysis. Findings indicate that the selection and sequence of extension codes varies.

Inquests:
Both cause coders marked 91.0% of inquests as “Complete”. Coder 1 and Coder 2 both reported a small percentage of records as difficult to code (7.6% and 16.5% respectively). For both cause coders, 8% of records could not be coded.

Figure 5: Manual coding outcomes – Inquests

Outcome	Deaths - Coder 1	Percentage - Coder 1	Deaths - Coder 2	Percentage - Coder 2
Complete	254	91.4	252	90.6
Complete, no reported challenges	210	75.5	200	71.9
Complete, difficult	21	7.6	46	16.5
Complete, Iris 6 decision table query	23	8.3	6	2.2
Imperfect code	3	1.1	4	1.4
Cannot code	21	7.6	22	7.9
Total	278	100	278	100

Coder 1 reported issues on 25.2% of total records, compared with Coder 2 who reported issues with 47.5% of records. Records with specific issues have been extracted for investigation.

For 244 records that both coders marked as complete, the underlying cause of death ICD-11 code was compared. The coders matched on the full ICD-11 code on 66.0% of these records, and matched on the ICD-11 stem code on 81.1% of records.

A sample of inquests for external causes have been extracted to inform MRG discussion. Both coders have identified inquest records from this exercise that could be useful for ICD-11 training.

Conclusions

- Most records included in the exercise could be coded in ICD-11, but coders did experience some challenges.
- Cause coders are more likely to be consistent with assigning underlying cause of death in ICD-11 for stem codes only.
- Cause coder consistency for ICD-11 underlying cause code is better for non-inquests than inquests.
- Extension codes are used differently between coders and sequencing can vary, suggesting more guidance is needed.

ONS have identified next steps for analysis of the manual coding exercise, to further understand quality of our ICD-11 coded data and how this will affect our implementation for mortality statistics.

Abstract

Quality cause of death (CoD) data are crucial for Sustainable Development Goals (SDG) monitoring. The World Health Organization supported the Civil Registration and Vital Statistics (CRVS) through standardized reporting of CoD data. The CRVS system currently uses the tenth version of the International Classification of Diseases, ICD-10. An upgrade of the CRVS system with ICD-11 is needed to improve the quality of CoD data and SDG monitoring in Rwanda.

IntroductionResultsConclusions

Reliable cause of death (CoD) data is critical for Sustainable Development Goals (SDG) , National Strategy for Transformation (NST2) and Health Sector Strategic Plan (HSSP5) monitoring. Seventeen (60%) of the 28 targets of SDG 3 and Universal Health Coverage (UHC) require counting births and deaths by age, sex, and cause of death (CoD) for planning and health services delivery (Fig.1)

The World Health Organization (WHO), the custodian agency for SDG Goal 3, is strengthening CoD reporting in the African region through the civil registration and vital statistics (CRVS) system and the WHO’s Family of International Classifications (WHO-FIC).

The Government of Rwanda is committed to establishing a well-functioning CRVS system. The WHO supports the strengthening of the country’s CRVS system, including CoD reporting.

Methods & Materials

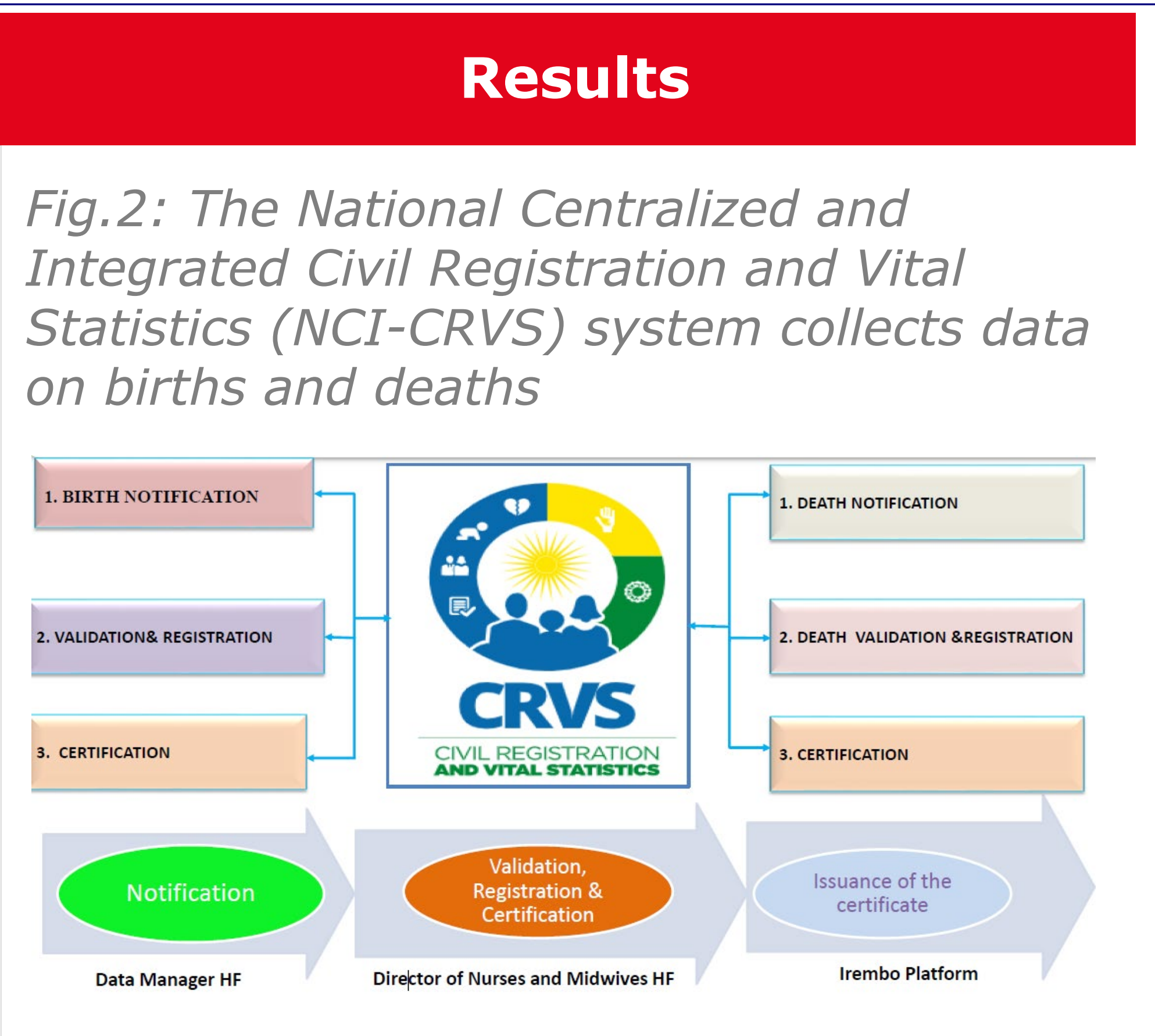
The WHO advocated for the implementation of the WHO’s International Medical Certificate of Cause of Death (MCCoD) to the Ministry of Health (MoH) and supported the development of its implementation plan.

The WHO further supported the adoption of the WHO-FIC and the development of Standard Operating Procedures (SOPs) for CRVS to ensure a smooth implementation of CRVS activities,

The WHO is working with the MoH to establish a multisectoral Health Estimates Technical Working Group (TWG) to strengthen data use and validate CoD data.

Fig 1: 17 of the SDG 3 targets require CRVS data for their monitoring

SDG 3 Target
3.1.1: Maternal mortality ratio
3.1.2: Proportion of births attended by skilled health personnel
3.2.1: Under-5 mortality rate
3.2.2: Neonatal mortality rate
3.3.1: Number of new HIV infections per 1,000 uninfected population
3.3.2: Tuberculosis incidence per 100,000 population
3.3.3: Malaria incidence per 1,000 population
3.3.4: Hepatitis B incidence per 100,000 population
3.4.1: Mortality rate attributed to CV disease, cancer, diabetes or chronic respiratory disease
3.4.2: Suicide mortality rate
3.5.2: Alcohol per capita consumption (aged 15 years and older)
3.6.1: Death rate due to road traffic injuries
3.7.1: Proportion of women of reproductive age (aged 15–49 years) with FP need satisfied
3.7.2: Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women
3.9.1: Mortality rate attributed to household and ambient air pollution
3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene
3.9.3: Mortality rate attributed to unintentional poisoning



As a result, the Rwanda MoH implemented MCCoD in all hospitals, and CoD data are now reported through the National Centralized and Integrated Civil Registration and Vital Statistics (NCI-CRVS), deployed countrywide (Fig.2).

The CRVS SOPs are used in the 3,260 CRVS service points, including health facilities, administrative sectors and cells, and embassies.

Further, MoH Rwanda decided to strengthen its health information system by implementing several global standards, including the eleventh version of the ICD (ICD-11), which has been integrated into the main morbidity reporting systems, such as electronic health records (EHR).

The CRVS system, however, needs to be upgraded, as the system is still using ICD-10.

Integration of ICD-11 into the CRVS will support the improvement of mortality data through features that are more adapted to the electronic environment. ICD-11 is easier to use and requires less training, which is ideal for hospitals in Rwanda and a key advantage in resource-constraint settings.

Analysis of mortality data is also required to monitor health trends and report COD information at sub-national, national, regional, and global levels.

This will be done through the newly established Health Estimates TWG.

Coded mortality data serve epidemiological purposes and support better decision-making and planning for the delivery of health services.

CRVS improvement is a journey. The NCI-CRVS is now deployed and records vital statistics countrywide (Fig.3).

The upgrade of the current CRVS system with ICD-11 will enhance the quality of COD data, which is needed for improved SDG monitoring in Rwanda.

Strengthened coordination of COD activities, training of trainers on ICD-11 and related tools, and close monitoring of COD quality at health facility, sub-national, and national levels are further needed to strengthen COD data at the country level (Fig.3).

Coded data support better monitoring of the SDGs and the promise to reach Universal Health Coverage. The integration of ICD-11 into the current CRVS system may support the abovementioned goals.



Acknowledgements or Notes

The authors of this poster would like to recognize all stakeholders involved in CRVS strengthening in Rwanda and declare no conflict of interest in conducting this research.

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Introduction

Tunisia has launched the project of the transition from the International Classification of Diseases 10th revision (ICD-10) to ICD-11 supported by the World Health Organization (WHO) that will help us to improve, among other benefits, the performance indicators of the National Causes of Death Information System and to accelerate its digitalization process. The WHO shared an algorithm allowing to make the ICD-10 and ICD-11 correspondences. Besides, WHO developed a new tool to identify the underlying cause of death (UCD) (Digital Open Rule Integrated cause of death Selection (DORIS) instead of Iris). However, to assess trends of causes of death statistics across this period of transition, it is crucial to take into account eventual disparities of Causes of Death statistics related especially to differences of causes of death data treatment and UCD identification rules between the old and new tools in country context.

This research aimed to compare the use and the output (causes of death data treatment and output) of DORIS and Iris to identify the UCD using Tunisian medical death certificates.

Methods & Materials

- This is a descriptive and evaluative cross-sectional study conducted by the National Institute of Health (NIH) in Tunisia.
- A sample of 300 Medical Death Certificates (MDC) were randomly selected among the MDCs received by the NIH in 2022 for the National Causes of Death Information System.
- Data entry was conducted via the official National Mortality Registry then coded via Iris software 5.8.1 using the ICD-10 and an integrated Tunisian Dictionary.
- The tool developed by WHO experts during the Tunisian pilot project to test the ICD-11 in 2019-2020 was used for coding causes of death.
- DORIS Desktop version was downloaded and used for batch processing of all MDCs included in the study, on July 16th, 2024.
- Data entry and coding using both software were conducted by three second year medical residents.
- Descriptive study of batch processing of MDCs, distribution of causes of death according to their types, invalid ICD codes, inconsistencies with age and sex of ICD codes and the 20 leading causes of death after coding with both Iris and Doris was performed.
- Data analysis was performed using the ANACod3 online tool. All MDCs processed by the coding software were analyzed by ANACod3.
- Univariate analysis of the association of Iris rejection and DORIS warnings was performed using Stata SE 17 software. The comparison of the percentages was made using the Pearson Chi 2(χ2) test or the exact Fisher test if the validity conditions were not verified.The significance level is set at p ≤ 0.05.

Results

Description of the study population:

The whole sample (300 MDCs) was included in the study.

The mean age of the study population was 65.2 ± 21.2 years, with extremes ranging from 0 to 113 years.

More than half (56.3%) of the study population were males.

Software handling:

Feedback from users indicated that DORIS's automated approach reduced the time required for coding, thereby enhancing workflow efficiency. Batch processing was only possible with the desktop version of the software, while the detailed guidance was available with the online version used only for individual certificate entry. In contrast, users of Iris appreciated its detailed guidance for batch processing but noted that it could be more time-consuming due to the semi-automated nature of the coding process.

Batch processing was conducted on both Iris and DORIS software. 300 certificates were included and automatically coded on DORIS while 300 certificates were included but only 297 were processed on Iris. Iris had a higher rejection rate (16.2% vs 15.0% with DORIS) and DORIS had an instant and automated use making it easier to handle.

Out of the 45 certificates with warnings on DORIS software, only 21 (46.7%) were rejected with Iris software with the rejection reason noted as “code” on Iris output in the 21 MDCs (Table I).

Table I. Coding statistics according to the software used

Iris				
	Coded	Rejected	Total	
DORIS	Coded	228	27*	255
	Warning	24	21	45
	Total	252	48	300

* 3 MDCs were not processed on Iris software

The most frequent warnings displayed by DORIS was “The conditions were reported without an external cause” figuring in 36% of MDCs with warnings, followed by the association of “The conditions were reported without an external cause ” and “External cause or injury is mentioned but the code mentioned is not the tentative underlying cause” with a percentage of 18% (Figure 1).

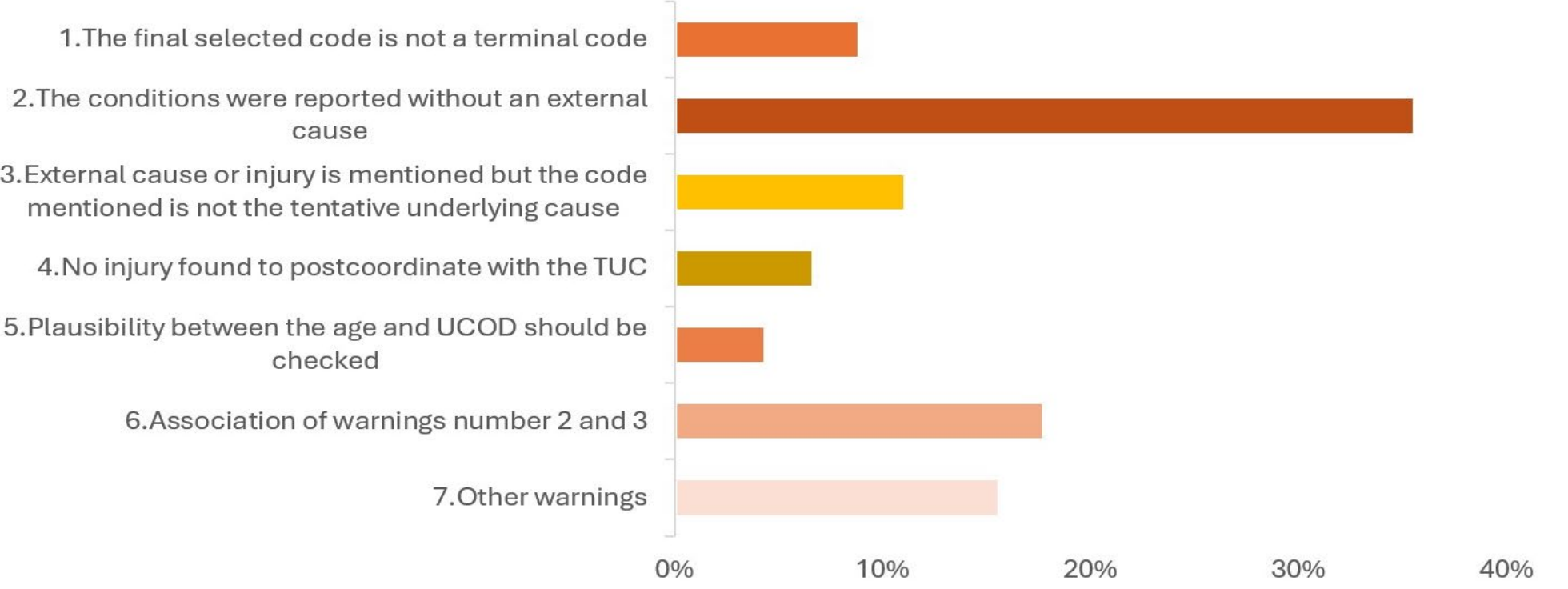


Figure 1. Distribution of warnings generated by DORIS

The univariate analysis showed that the difference in the Iris coding of MDCs with warnings on DORIS and the types of warning displayed by DORIS was not significant (p=0.237).

Data analysis:

Invalid ICD codes:

This analysis found two MDCs with invalid codes with DORIS versus zero MDCs with invalid codes with Iris.

Distribution of causes of death according to their type:

In total, DORIS coded 23 injuries versus 13 with Iris.

The percentage of ill-defined injuries was 70% with DORIS versus 0% with Iris.

DORIS recorded 13 ill-defined diseases while Iris recorded only eight.

The distribution of causes of death according to their type and the coding software is presented in figure 2.

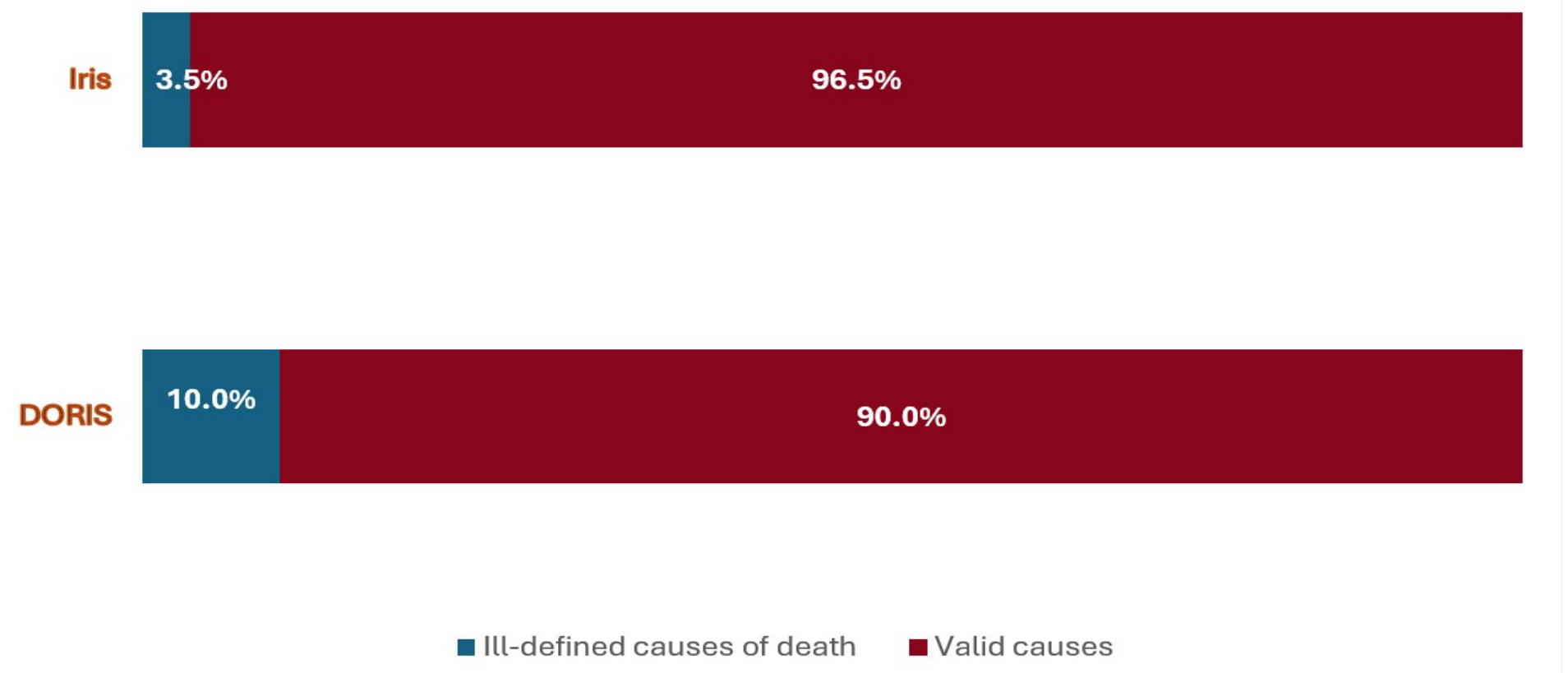


Figure 2. Distribution of causes of death according to their type

ICD codes inconsistent with age and sex:

Our analysis found only one certificate with a code inconsistent with age with DORIS while five certificates with the same inconsistency were coded with Iris (Table II).

None of the software recorded any certificate with codes inconsistent with sex.

Table II. Distribution of certificates according to codes inconsistent with age

ICD codes	Disease	Age	Number of deaths	Total
Iris				
P219	Birth asphyxia, unspecified	>1 year	1	
P220	Respiratory distress syndrome of newborn	>1 year	1	
P269	Unspecified pulmonary haemorrhage originating in the perinatal period	>1 year	1	
P351	Congenital cytomegalovirus infection	>1 year	1	
P964	Termination of pregnancy, foetus and newborn	>1 year	1	5
DORIS				
KB03	Neonatal encephalopathy	>1 year	1	1

Top 20 causes of death, according to the Global Burden of Disease list

20 leading causes of death, by sex, all ages

ANACod3 online tool analyzed all MDCs processed by Iris and DORIS.

The 20 leading causes of death, by sex, all ages, were different depending on the coding software used. The 20 leading causes of death, all ages, before manual coding verifications are presented in table III.

Table III. Distribution of 20 leading causes of death, in both genders, all ages, according to the software used for coding*

Iris (N=252)			DORIS (N=300)	
Cause	Number of deaths	Rank	Cause	Number of deaths
Diabetes mellitus	21	1	Ischaemic heart disease	24
Ischaemic heart disease	20	2	Diabetes mellitus	22
Cerebrovascular disease	17	3	Cerebrovascular disease	20
Trachea, bronchus and lung cancers	13	4	Nephritis and nephrosis	10
Chronic obstructive pulmonary disease	8	5	Hypertensive disease	9
Nephritis and nephrosis	7	6	Trachea, bronchus and lung cancers	9
Alzheimer and other dementias	6	7	Breast cancer	7
Breast cancer	6	8	Chronic obstructive pulmonary disease	6
Leukaemia	5	9	Alzheimer and other dementias	5
Endocrine disorders	5	10	Lower respiratory infections	5
Liver cancer	5	11	Prematurity and low birth weight	4
Pancreas cancer	4	12	Leukaemia	4
Colon and rectum cancers	4	13	Colon and rectum cancers	4
Lower respiratory infections	4	14	Prostate cancer	3
Prostate cancer	4	15	Pancreas cancer	3
Stomach cancer	4	16	Inflammatory heart diseases	3
Cirrhosis of the liver	4	17	Parkinson disease	3
Poisonings	2	18	Cirrhosis of the liver	2
Birth asphyxia and birth trauma	2	19	Skin diseases	2
Corpus uteri cancer	2	20	Homicide	2

*Table III presents the 20 leading causes of death, all ages, before manual coding verifications

Conclusions

This study highlighted the existence of causes of death data treatment and output disparities between DORIS and Iris. DORIS, utilizing ICD-11 rules, offers superior automation and ease of use. The findings also confirm that DORIS achieved higher accuracy in complex cases and fewer invalid codes, whereas Iris had a higher rejection rate but also offered valuable insights in its coding process. These findings would contribute to improve DORIS tool for better assessment of the causes of death trends through the ICD transition.



Participation of the Mexican Collaborating Center in Mortality Rule Digitalization: Analyzing Mexico's Mortality Data and the M2 Step for ICD-11

14-18 October 2024

WHO-FIC

Poster Number

308

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Abstract This work shows the participation of the Mexican Collaborating Center within the Mortality Rule Digitalization (MRD), which takes as an example the base of date of mortality in México and analysis of M2 step, as part of the tasks assigned for the contribution in the ICD -11 to the mortality coder users around the world.

Introduction

In 2024, the Mexican Collaborating Center (CEMECE) actively participated in the Mortality Rule Digitalization (MRD) efforts, focusing on two main areas: the analysis of Mexico's mortality data, specifically related to maternal death and HIV, and the implementation of the M2 Step for ICD-11. Both activities utilized the ICD-11 for coding and the WHO's automated encoder, Digital Open Rule Integrated Cause of Death Selection (DORIS), to select the underlying cause of death (UCOD).

Methods & Materials

The collaborative work focused on two key areas. First, a Mexican database containing 10 cases of maternal causes and Human Immunodeficiency Virus Disease as causes of death was analyzed. The coding process involved selecting the appropriate codes using the ICD-11, adhering to its specified steps and coding rules, with particular attention to section 2.19.7 on special instructions for maternal mortality (Step M4). Following this, the selection of the underlying cause of death (UCOD) was performed using both the WHO's automated coder, Digital Open Rule Integrated Cause of Death Selection (DORIS), and manual coding according to ICD-11 guidelines. Second, we focused on step M2 of specificity, particularly in two main rules. The first rule states: If the tentative underlying cause (TUC) is a residual code (Z) and a more specific code from the same family appears elsewhere in the death certificate (DC), the more specific code becomes the new TUC, applicable to chapters 12 to 23 of ICD-11. The second rule involves coding specificity: If the TUC is a disease defined as unspecified and a more specific mention of the same disease (parent code) is found elsewhere on the death certificate, the more specific code should be assigned, applicable to chapters 1, 8, 11-13, and 21. To accomplish this, we utilized a database in which the "TUC" (tentative underlying cause) was identified, along with fields for "mention of," "code to," and a column for "observations" made during the coding process with DORIS.

Results

Image 1: Team from the July Workshop Session



In the exercise conducted with maternal deaths and HIV disease, we found discrepancies between manual coding and the automated DORIS system. During manual coding, when the TUC was identified as "1C62.Z Human immunodeficiency virus disease without mention of associated disease or condition, clinical stage unspecified," and step M4 was applied, we selected "JB63.7" following the guideline in section 2.19.7, "Special instructions on maternal mortality (Step M4)," which states: "Maternal diseases classified elsewhere: JB63.- (infections)." Consequently, "JB63.7 Human immunodeficiency disease complicating pregnancy, childbirth, or the puerperium" was chosen, resulting in the cluster "JB63.7/1C62.Z." However, DORIS selected "JB63.Z (Maternal infectious diseases classifiable elsewhere but complicating pregnancy, childbirth, or the puerperium, unspecified)," creating a different cluster: "JB63.Z/1C62.Z." In another case of disagreement, DORIS did not recognize that the death occurred during pregnancy (as indicated) and instead selected the code "JB62.1, The death occurred 1 year or more after the end of pregnancy," which was then post-coordinated to "JB62.1/1C62.Z."

In the exercise conducted for M2, the first rule revealed that "gray" child codes within a category are not considered when applying this rule. For example, when the TUC "CA4Z" is obtained in the presence of "1F2A.0" on the death certificate, DORIS assigns "CA4Z (Lung infections, unspecified)" as the UCOD.

In the exercise conducted for M2, the first rule revealed that "gray" child codes within a category are not considered when applying this rule. For example, when the TUC "CA4Z" is obtained in the presence of "1F2A.0" on the death certificate, DORIS assigns "CA4Z (Lung infections, unspecified)" as the UCOD. For the second rule, we analyzed 261 non-specific codes from Chapter 1, each with different specificity options.

Conclusions

The analysis highlighted several areas for improvement in the digitalization of mortality coding rules using DORIS and ICD-11. In the M2 specificity step, discrepancies were identified in the handling of "gray" child codes and the default selection of residual codes, which may not always align with clinical specificity. Additionally, the review of 261 non-specific codes from Chapter 1 revealed multiple options for increasing coding accuracy. These findings suggest that while DORIS provides a valuable tool for automating the selection of the underlying cause of death, there is a need for ongoing refinement of the rules and enhanced training for coders to ensure that all coding decisions reflect the most accurate clinical information. Future work should focus on addressing these discrepancies and further optimizing the digitalization process for mortality data.

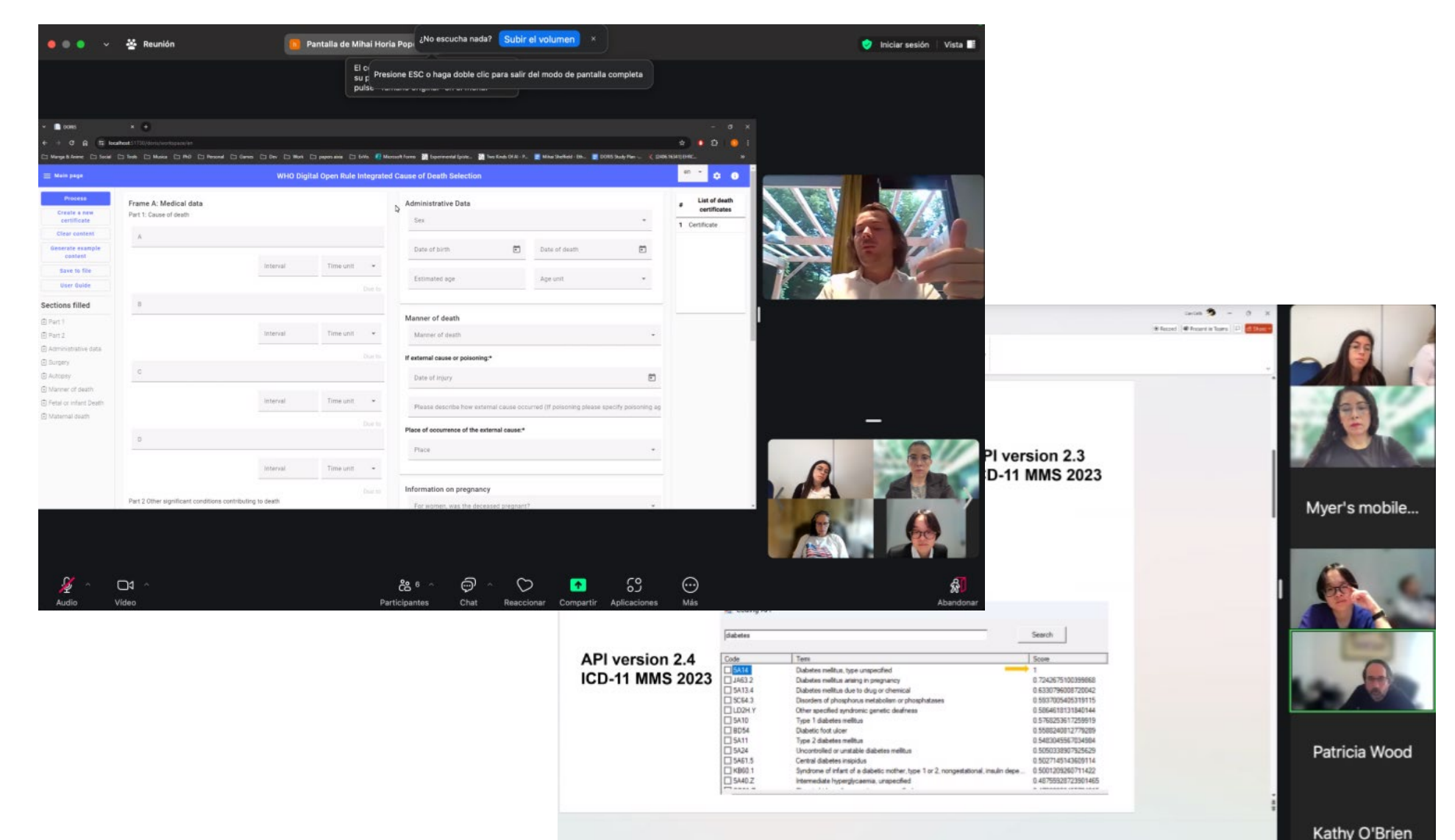


Image 2: July workshop session

Acknowledgements

We extend our gratitude to the WHO for including the Mexican Collaborating Center (CEMECE) in its efforts to enhance tools and processes aimed at achieving continuous updates and improving the quality of mortality data.



Lessons learned in using the API in mortality coding

14-18 October 2024



WHO-FIC

Poster Number
309

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Abstract As the Iris Core Group works on fine-tuning an electronic system for automated coding of underlying causes of death in ICD-11, we explored the current feasibility of using the ICD API. During the process we learned several lessons which will impact the transition from ICD-10 to ICD-11 for mortality purposes, and possible future iterations of the ICD API.

Introduction

The Iris Institute emerged from an international cooperation for the deployment, maintenance and development of the Iris software, an electronic system for automated coding of causes of death. It is a language-independent system, so Iris can be used with any language. Iris was initially developed to code in ICD-10. With the 2018 release of ICD-11 for implementation programs, the Iris Core Group (cooperating international partners, from 8 different countries) began evaluating and developing a version for ICD-11. Beta-versions of Iris for ICD-11 (Version 6) have been coding ICD-11 since 2022. However, initial versions of Iris continued the legacy of requiring a language-specific dictionary and possibly language-specific standardization tables. This is not how ICD-11 is intended to be used. Therefore, the Iris application was developed to WHO's REST API to access the ICD-11 database of terms and code. The initial version allowed the API to be accessed for line coding (when reviewing individual records), and the coder could select the best code from the list. This version (6.0.17) was released to Iris Users as the first beta version for them to test in October 2023. However, Iris Core members wanted to see if the API could also be leveraged for batch processing, reducing the need for Iris Users to maintain a dictionary. In April 2023 a version was released to Iris Core members to test the batch processing and to determine if this would be a viable option. This poster describes how the testing was completed and lessons learned.

Methods & Materials

A batch of 4,000 records that contain terms frequently reported on Canadian Deaths certificates were batch processed, on a virtual machine separate from the Statistics Canada networks. All the terms were in English, although the Iris Interface allows users to select any language with a released translation of ICD-11. The same batch was repeatedly processed using the Canadian dictionary (built on frequently reported terms), and the match thresholds of 1, 0.75, 0.5 and 0.43. The tests were

initially done in early May 2024, were repeated in August 2024. Results were analysed by the statistics logs, as well as using the coding log that Iris created to track the matches specifically; the code selected and matching term and the match score.

Results

The API was successful in coding 4844 lines of data. These lines usually contained only one condition, or the two conditions were separated by a comma. When the match threshold is 1 the concordance for the 4th character stem level code for underlying cause of death (UCOD) selected between the dictionary coding and the API coding was over 92%. However, as the match threshold decreased to increase the number of records that code automatically, the concordance between the UCOD selected when using the dictionary versus the API at the lower match threshold decreased (Chart 1).

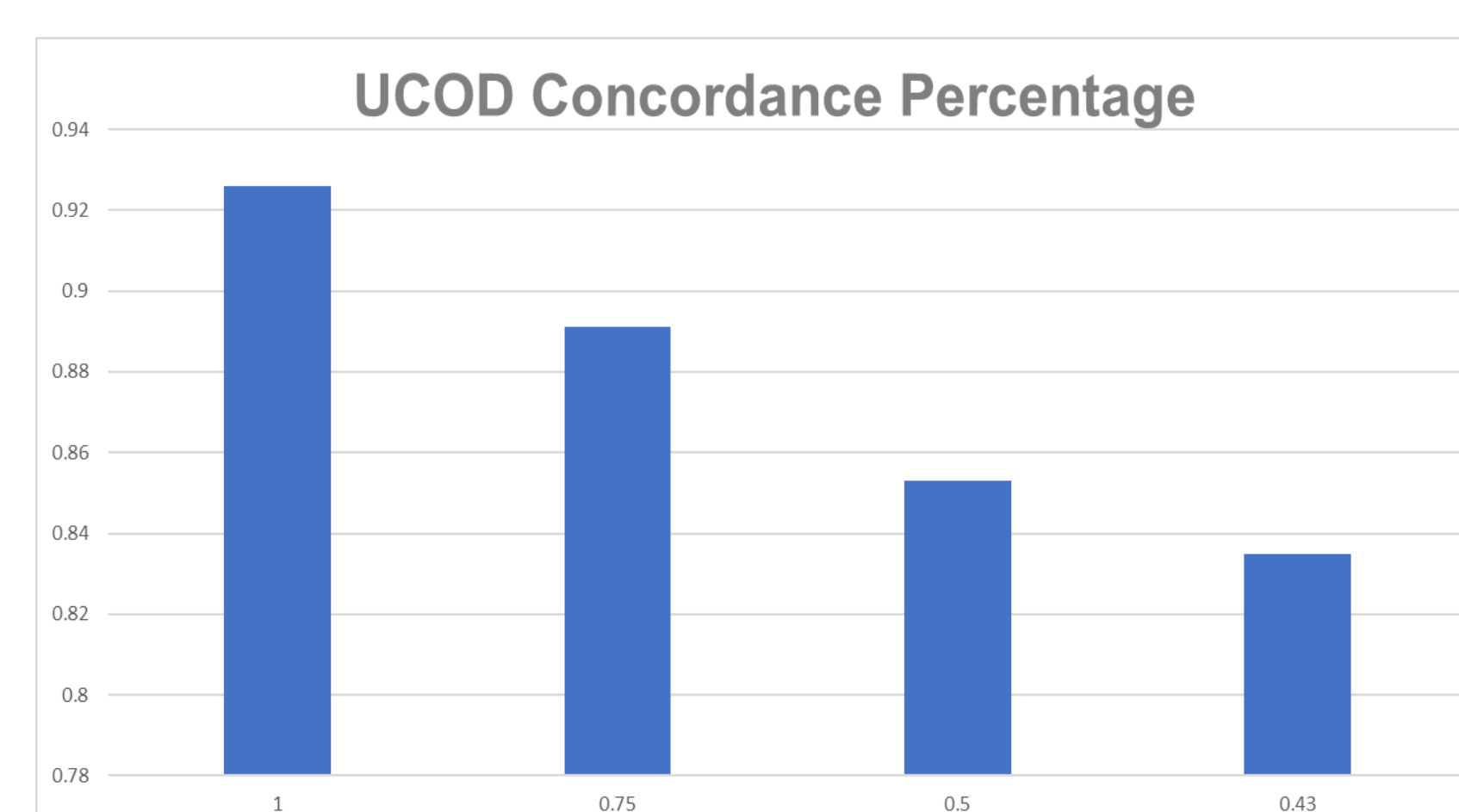


Chart 1: Underlying cause of death (UCOD) concordance percentage with dictionary at the 4-character stem level

In analyzing the coding logs the reasons for not achieving a perfect concordance with a threshold match of 1 was primarily the result of two terms. One is aortic stenosis, as the API selects stenosis of aorta (LA8A.3) not aortic valve stenosis (BB70.Z), which is what that term means. In ICD-10, the indexing has valve in brackets meaning it is an optional modifier. The other is metastatic lung cancer, which the API selects to metastatic cancer in lung (2D70) not metastatic lung cancer 2C25.Z. As the match threshold decreases the API will ignore words in the term either it is search for or matching to. For example, the API will ignore the word 'progressive' in the term progressive dementia, with a match rate of 0.77, to dementia NOS. Notice that this is different than what the Coding Tool produces, which is dementia due to progressive supranuclear palsy.

This is because the coding tool will add a wild card character unless an additional space is added after the term. Reasons like this are why the WHO recommends that all records that without a match score of 1 should be reviewed. Of note, it was interesting to see how the processing of the API struggled with the term 'and', as it is frequently reported on death certificates (Chart 2).

Term	Code	Matching Term
LIVER CIRRHOSIS AND HEPATOCELLULAR CARCINOMA	2C120Z	Hepatocellular carcinoma of liver
COPD AND PNEUMONIA	CA40Z	Pneumonia
DYSRHYTHMIA AND BLEEDING	BC9Z	dysrhythmia NOS
FUNCTIONAL AND COGNITIVE DECLINE	MG2Z	functional decline
LUNG AND RENAL CANCER	2C90Z	cancer of kidney

Chart 2: Examples of how the coding tool handled term 'and'. The highlighted yellow is the part of the statement that it coded

Unfortunately, the biggest hurdle in using the API for batch processing versus a dictionary, is that even with a match threshold of only 0.43, the API was able to code all conditions on less than half of all the records, and hence an UCOD could not be determined for over half of the records. As expected, the successful coding rate did decrease as the match score increased. With a match threshold of 1, and hence not all terms coded correctly, and UCOD could only be determined in a third of the 4,000 records (Chart 3).

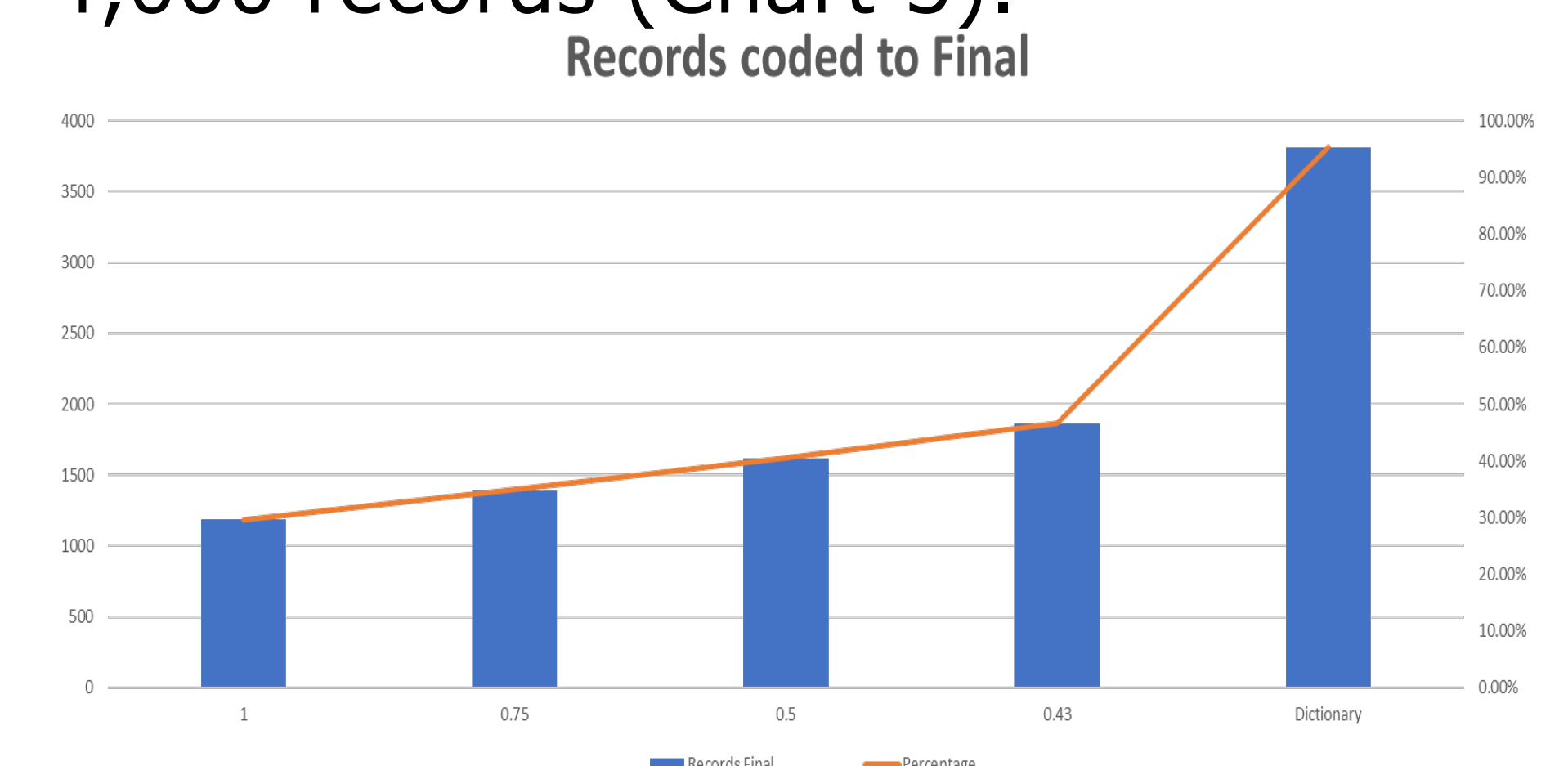
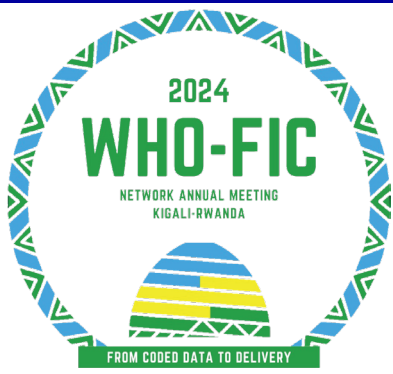


Chart 3: Number of records where all conditions were coded by the API & UCOD could be determined

Conclusion

There are two main conclusions from these tests. One: there is an opportunity to improve the coding tool for it to be able to be successful in coding frequently reported mortality conditions. This can be partially done by submitting proposals for synonyms. However, the other element is the coding tool natural processing language needs to be worked as seen with the issues 'and' and aortic stenosis. The other conclusion is while using the API instead of creating and maintaining a dictionary would initially decrease the workload for mortality coders, currently, it would significantly increase the number of records needing to be reviewed by a coder, and many countries do not have the resources to do this.

WHO FAMILY OF INTERNATIONAL CLASSIFICATIONS NETWORK ANNUAL MEETING 2024



Improving Cause of Death Reporting: An online training course in medical certification of COD and ICD 11

Natasha Kallis, Stefanus Snyman, Benson Droti, Hillary Kipruto, Darelle van Greunen, Kevin Kativu, Lyn Hanmer and Debbie Bradshaw
Co authors from: SA WHO FIC CC, WHO AFRO, NMU

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WHO - FIC

Poster Number
310

Abstract

The WHO Regional office for Africa, in collaboration with the SA WHO FIC CC and Nelson Mandela University have been developing an online training course, to improve and strengthen cause of death reporting in the African region. Based on a South African course on medical certification of cause of death, the online course covers an **Introduction to CRVS and causes of death Medical certification of cause of death according to WHO guidelines** and **an Introduction to ICD 11 for mortality and morbidity coding**. The modules include didactic information accompanied by self assessment exercises A certificate of attendance will be issued on successful completion of a final assessment This poster gives background to the regional need for this course, the project collaboration and process and future plans for capacity building in the African region to strengthen cause of death recording and reporting.

Introduction

The African Region faces significant challenges in collecting high-quality, comprehensive data on deaths and their causes(1). As of 2020, 35 countries in the region lacked good quality continuous death registration systems (2). Additional challenges include the poor quality of medical certification due to inadequate training as in most cases medical certification is not included in pre-service trainings, incomplete death registration due to high proportions of community deaths and delayed or incomplete reporting. To address this, the WHO Regional Office for Africa has implemented a multi-faceted approach, including:

1. Technical training on WHO standards and tools
2. Strategic planning for vital statistics systems
3. Implementing medical death certification and ICD-11 regionally
4. Developing in-country expertise through policy champion training
5. Strengthening mortality data analysis, use and communication capabilities.

In line with their vision for training and capacity development, in partnership with Nelson Mandela University and the South African Medical Research Council, the WHO Regional Office has developed an online training course titled "Improving Cause of Death Reporting" to strengthen mortality data collection in the region.

Methods & Materials

With the focus on WHO standards and the International Form for Medical Certification of Cause of Death, it equips participants with skills for accurate cause of death recording and reporting and ICD-11 coding. The comprehensive course is structured into three key modules:

Module 1: Introduction to CRVS Systems and Causes of Death

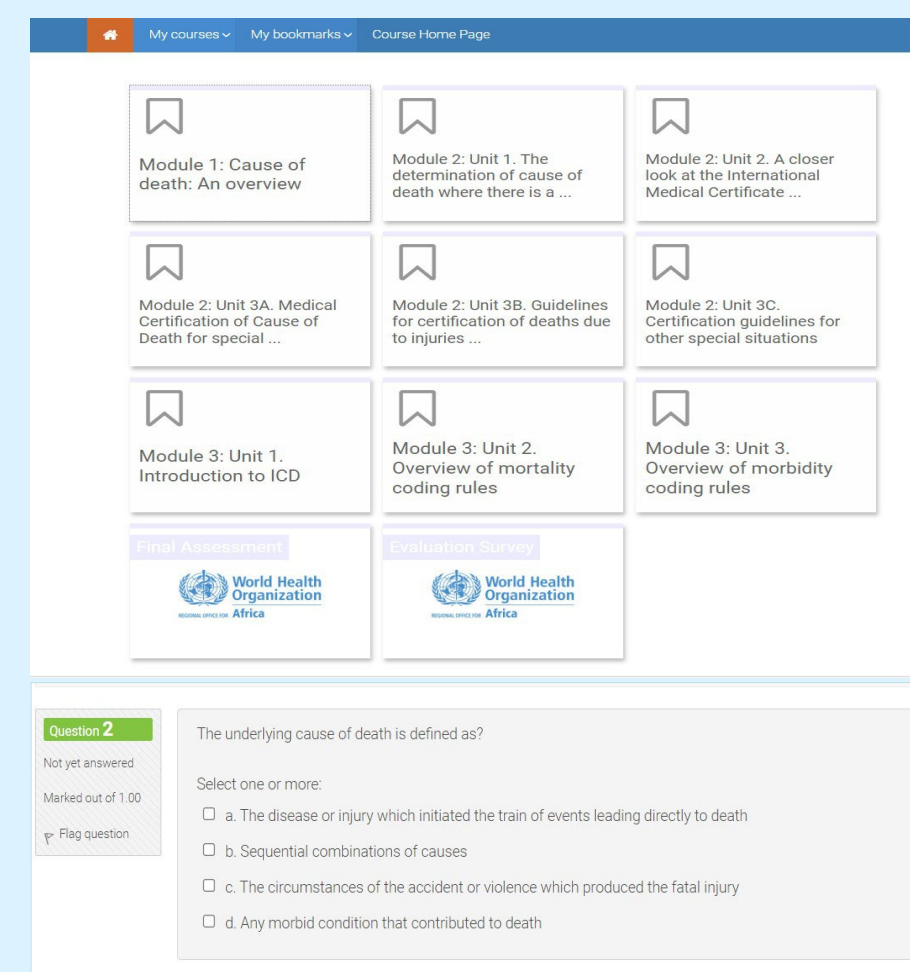
Module 2: Medical Certification of Cause of Death

- **Unit 1: In-depth training on WHO standards for medical certification**
- **Unit 2: Detailed review of the WHO International Medical Certificate of Cause of Death**
- **Unit 3: Specialized training for consistently under-reported deaths, such as perinatal and maternal deaths and HIV.**

Module 3: ICD-11 Implementation

- **Unit 1: Overview of WHO-FIC and ICD-11**
- **Unit 2: ICD-11 digital tools for mortality coding**
- **Unit 3: Morbidity coding using ICD-11**

The course utilizes teaching videos and case scenarios relevant to the African context to reinforce learning. Each unit concludes with self-assessment questions, for practice in certification and test their knowledge. Upon completing all modules and passing the final summative assessment by achieving a mark of 80%, participants receive a certificate of completion.



The design prioritises accessibility and flexibility, offering free web-based access, self-paced learning, bookmarking progress, and repeatable assessments. The course utilizes the open-source Moodle learning management system, with technical support provided by the Centre for Community Technologies at Nelson Mandela University, renowned for developing smart technologies for health and education in low-income communities.

Bridging the knowledge gap

The course addresses shortfalls in medical education and public health practice by covering topics often absent from medical school curricula. These topics are essential for clinicians in understanding their role in producing quality data. Studies consistently demonstrate that training physicians in proper certification significantly improves the accuracy and utility of cause of death data(4), which is especially important in regions where medical certification is limited and CRVS systems need development. The Regional office is committed to strengthening regional health systems, and this online training is part of its strategy of supporting efforts to improve mortality data quality, vital for assessing progress on the Sustainable Development Goals and providing universal healthcare. Expanding access to health services requires the integration of technology and developing technical leadership and expertise. The ICD-11 module supports ICD-11 implementation, as an introductory tool for countries planning ICD-11 rollout.

Way Forward

The training material, which has been reviewed by experts, is being translated into French and Portuguese, to reach a wider audience throughout the African Region. We plan to launch for use in 2024.

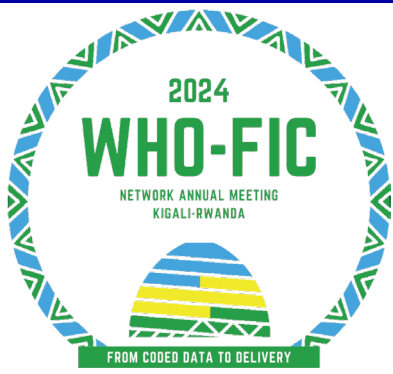


The course is based on the SAMRC's training on medical certification of cause of death, which utilised the WHO-FIC network's core curriculum for certifiers(3). The regional version expands the content to include an introduction to ICD-11 for mortality and morbidity coding.

1. A decade of transformation: advancing health across Africa, August 2024. Brazzaville: WHO African Region, 2024. Licence: CC BY-NC-SA 3.0 IGO
2. WHO, 2020. SCORE for health data technical package. Global Report on health data systems and capacity. Online at: <https://www.who.int/data/datacollection-tools/score/dashboard#>
3. WHO-FIC Network. Core curriculum for certifiers of underlying cause of death. March, 2007. https://getinthepicture.org/sites/default/files/resources/Core%20Curriculum%20for%20certifiers%20of%20underlying%20Cause%20of%20Death_0.pdf
4. Gamage et al. BMC Medicine (2020) 18:384 <https://doi.org/10.1186/s12916-020-01840-2>



WHO - FAMILY OF INTERNATIONAL CLASSIFICATIONS NETWORK ANNUAL MEETING 2024



Analyzing Morbidity and Mortality Data Using Excel-Based Tools 14-18 October 2024
Benson Droti, Hillary Kipruto, Wai Phyo Thant, Sarah Egbe, Moussa Traore, Richmond Sowah

WHO-FIC

Poster Number

311

Co-authors from: WHO Regional Office for Africa, Congo, Brazzaville

Abstract

The World Health Organization (WHO) Regional Office for Africa has developed Excel-based tools for analyzing morbidity and mortality data to support its member states. These tools are designed to simplify the complex process of data analysis, making it accessible even to users with minimal technical expertise. The tools enable the Ministry of Health teams in processing, and visualization of morbidity and mortality health data to generate insights that are critical for public health planning and policy decision-making. This poster provides an overview of how these Excel-based tools can be used to analyze key health metrics, such as leading causes of death, age-specific mortality rates, life expectancy, and inpatient morbidity. The use of these tools is part of WHO’s broader strategy to strengthen Health Information Systems (HIS) across the African region, improve the quality of health data, and support the tracking of progress towards the achievement of Sustainable Development Goals (SDGs).

Introduction

The analysis of morbidity and mortality data plays a vital role in understanding population health trends, guiding healthcare interventions, and informing policy decisions. However, the use of advanced software and complex tools can sometimes be a barrier for health professionals, especially in low-resource settings. To address this challenge, WHO AFRO has developed Excel-based tools that simplify the process of analyzing morbidity and mortality data.

These tools offer an accessible and structured approach to handling health data, allowing users to generate meaningful insights without the need for extensive technical expertise.

The Morbidity Analysis Tool includes an input template for hospital admission data, covering details such as patient demographics and clinical diagnoses. After populating the template, the tool generates critical statistics like the distribution of admissions by age and sex, the average length of stay per ward, and the top morbidity conditions. This helps health professionals to quickly identify trends and areas for interventions.

Similarly, the Mortality Analysis Tool offers an input template for mortality data, which users can complete with details on deaths, including age, sex, and cause of death. The tool then calculates age-specific mortality rates, life expectancy, and produces detailed reports on the causes of death by demographic groups and at different time points.

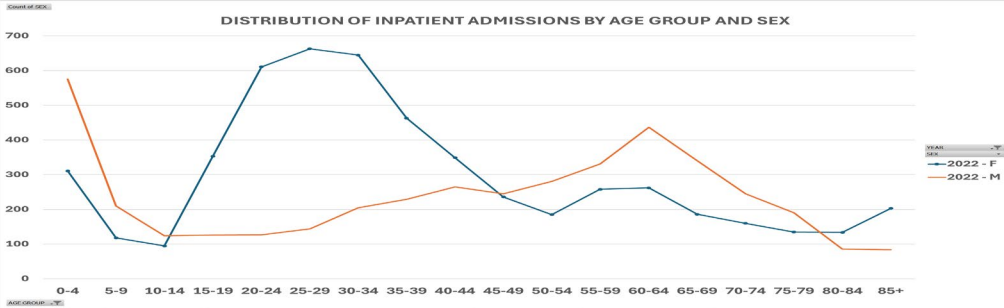
Methods & Materials

The Morbidity Analysis Tool is designed to analyze inpatient data using structured templates.

Inpatient Data Entry: This section allows users to input raw data on hospital admissions, including patient demographics, ward information, and ICD-11 codes. The tool is equipped with a pre-structured template where users can enter this data consistently and accurately.

ICD-11 Codes: The tool includes a built-in ICD-11 database that automatically retrieves the corresponding condition when the ICD-11 code is entered. This is made possible by preloaded data within the tool, ensuring that the correct information is instantly available. This ensures that the analysis is aligned with international disease classification standards and eliminates potential coding errors.

After the data is entered, the tool’s Analysis Pages automatically process the information and generate the following insights: Average Length of Stay per Ward, Top 10 and Top 20 Morbidity Conditions, Distribution by ICD-11 Chapter and Major Group and Inpatient Admissions by Month.



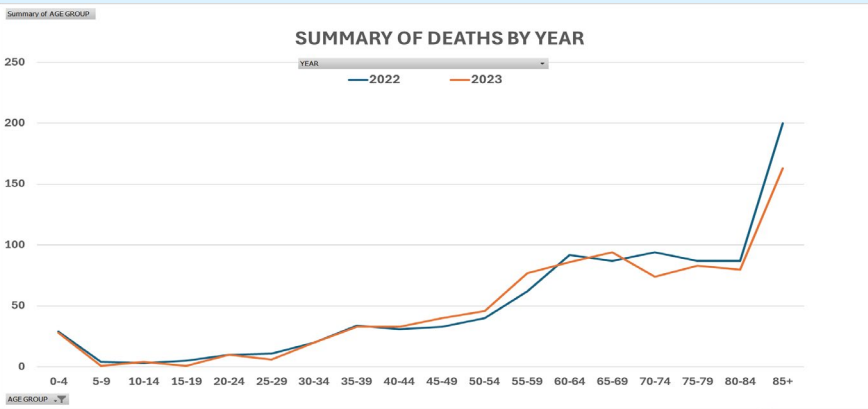
The Mortality Analysis Tool enables detailed analysis of mortality and live birth data.

Mortality Data Entry: Users input mortality data, including the number of deaths, age, sex, and ICD-11 codes related to the causes of death. The tool has a pre-structured template for this information.

These tool also include an option to export the data into CoEdit and ANACoD3 formats, which are used for further mortality data validation and reporting.

After the data is entered, the tool’s Analysis Pages automatically process the information and generate some insights.

Analysis Page - Mortality: Number of Deaths by Age & Sex, Age-Specific Mortality Rates, Percentage of Deaths by Age & Sex, Crude Death Rate, Life Table, Distribution of Causes of Death by Group, Top 10 and Top 20 Causes of Death. The combination of tables and graphs ensures that the outputs are easily understood.



Bridging the knowledge gap

The lack of access to advanced analytical tools in many low-resource settings has made it difficult for health professionals to effectively analyze morbidity and mortality data. This knowledge gap has resulted in limited capacity to produce reliable, actionable health insights, which are crucial for public health planning and decision-making.

These Excel-based tools complement existing tools like ANACOD3, which is designed for single-year mortality data analysis but cannot analyze trends over multiple years.

Way Forward

Continuous support and capacity-building efforts are needed to ensure that health professionals are capable of using the tools for both routine and advanced data analysis. Regular updates to the tools, incorporating user feedback, will ensure they remain relevant and aligned with evolving health priorities. Also, collaboration between WHO and other relevant stakeholders is key to ensuring the long-term sustainability of these efforts. By encouraging the use of these tools, member states will be better positioned to monitor health trends, address healthcare gaps, and ultimately improve population health outcomes in line with the Sustainable Development Goals (SDGs).





Implementing ICD cluster coding in Australia: Laying the groundwork for ICD-11 with data standards

14-18 October 2024

WHO-FIC

Poster Number
312

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Abstract Cluster coding in morbidity is conceptually practiced in Australian hospitals through sequencing of related classification codes. This sequencing may be disrupted in transmission, by data quality processes, or coding standards that do not allow using the same code twice. Australia is using new data standards to introduce cluster coding to clarify the relationship between ICD-10-AM codes and prepare the systems and workforce for cluster coding with ICD-11 MMS codes.

Australian morbidity data

Australia collects morbidity data from admitted hospital episodes using the International Classification of Diseases (ICD). Australian data standards only allow ICD morbidity data to be categorised as one of two types: a principal diagnosis or an additional diagnosis. This binary distinction is important as it enables data users to understand the principal diagnosis as the condition chiefly responsible for an episode of care but limits the ability to understand if additional diagnoses are related to each other or to the principal diagnosis. An added limitation in Australian reporting is that the order of ICD codes input by clinical coders is not necessarily the same order received by the jurisdictional health departments or national health agencies.

Relationships between ICD codes

Multiple ICD codes may be required to describe a condition or event. With simple episodes of care, it may be easy to infer the relationship with multiple ICD codes. For example, if N39.0 *Urinary tract infection, site not specified* and B96.2 *Escherichia coli [E. coli] as the cause of diseases classified to other chapters* are the only codes reported for an episode of care it is easily understood as “*E. Coli* causing a urinary tract infection”. With more complex or longer episodes of care, there may be relationships between multiple ICD codes. It is not clear for governments, researchers and the other users of ICD coded data **whether two or more codes are related** or unrelated, and instead assumptions are needed for interpreting data.

Some examples where ICD requires multiple codes to describe a condition or event:

Injuries
+
External causes

Poisoning
+
Drug, medication or substance

Manifestation
+
Underlying cause

Site of neoplasm
+
Morphology

Cluster coding with ICD-10-AM codes

Australia has implemented funding adjustments for public hospitals based on poor [safety and quality measures](#) using [ICD-10-AM codes](#) (the Australian Modification of ICD-10) and a data element that identifies the onset of a condition called the Condition Onset Flag ([COF](#)).

An example is drug-related respiratory complications such as respiratory failure (J96.99) from opioid drugs (Y45.0), where these arise during an admission the episode qualifies for a funding adjustment. However opioid drugs can cause many adverse effects such as dizziness or constipation, and with longer or complex episodes of care the Y45.0 code might be related to any number of conditions that should not qualify for a funding adjustment.

Australia uses metadata standards to define how data from episodes of care are reported to jurisdictional health departments and national health agencies such as the Independent Health and Aged Care Pricing Authority (IHACPA). IHACPA has begun to explore metadata standards to include a new data element in national morbidity reporting called the “diagnosis cluster identifier” (or DCID) to clarify the relationships between ICD-10-AM codes.

SCENARIO: A patient was admitted for hip replacements from osteoarthritic pain following a car crash 10 years ago. After surgery, the patient had significant constipation from opioids, requiring aperients and a change in pain medication. On day 5 the patient developed respiratory failure which was treated.

DCID	COF	ICD-10-AM	Type of diagnosis
A	2	M16.4 <i>Post traumatic coxarthrosis, bilateral</i>	Principal diagnosis
A	2	T93.1 <i>Sequelae of fracture of femur</i>	Additional diagnosis
A	2	Y85.0 <i>Sequelae of motor-vehicle accident</i>	Additional diagnosis
B	1	K59.0 <i>Constipation</i>	Additional diagnosis
B	1	Y45.0 <i>Opioids and related analgesics causing adverse effects in therapeutic use</i>	Additional diagnosis
B	1	Y92.24 <i>Place of occurrence, health service area, this facility</i>	Additional diagnosis
8	1	J96.99 <i>Respiratory failure unspecified, type unspecified</i>	Additional diagnosis

The alpha values of the [DCID](#) (e.g. A, B, C .. ZX, ZY, ZZ) indicate that a code is in a cluster with other codes with the same value. Numeric values are used for special reasons, 8 is used to indicate the ICD-10-AM code is not related to other codes.

In the scenario above, the DCID now tells us that Y45.0 and J96.99 are not in the same cluster and identifies that this episode of care would not qualify for a funding adjustment. Without the DCID the above scenario would incorrectly qualify for a funding adjustment.

Preparation for post-coordination with ICD-11 MMS codes

The implementation of new data elements and reporting requirements may take several years to improve in quality. Building familiarity with cluster coding before ICD-11 implementation starts the data quality improvement clock earlier, and supports the workforce to develop this new skill with their familiarity of the ICD-10-AM codes and conventions.

Australia already uses attributes from the ICD to support **displaying coded data in a different way to how it is stored**.

Stored as	Attributes	Displayed as
A390	Dagger code	A39.0†
G01	Asterisk code	G01*
M81203	ICD-O code	M8120/3

SCENARIO: a chronic smoker admitted with left diabetic foot from type 2 diabetes.

DCID	Stored as (URI)	Attributes	Displayed as	Reporting syntax
A	74527684	Part of cluster A, stem code	BD54	BD54&XK8G/5A11
A	271422288	Part of cluster A, extension code	&XK8G	
A	119724091	Part of cluster A, stem code	/5A11	
8	457960184	Part of no cluster, a stem code	QE13	QE13

The structural design of the DCID, along with attributes from ICD-11 MMS, may be used to report the stored ICD data as per the syntax requirements outlined in the ICD-11 Reference Guide. Storing data in this way may support the implementation of data validations that enhance data quality for the multiple uses of clinically coded data in Australia.

Further information on cluster coding in Australia can be found on [IHACPA's website](#).



Analysis of diagnostic search processes, code selection, and opinions on the use of ICD-11 among medical students in Mexico

14-18 October 2024

WHO-FIC

Poster Number 313

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Abstract This work presents a detailed analysis of the diagnostic search processes, code selection, and opinions on the use of the International Classification of Diseases, 11th Revision (ICD-11) among medical students in Mexico. Following a training session, information was collected through a survey on how future doctors use ICD-11 to identify and code diagnoses, evaluating their familiarity and confidence with the tool.

Introduction

In the training and implementation of ICD-11, it is crucial to consider both current and future users of WHO's international classifications, including medical students, to ensure its correct application. This analysis aims to understand how medical students in Mexico approach diagnostic searches, select codes, and their perspectives on the use of ICD-11. The results show the challenges and perceived advantages of using ICD-11, providing valuable insights into the effectiveness of current training and potential areas for improvement in medical coding education in Mexican medical schools.

Methods & Materials

We worked with a group of 25 students who participated in a 2-hour workshop on ICD-11. The workshop covered general information about the WHO Family of International Classifications, the history and evolution of the ICD, and the most relevant changes in the 11th revision. The template was presented in Spanish (<https://icd.who.int/es>), and the use of the coding tool and browser was demonstrated. Each student had access to a computer where they performed practical exercises throughout the workshop. At the end, they completed a questionnaire via Google Forms, which included 5 questions about personal data, 10 health conditions for which they searched in ICD-11, and 13 questions regarding their opinions and experiences with using the platform (2 "yes" or "no" questions, 6 questions with a Likert scale, 1 multiple-choice question, and 4 open-ended questions) Some of the questions and their options are:

- The ICD-11 improves the quality of the health care information I provide: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
- The ICD-11 saves me time when searching for diagnoses, conditions, or health information I provide: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
- It was easy to use the ICD-11 platform: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
- I would use the ICD-11 platform primarily for: studying, searching for diagnoses, providing better care for my patients, obtaining better health information.

Results

Chart 1: Questions for medical students about ICD-11, in Likert Scale

Questions in Likert Scale	Strongly agree	%	Agree	%	Neither agree nor disagree	%
The International Classification of Diseases, 11th Revision (ICD-11), improves the quality of the health care information I provide.	20	80	5	20		
The International Classification of Diseases, 11th Revision (ICD-11), saves me time when searching for diagnoses, conditions, or health care information I provide.	19	76	6	24		
It was easy to use the ICD-11 platform.	15	60	10	40		
It was easy to learn how to use the ICD-11 platform.	16	64	8	32	1	4
When I made a mistake on the ICD-11 platform, I was able to correct it quickly and easily.	14	56	10	40	1	4
I feel that I was able to find the diagnoses I searched for during the ICD-11 workshop.	15	60	10	40		

The sample consisted of 25 first-semester medical students, of whom 64% were women and 36% were men, aged between 18 and 23 years. All participants reported having no prior knowledge or experience with ICD-11. The entities to be coded were: Down syndrome, neurological developmental disorder autism spectrum, retinal condition in both eyes, early-onset Alzheimer's, threat of abortion, meningeal tuberculosis, diabetic cataract, breast cancer, gastric ulcer due to use of medications, and bilateral blindness. Of the participants, 87% selected the correct code, while 13% chose an incorrect or unspecific code. For example, the correct code for bilateral blindness (9D90.6&XK9J) was selected by only 60% of the students, while the rest chose only blindness (9D90.6). When asked, "Which diagnoses were the most difficult for you to find?" 64% reported that it was the retinal condition in both eyes. When asked "Why?", they mentioned reasons such as, "It was a little confusing because it involved navigating hierarchies," "The disease is very specific," "There are many variations and I didn't know which one to choose," and "It didn't appear exactly as named." In the Likert scale questions, the majority of participants selected "Strongly agree" for statements such as "The International Classification of Diseases, 11th Revision (ICD-11), improves the quality of the health care information I provide" (80%) and "The International Classification of Diseases, 11th Revision (ICD-11), "Saves me time when searching for diagnoses, conditions, or health care information I provide" (76%).

However, for statements like "It was easy to use the ICD-11 platform," "When I made a mistake on the ICD-11 platform, I was able to correct it quickly and easily," and "I feel that I was able to find the diagnoses I searched for during the ICD-11 workshop," the percentage dropped to around 60%. Only two questions received responses of "Neither agree nor disagree," and none were marked as "Disagree" or "Strongly disagree" (Chart 1).

Conclusions

The findings suggest that medical students in Mexico generally perceive the ICD-11 as a valuable tool that enhances the quality of the health care information they provide and helps them save time when searching for diagnoses and health conditions. While the overall feedback on the usability of the ICD-11 platform was positive, a notable proportion of students found aspects, such as navigating hierarchies and correcting mistakes, to be somewhat challenging. Despite these difficulties, the majority of participants felt confident in their ability to use the platform effectively after a brief introduction. These results highlight the need for further training in ICD-11 and integrating educational modules on ICD-11 into medical curricula could help future healthcare professionals better understand and utilize this essential classification system, ultimately improving health data quality and patient care outcomes.



Image 1: ICD-11 Workshop for Mexican medical schools

References

CIE-11. (2024). <https://icd.who.int/es>

Acknowledgements

Special thanks to CEMECE and the Faculty of Medicine at the University of Colima



Automatic real-time coding of Health Problems versus retrospective & manual coding by expert coders

14-18 October 2024

WHO-FIC

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Poster Number
314

Abstract This project is focused on a multi-terminology approach to get clinical information coded with ICD11, ICD10CM and SNOMED-CT, working in harmony in our organization. In April 2024, a first version of a real-time NLP engine, over the EHR using SNOMED-CT has been implemented. As an initial approach we present a comparative analysis between the SNOMED-CT codes from the clinical expressions registered by physicians at the beginning of episode and the hospital discharge diagnoses coded in ICD10CM registered by expert coders. In both cases, coding was supported by the trained Natural Language Processing (NLP) engine. Our goal is to evaluate the completeness, equivalence and the degree of concordance between the two types of codes recorded.

Introduction

As exposed in the Terminologies paper, our use case to harmonize the use of different terminologies in the clinical process is based in a "bottom-up" approach based on supervised NLP over free clinical expressions introduced by physicians¹.

In 2023, a previous poster² presented the findings of the comparison between ICD11 and SNOMED codes to determine the degree of agreement in a real scenario.

Recently (April 2024) a dual coding NLP engine is operating over in the EHR using SNOMED-CT and ICD10CM, our current coding standard in Spain. A new list of Health Problems (HP) is built using primarily SNOMED-CT. Discharge diagnoses are registered in ICD10CM.

Methods & Materials

Objectives:

- To perform a comparative analysis between:
 - the HP proposed in real time by physicians at the beginning of the care process, and
 - the hospital discharge diagnoses coded at the end of the inpatient episode with ICD10CM by a group of expert coders in a retrospective manner.

In both cases with the support of the NLP engine.

- To determine the current behavior of users when registering HP.

Materials:

A random sample of 25 inpatients episodes, in the first 45 days after the implementation of the HP list with, at least, three HPs reported and coded.

Methods:

Evaluation of the completeness, equivalence and the degree of concordance between the codes obtained in the two different terminologies, and to detect differences in their specificity and possible inconsistencies and incongruities between them.

References

¹ Background WHOFIC meeting 2019 Poster Id. 327
<https://cdn.who.int/media/docs/default-source/classification/who-fic-network/terminologies-in-who-fic-white-paper.pdf>

² "Organizing a proper catalogue to capture and code clinical concepts at Hospital Clínic of Barcelona"
Background WHOFIC meeting 2023 Poster Id. 602

Results

a) Completeness and equivalence:

A mean by patient of 2,2 SNOMED codes in HP list versus 7 ICD10CM codes as discharge diagnosis ($t=5,57$, $p<0,001$).

A total of 13 HPs (22,8%) are not present as discharge diagnoses.

b) Coding:

Only 2 of 57 (1,8%) HPs were not coded by the NLP engine.

c) Concordance between recorded SNOMED and ICD10CM codes:

A total of 47 pairs of SNOMED-ICD codes has been analyzed in detail about their clinical significance.

- 50 % (22): exact concordance.
- 45% (20): nearby correspondence.
- 5 % (5): no concordance.

Qualitative analysis:

Those 20 with a nearby correspondence are related with the degree of specificity in the assigned code. Half of them (10) have an ICD code more specific than the HP. In 6 cases the ICD code is less specific than the recorded HP. In 4 cases the differences are due to different approach in the selection of the code. As examples of those differences are the preferent selections on causes, morphology, location, laterality, etc.

	Mean	Std Dev
HP in SNOMED	3	0
Dx in ICD	8,44	4,88

Table 1: number of registries by patient before removing duplicates
($t=5,57$, $p < 0,001$)

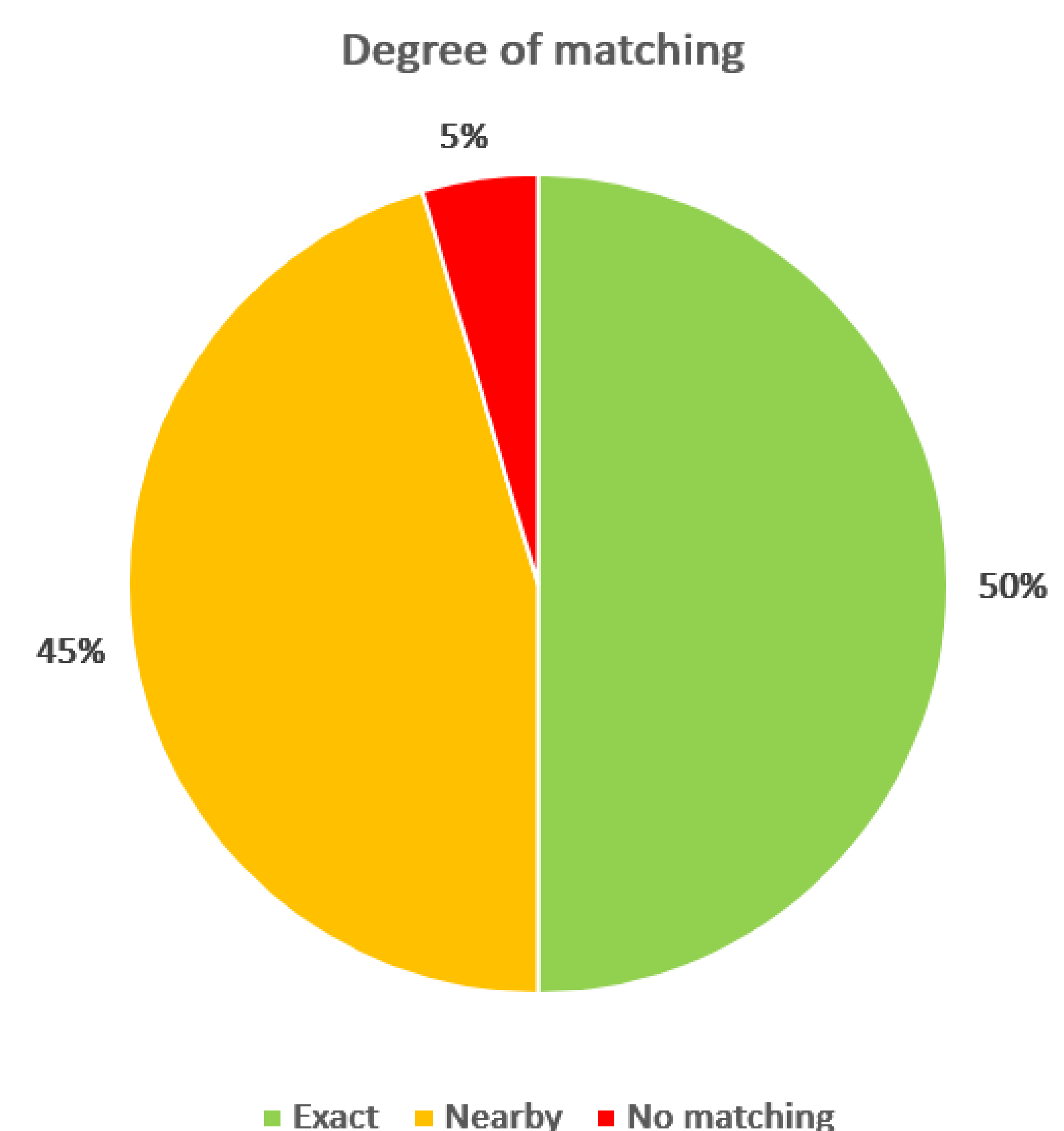


Chart 1: Qualitative analysis. Degree of clinical matching by patient between SNOMED codes in HP list and ICD10CM codes at discharge diagnoses.

Conclusions

- A greater exhaustiveness is achieved in the discharge diagnosis because are mainly based in the discharge report and the involvement of the experts' coders who look other sources of clinical information in the EHR.
- However, there are HPs which are not included as diagnosis at discharge.
- Nearly in half of the cases the correlation between SNOMED and ICD is complete. In the nearby matching the difference depends on the degree of terminology specificity. The disagreement (10%) is due to different coding criteria.

Improvement proposals:

- Improve the quality of clinical text and the management of the HP list.
- Keep a continuous surveillance and maintenance of the coding engine and the catalogs.
- Take profit of the complementarity developing a supervised refeeding the two list of codes.
- Develop a guide of good practices and established criteria for coding.

Strengthening Primary Health Care Through Coded Data in Rwanda

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¹ Ministry of Health Rwanda, ² World Health Organization Rwanda, ³ University of Rwanda

Abstract The Rwanda Ministry of Health adopted the World Health Organization’s Family of International Classifications (WHO-FIC) and eHealth strategies to promote efficient communication among primary, secondary, and tertiary levels. The WHO-FIC is now being integrated into the various health information systems, connected through the health information exchange platform to strengthen the continuity of care, the quality of health services, and the availability of quality data.

Introduction

Without good continuity of care, many patients experience poorly integrated care from various providers with suboptimal health outcomes due to inadequate sharing of clinical information. Continuity of care and eHealth are interlinked. The Rwanda Health System includes 518 public health centers that serve 85% of the population (Fig.1). Digitalizing the PHC level was, therefore, necessary.

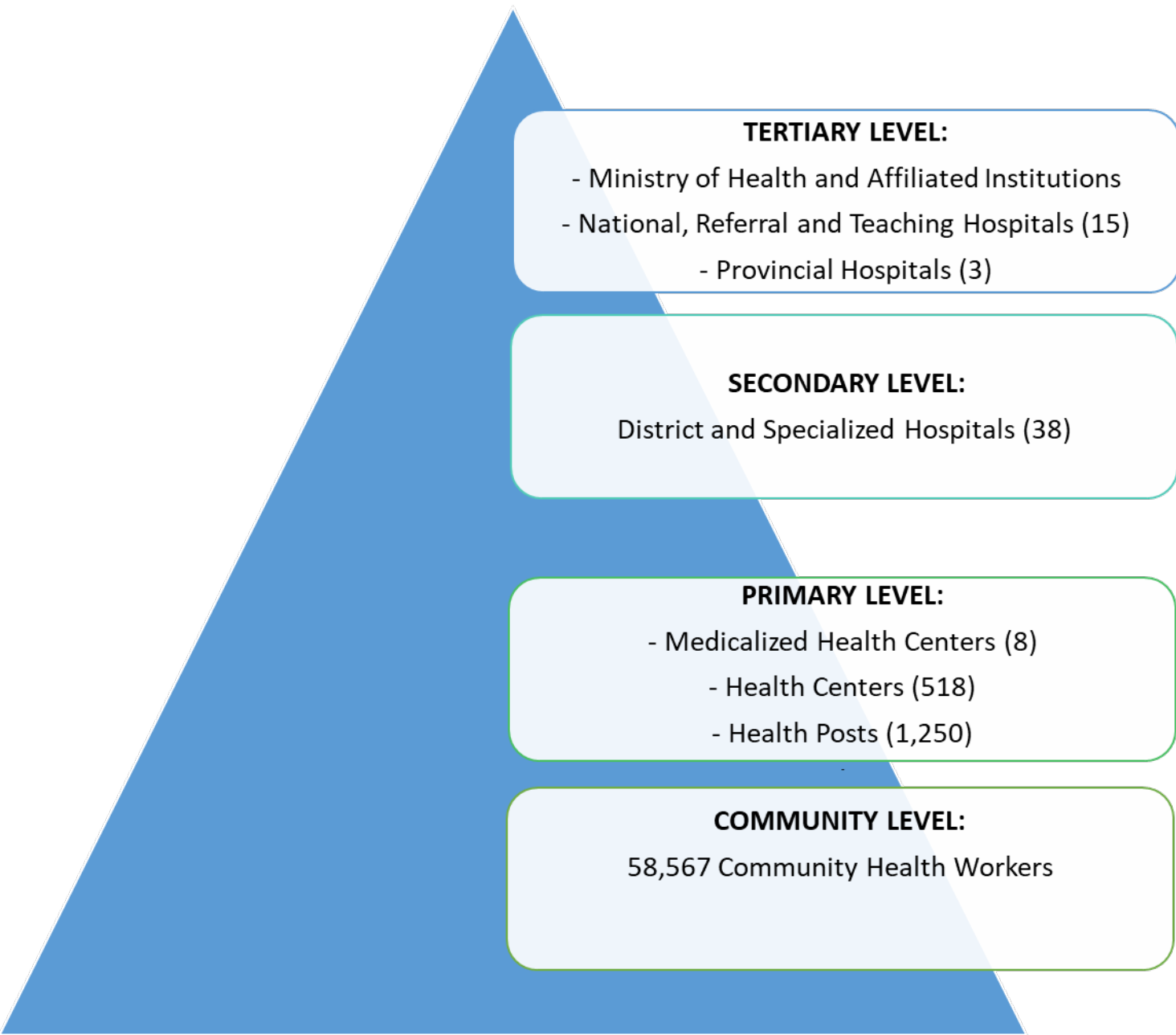
The World Health Organization’s (WHO) Family of International Classifications (FIC) includes the International Statistical Classification of Diseases and Related Health Problems (ICD), the International Classification of Functioning, Disability and Health (ICF), and the International Classification of Health Interventions (ICHI). They serve multiple uses, including at the primary health care (PHC) level, and are scientifically updated for use in a digital world.

Methods & Materials

The MoH developed a comprehensive digitalization roadmap that included: (i) the adoption of Health data and interoperability standards, (ii) the Health Information Exchange (HIE) platform, and (iii) the expansion of the Electronic Health Record (EHR) system at PHC level.

Consequently, the MoH mandated the use of WHO-FIC in all public and private health facilities in 2023. The HIE platform was developed to integrate various health information systems. The national EHR system was upgraded with ICD-11 in hospitals and health centers using a phased approach, including countrywide training.

Fig 1: The Rwanda Health System

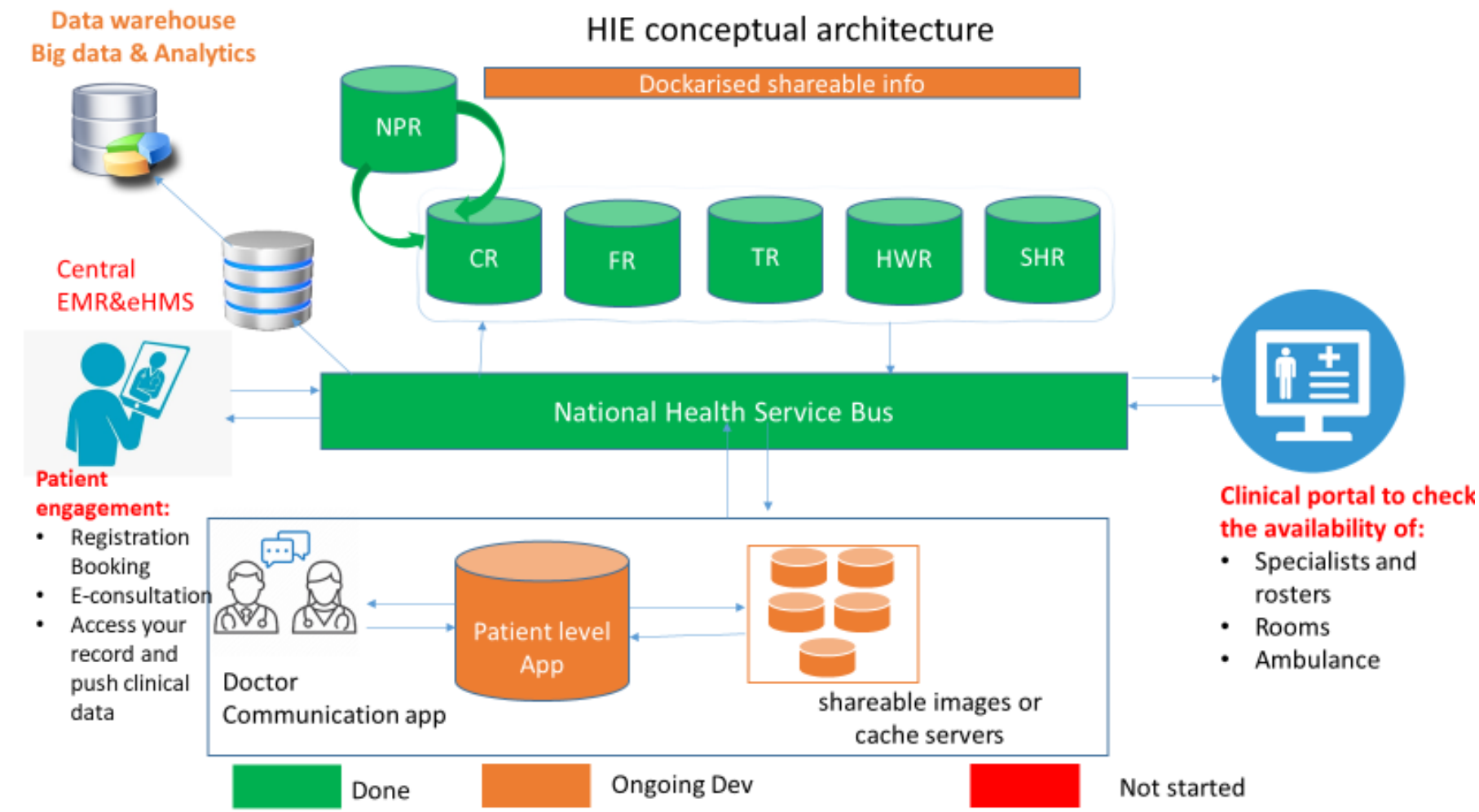


Results

All health information systems are now transitioning to integrate ICD-11, ICHI, and ICF.

The HIE platform connects nearly 200 sites for a seamless exchange of patient health information (Fig.2)

Fig 2: The Rwanda Health Information Exchange (HIE) Platform



The national EHR integrating ICD-11 is used in all public hospitals. All public health centers in the Kigali Province now use the enhanced EHR.

The deployment of the enhanced EHR is ongoing in the Eastern and Northern provinces, with a target to digitalize all public health centers by the end of 2024 (Fig.3).

Fig 3: Proportion of health centers that use the enhanced EHR and ICD-11 (Sept. 2024)

Province	Number of health centers	Number (percentage) of health centers using the enhanced EHR
Kigali	37	37 (100% in Kigali)
East	122	Ongoing
North	105	Ongoing
West	125	Not started
South	129	Not started
Total	518	7%

At the health facility level, coded data fosters the availability of real-time information on the number of patients with specific conditions to allow for proper planning and allocation of personnel and resources. At the national level, such information is used for statistical purposes, research, and planning.

The main challenges include the limited availability of reliable and stable Internet in remote facilities, the shortage of IT equipment at the health center level, and the limited digital literacy of older health workers.

Conclusions

Healthcare providers now have reliable access to comprehensive medical histories, enhancing the accuracy and efficiency of patient care to improve healthcare outcomes.

The digitalization of PHC and the use of coded data fosters the availability of quality and standardized data to improve the planning and allocation of resources at all health system levels.

Integrating various health information systems, including health insurance portals, is ongoing to strengthen patient management, reduce waiting times, and improve the quality of care.

Coding of patient information and its exchange across various health facilities improves the continuity of health service.

To conclude, the use of coded data holds the promise to improve health by accelerating the development and adoption of appropriate, affordable, scalable, and sustainable digital health solutions and the use of health data to promote the health of everyone, everywhere, and to achieve Universal Health Coverage.

Picture A consultation in a health facility (Courtesy: WHO)



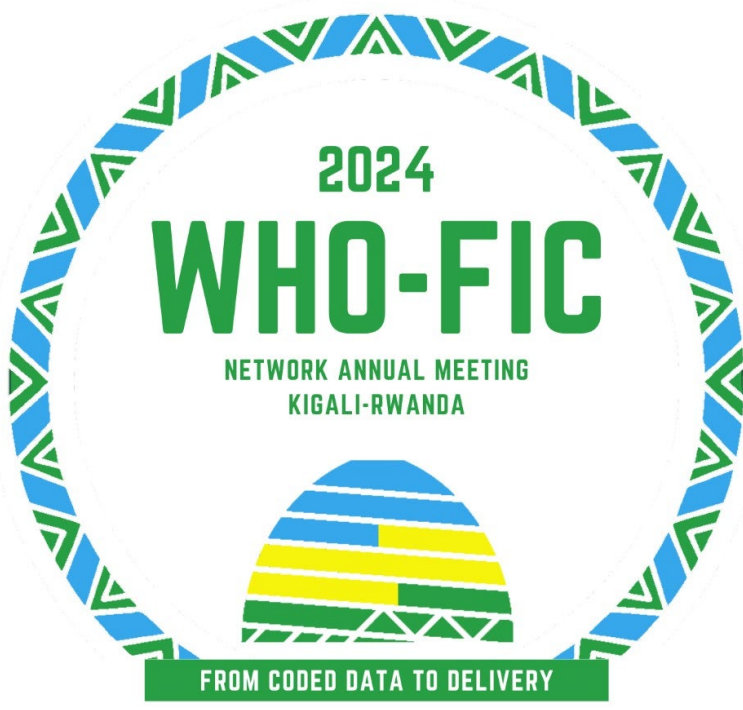
Acknowledgements or Notes

The authors of this paper would like to acknowledge everyone involved in the digitalization of the health system in Rwanda.

The authors recognize no conflict of interest.

Further, no funding was provided in the context of this research.

Abstract ICPC-3 entities regarding reason for encounter content primary care is mapped to relevant content in ICD-11. Relevant entities included in the ICD-11 Low Resource Version are also examined. The ICPC-3 User Guide released by WONCA states that Reason for Encounter is not captured by ICD. The mapping from ICPC-3 to ICD-11 does not support this claim. Over 80% of the 306 ICPC-3 entities mapped were found to have an exact map to ICD-11. A further 8% had a narrower map. 5 entities had no map. 74% of the ICD-11 entities found through the mapping were included in the Low Resource Version. Possible updates to ICD-11 have been examined.		
Introduction ICD-10 and ICPC-2 have each been used to classify primary care. As ICD-10 did not adequately include reasons for encounter, ICPC-2 was included in WHO-FIC as a related classification. ‘Primary care (is) essential front line health care ... made universally accessible to individuals and families ... through their full participation and at a cost that the community and the country can afford to maintain... ICD-11 includes many diagnostic and disease entities that are common reasons for care at the first level of health services. ICD-11 has a simplified version for low diagnostic resource primary care settings. (ICD-11 Reference Guide 2.23.3.7).’ Primary care health is a task in the FDC Strategic Work Plan, following discussions in earlier years. ICPC-3 has been released by WONCA. The User Manual claims that ‘reason for encounter (RFE) ... is not captured by ICD’. This claim is examined here.	Results Mapping ICPC-3 to ICD-11 306 ICPC-3 entities were mapped: • 246 ICPC-3 entities (80%) have an exact ICD-11 match • 24 ICPC-3 entities (8%) have a match to a narrower ICD-11 code • 31 ICPC-3 entities (10%) have a match to a broader ICD-11 code • 5 ICPC-3 entities (2%) have no map to ICD-11 Narrower maps can arise from combined entities in ICPC-3 which are separate in ICD-11, including ICPC-3 entities which map to male/female entities in ICD-11. For 14 of the broader maps, an ICD-11 index term provides an exact map. Excluding the 5 no maps, 301 ICPC-3 entities were mapped to ICD-11: • 222 (74%) are included in ICD-11 Low Resource Version • 79 (26%) are not included in ICD-11 Low Resource Version Of the 246 exact maps: • 116 (47%) were one to one. Most were proposed in the ICPC-3 browser. • 130 (53%) additional exact maps were identified: - 70 ICPC-3 codes reported ‘no exact corresponding class’ in ICD-11, but an exact map was identified - 60 ICPC-3 codes just reported a range of ICD-11 codes, but an exact map was identified.	Conclusions With 80% of the mapped ICPC-3 entities having an exact match in ICD-11, it is not correct to state that RFE is not captured by ICD-11. ICD-11 contains the bulk of the Symptoms, complaints and abnormal findings content of ICPC-3, plus the broader content of chapters A1, A and Z. There are two actions in relation to ICD-11 which should be addressed: 1. Review the WHO entities where the ICPC-3 map is not exact. A quick review suggests that many of these do not warrant any change to ICD-11, with a number arising from ICPC-3 language and scope. But there are a number where further discussion appears worthwhile. 2. If there is an ongoing use case for the Low Resource Version, a number of ICD-11 entities should be included in the Low Resource Version. It would be worthwhile to establish an ongoing interaction between WHO-FIC and the WICC, the WONCA Committee responsible for ICPC. Initial discussions have shown a willingness from WICC for this. The ICD-11 Reference Guide (2.23.3.7) proposes that ICD-11 and ICPC ‘share a common subset of categories’, which would establish a worthwhile goal for these discussions. In the published Terminology paper there are recommendations to use the reference classifications when possible. Related classifications should not replace the reference classifications. Within WHO-FIC, the Family Development Committee could provide a sound base for relationships with the WICC.
Methods & Materials ICPC-3 comprises 19 chapters • 3 chapters (A1, A and Z) for ‘general issues, for prevention, family planning and general examination, for social problems’ • 14 chapters (B to U) ‘representing the localisation of the problem and / or disease’, each with two sections - Symptoms, complaints and abnormal findings - Diagnoses and diseases • 2 chapters cover functioning and interventions. Entities in red were mapped to ICD-11. Each ICPC-3 entity includes a map to ICD-11, some to a single ICD-11 entity, some to more than one ICD-11 entity. Many of the ICD-11 suggested maps are headed ‘no exact corresponding class’. 306 entities were mapped to ICD-11. Where an ICD-11 entity is identified as an appropriate map, it was noted if the entity is included in the ICD-11 Low Resource Version.		Acknowledgements or Notes Many WHO-FIC members have contributed to Primary Care discussions in the past. Gustavo Gusso and Julie Gordon from WICC have been helpful in initiating the current work.



ICD-10/ICD-11-Mapping: Evaluation of the CodeFusion Tool

14-18 October 2024

WHO-FIC

Poster Number
318

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Abstract With the introduction of ICD-11, there is a need to map ICD-10-GM (German Modification) currently used in Germany to ICD-11. This requires precise and efficient mapping strategies to ensure the continuity and comparability of health data. In this context, we have tested the CodeFusionTools provided by the WHO for the conversion of ICD-10-GM codes to ICD-11 codes. The aim is to evaluate the accuracy, user-friendliness, and practical challenges of using this tool. This poster reports on the experiences gained during the testing.

Introduction

ICD-11 is vital for addressing the digitalization requirements in today's healthcare systems ensuring semantic interoperability of healthcare data. With the transition to ICD-11, it is necessary to map ICD-10-GM (German Modification) to ICD-11, which is currently widely used for health data reporting and billing in Germany. It requires precise and efficient mapping strategies to ensure the continuity and comparability of health data including accurate and reliable mapping tools. The CodeFusion Tool Version 0.9.4. developed by WHO was selected for testing. It is designed to assist in coding diagnoses and medical phrases using ICD or other WHO-FIC classifications.

Methods

The CodeFusion Tool can read Excel (.xlsx) and tab-separated text files (.txt) as an input file. It matches the text in these files to the appropriate codes and URIs of the selected classification (ICD-11 MMS, ICD-11 Foundation, ICF, ICHI) and version (2024, 2023, etc., daily). The tool can be downloaded from the WHO website <https://icd.who.int/docs/codefusion/en/> and consists of an executable file and a parameter file in JSON format. We selected the file "Alpha-ID-SE 2024.xlsx" as the input file because it contains all of the nearly 90,000 diagnostic terms of the Alphabetical Index of ICD-10-GM. The output file includes beside the ICD-11 codes and URIs the best match phrase, the match level and the match score.

The match levels are defined as follows:

- GoodMatch: very good match. Every word or an equivalent is found and there are no additional words other than the words that could be ignored
- MatchHasAdditionalWords: all words are found in the matching text but it has some additional words.
- FlexiMatch: a match that is found using the Flexible search algorithm. Some words are not included in the search result.
- NoMatch: no match is found that has a higher score than requested threshold.

The match score is a value between 0 and 1, with higher scores indicating a better match. We chose a match score threshold of 0,01 to see the spread of scores (see Fig. 1 and Fig. 2).

Results

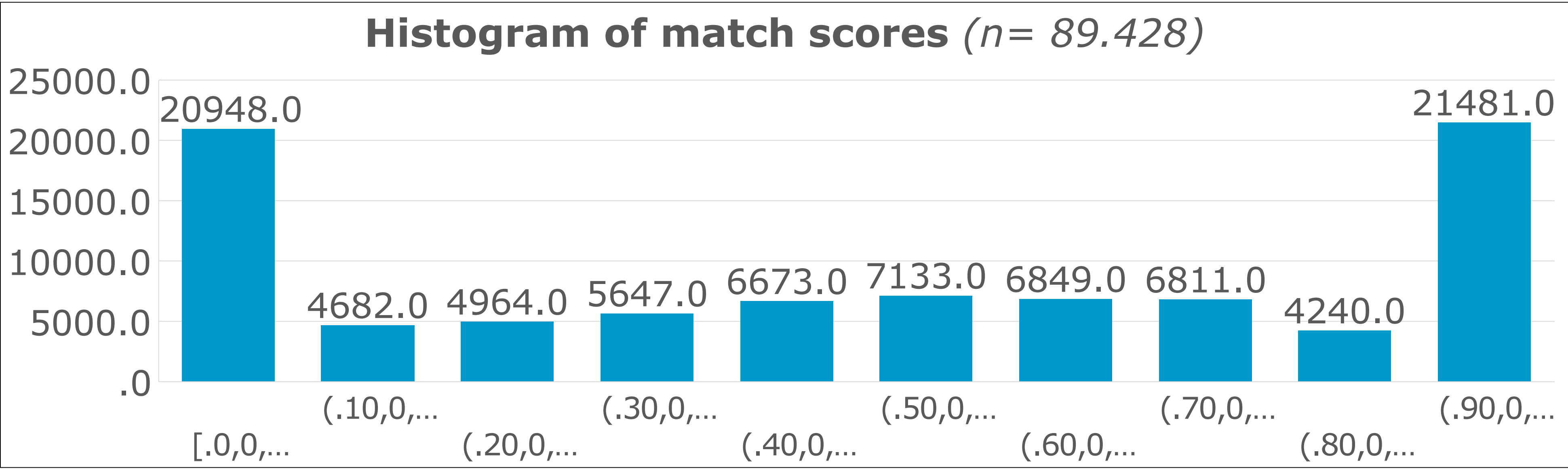


Fig. 1: Histogram of match scores of ICD-10-GM to ICD-11-DE mapping

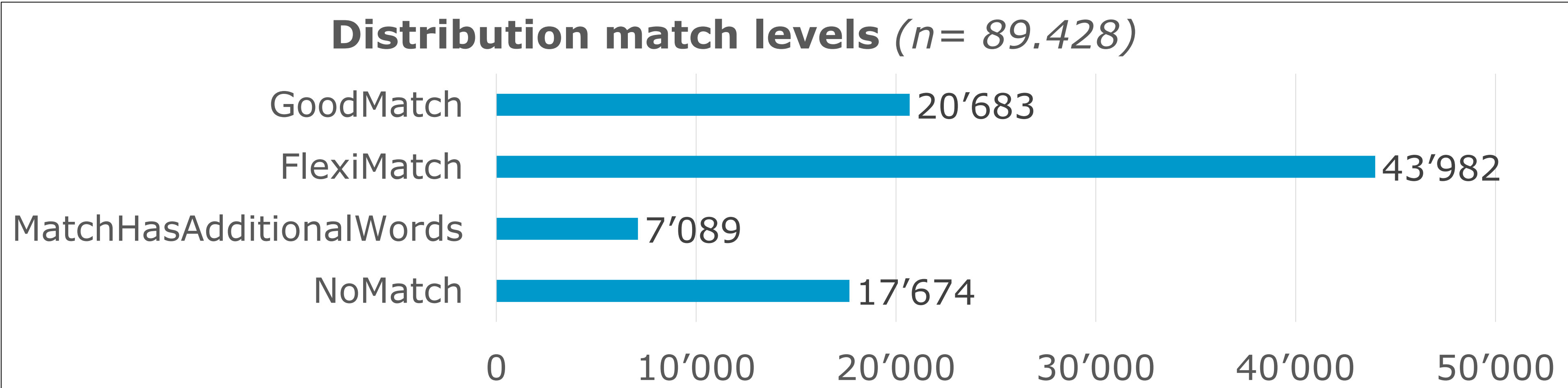


Fig. 2: Histogram of match levels of ICD-10-GM to ICD-11-DE mapping

Approximately 20% of diagnostic terms do not match at all (NoMatch; match score < 0,01). Approximately 23% of matches are GoodMatch (match score = 1). The majority of matches (approx. 57%) are in between with a focus around a match score of 0,5 to 0,6.

Exam- ple #	ICD- 10-GM Code	Phrase	Match Level	Match Score	best Match Phrase	ICD-11- DE Code	better Code
1	J20.9	Akute Bronchitis	GoodMatch	1	Akute Bronchitis	CA42.Z	-
2	A00.0	Klassische Cholera	GoodMatch	1	Klassische Cholera	1A00 & XN8P1	-
3	C00.0	Oberlippenkrebs	GoodMatch	1	Oberlippenkrebs	2B60.Z	2B60.Z & XA7VQ4
4	C54.9	Bösartige Neubildung des Uteruskörpers	FlexiMatch	0,7	Gutartige Neubildung des Uteruskörpers	2F31.1	2C76.Z
5	A78+	Endokarditis bei Q-Fieber	FlexiMatch	0,9	Q-Fieber-Endokarditis	1C33	-
6	D38.1	Tumor der Trachea	MatchHas Additional Words	0,8	Bösartiger Tumor der Trachea	2C24.Z	2F91.1
7	D84.9	Primärer Immundefekt	MatchHas Additional Words	0,8	Primäre Immundefekte, nicht näher bezeichnet	4A0Z	-
8	S42.10	Skapulafraktur	NoMatch	0	-	-	NC12.1

Fig. 3: Examples of mapping results of ICD-10-GM to ICD-11-DE mapping

- GoodMatch provides correct stem code, but can lack post-coordination (Example #3).
- FlexiMatches and MatchHasAdditionalWord can either provide wrong (#4; #6) or true matches (#5; #7).
- NoMatch can lack because of missed recognition of compound words (#8).

Overall Tool provides a structured approach, demonstrating strong potential in accuracy and user-friendliness. Result should be reviewed by a human coder especially when the matching level is not GoodMatch. Further detailed testing will be carried out during the transfer of the mapping results into the German ICD-11 foundation.



MEXICAN WHO-FIC CC ANNUAL REPORT 2024

14-18 October 2024

WHO-FIC

Poster Number

319

Auhors: Zaragoza, C.; Yañez, M.; Barranco, A.; Cuevas, Y.; Vazquez, B.; Paredes, T.;
Chávez, E.; García, N.; Velázquez, A.; Fonce, C.; Santos, S.; et al.

Ministry of Health Mexico, MoH Colima, Nuevo Leon, IMSS Bienestar, INCMNSZ, INGUDIS

Abstract During the last year, the Mexican WHO-FIC CC (CEMECE) has worked in the dissemination, promotion and surveillance of the correct use of the WHO-FIC in Mexico and supports countries in the Region of the Americas with support of PAHO and WHO. This poster shows briefly this activities during last year.

Introduction

The Mexican WHO-FIC Collaborating Center (CEMECE) has an participation with the WHO/PAHO in the development, maintenance and revision of the Classifications, Terminologies and Standards (CTS) products. In the 2024 has been involucrate in the training, dissemination in Mexico and South America in particular the International Classification of Diseases (ICD) and the International Classification of Functioning, Disability and Health (ICF). Also had been part of the network in different committees and reference groups of the WHO FIC, as MRG, FDRG, EIC, ITC, CSAC-ICF and VARG. Finally Mexico was the hosted of the WHO FIC Mid Year Meeting 2024.

ICD-11

CEMECE, in collaboration with Regional Training Centers, has carried out dissemination and training activities for general and specific knowledge of ICD-11, covering mortality and morbidity components, all over the year in different regions of Mexico. In collaboration with PAHO, the training of ICD-11 instructors of Panama was concluded on June 2024, resulting in 15 instructors of ICD-11 who can start the training within the country. Collaborative efforts continue with countries such as Colombia and Brazil.

ICF

Since the publication of the NOM-039-SSA-2023 regulation on Disability Certification, the training and dissemination of the International Classification of Functioning, Disability, and Health (ICF) have taken on special significance this year. On one hand, 600 health professionals involved in the assessment and issuance of electronic disability certificates have been trained in accordance with the aforementioned standard, which is based on the International Classification of Functioning, Disability, and Health (ICF). On the other hand, a group of 50 individuals received training in the ICF through two courses at the basic and intermediate levels.

In August of this year, Mexico inaugurated its first Disability Assessment Centers and Electronic Certificate Issuers (CEVADECE), along with the issuance of the first electronic disability certificates using the biopsychosocial approach based on the ICF. There are now over 40 CEVADECE centers across the country. Additionally, the Questionnaire on Activity and Participation in Infants and Adolescents (CAPIA), designed by a group of national experts, has been introduced as one of the instruments to be used in the evaluation of Activity and Participation for the issuance of Disability Certificates.

WHO FIC Mid Year Meeting 2024

Chart 1: Participant at the WHO FIC Mid-Year Meeting, Mexico, 2024.



Mexico, through its Collaborating Center, CEMECE, Pan American Health Organization (PAHO) and Brazil Collaborating Center, hosted the WHO Family of International Classifications (WHO-FIC) Mid-Year Meeting 2024, held in Mexico City from May 13 to 17 of this year.

The event brought together more than 140 participants, both in person and virtually, from over 20 countries worldwide, with the presence of the:

- Functioning and Disability Reference Group (FDRG)
- Mortality Reference Group (MRG)
- Morbidity Reference Group (MbRG)
- Informatics and Terminology Committee (ITC).

Additionally, a webinar on the Digital Open Rule Integrated Cause of Death Selection (DORIS) Automated Coder was held, with the participation of 300 attendees across the Region of the Americas.

WHO FIC network

Throughout this year, CEMECE has actively participated in various reference groups and committees, including:

- The PAHO webinar on ICD-11 updates from the annual WHOFIC meeting held on December 23, with participation from countries such as Canada, Argentina, and Mexico.
- The Education and Implementation Committee (EIC), contributing to the review and proposals for the educational tool in January.
- The Informatics and Terminology Committee (ITC), involved in the Harmonization Criteria and Update Process, specifically the inventory of areas of overlap a continuous work from 2023 to date.
- Meetings of the Verbal Autopsy Reference Group (VARG), including the review and editing of the "Cause of Death Assignment by Physicians from Verbal Autopsy Data - Manual for Physician Reviewers" in March, and participation in the Technical Workshop in September.
- The Classification and Statistics Advisory Committee (CSAC) and the ICF, by joining the virtual meeting in April.
- The Mortality Rule Digitalization (MRD) group, where it took part in Technical Workshops in April and July, with a focused role in analyzing the M2 specificity step.

Acknowledgements or Notes

We extend our gratitude to PAHO, WHO, and the Brazil Collaborating Center for their invaluable support over the past year in achieving the goals and activities outlined here. We also wish to thank the members of the Mexican Collaborating Center (CEMECE) for their tireless dedication and commitment.





Validation of WHO ICD-10 to ICD-11 Mappings:
A Comprehensive Review

14-18 October 2024

WHO-FIC

Poster Number
320

Authors: Sharon Baker¹, Alana Lane¹, Nicole Rankin², Samson Tu³, Eva Krpelanova⁴
¹ Canadian Institute for Health Information, ² Independent Health and Aged Care Pricing Authority, Australia, ³ Stanford University CC, USA, ⁴ WHO

Abstract The validity of the WHO ICD-10/ICD-11 maps is crucial for WHO-FIC Network members to bridge ICD-10 and ICD-11. Since its establishment, the Mapping Task Force (MTF) has been diligently working towards achieving its objectives. One key area of the workplan involves validating the WHO ICD-10 to ICD-11 mappings. Conducted by volunteer reviewers, the validation process includes comprehensive comparison of a map subset developed by the Canadian Institute for Health Information (CIHI) and the WHO maps. The poster will describe the progress of the work and issues raised by it.

Introduction

A key priority for the MTF is the review and validation of the existing WHO ICD-10 to ICD-11 mapping tables. Ensuring these mapping tables are accurate and robust is crucial for the successful transition to ICD-11. CIHI has successfully completed a primary mapping from version 2018 ICD-10-CA to the 2022 version of ICD-11 MMS. A subset of this mapping table, focusing exclusively on ICD-10 codes, was derived to support this work.

Methods & Materials

Approximately 2,700 ‘no match’ maps resulted from the CIHI review when compared to the WHO 2023 release maps. The WHO map targets were updated to the 2024 release of ICD-11 resulting in 2,376 ‘no match’ maps that were used for the MTF review.

The validation exercise used the 2024 versions of ICD-11 MMS (including the use of the Coding Tool) and WHO mapping tables.

Volunteer reviewers were recruited from WHO-FIC Collaborating Centres and initially met with the MTF subgroup, where a presentation with examples guided the reviewers through the mapping process. There were 5 teams of 2 reviewers with each team receiving a spreadsheet with a designated number of maps for review containing the following fields:

- the ICD-10 source codes,
- the ICD-11 MMS target codes assigned in the WHO mapping table,
- the ICD-11 MMS target codes assigned by CIHI experts; and
- links to the ICD-10 and WHO map target codes in the ICD-10 and ICD-11 browsers.

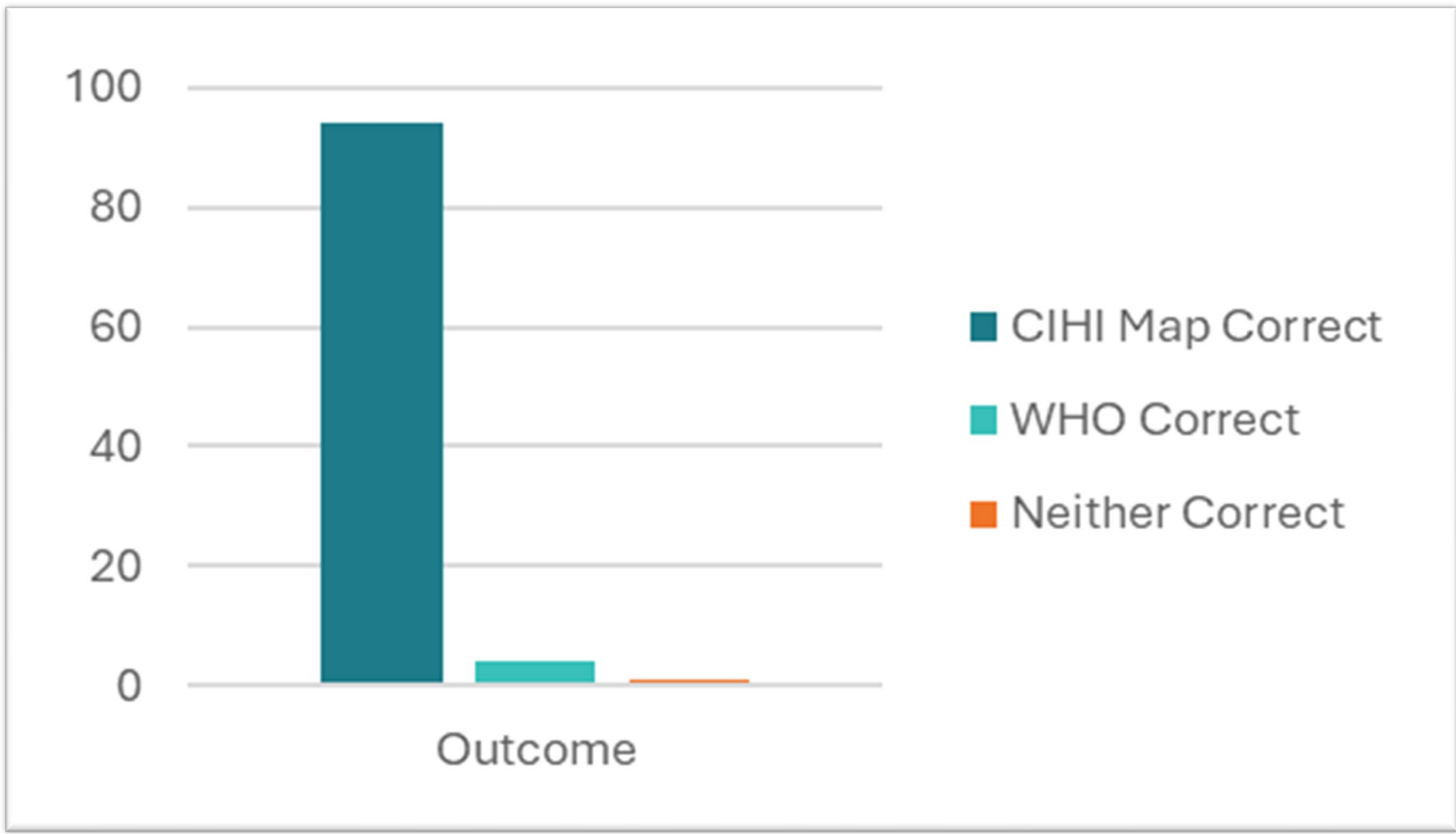
The reviewers used their knowledge of ICD-10 and ICD-11, the browsers, and the coding tool to determine whether the WHO map or the CIHI map is correct, or, if neither is correct, to suggest the correct map target. The “correct” map target is defined to be the most-specific ICD-11 MMS code, possibly using post-coordination, that can be formulated to capture the meaning of the ICD-10 source code.

From the initial batch of 489 maps, 185 maps were identified where there was no consensus. These were reviewed and discussed by the MTF subgroup to resolve.

Results

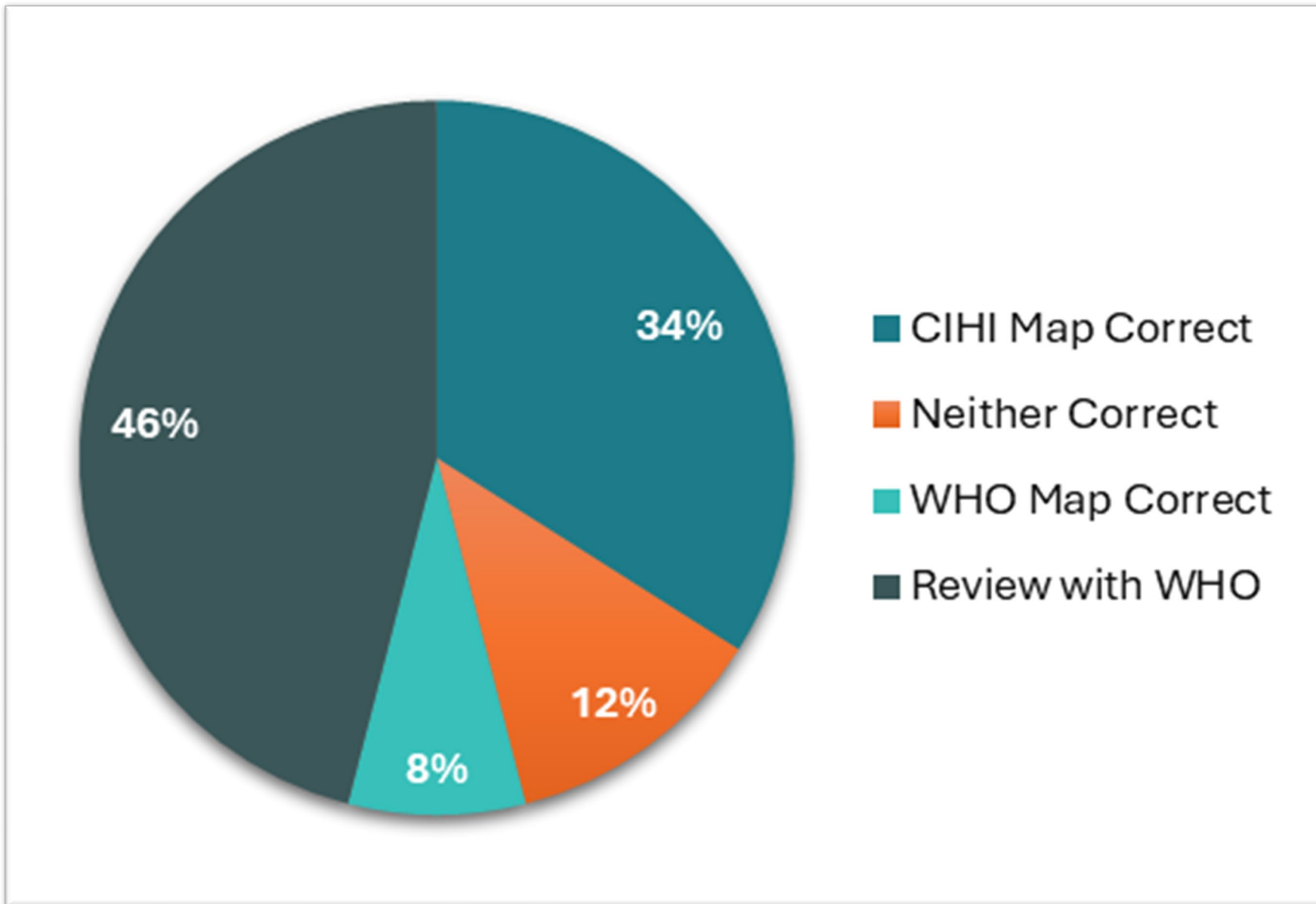
Out of the 489 maps reviewed, 303 reached reviewer consensus. Among these, 94% (n=285) agreed that the CIHI map was correct, 4% (n=13) supported the WHO Map, and 1% (n=5) concluded that neither map was correct.

Figure 1 Comparison of maps with consensus between reviewers.



Of the 185 maps reviewed for conflict resolution, 34% (N=62) were resolved in favour of the CIHI map being correct, 12% (n=23) determined that neither was correct, 8% (n=14) resolved in favour of the WHO Map being correct, and 46% (n=86) were identified as requiring further discussions with WHO before a resolution could be reached.

Figure 2 Conflict resolution results



During the conflict resolution process, 98 cases were identified as requiring further review with WHO. Of these 81% (n=79) were related to codes within Chapter II of ICD-10 (C00-D48). Mapping in this chapter can be challenging due to the structural hierarchical changes from ICD-10 to ICD-11.

Of the 489 maps where the outcome identified CIHI maps conflicted with the WHO Maps, 223 of these were associated with an ICD-10 residual code, such as ‘Other specified’, (.8) and ‘Unspecified’ (.9) code categories. Some of these conflicts occurred because the legacy ICD-10 terms were not indexed to equivalent ICD-11 concepts. In other cases, the ICD-11 Coding Tool search resulted in mapping to a ‘Z’ (Unspecified) residual code instead of a ‘Y’ (Other specified) residual code (see Table 1). In some instances, the WHO map, that is constructed according to the mapping conventions described in the mapping white paper, pointed to a different code than the code selected by the Coding Tool (see Table 2).

Table 1 Example of CIHI and WHO maps in conflict where there is no indexing of the legacy term in ICD-11.

ICD-10 Code	ICD-10 Code Description	WHO Map	CIHI Map
D53.8	Other specified nutritional anaemias	3A03	3A0.Y

Table 2 Example of CIHI and WHO maps in conflict where the ICD-11 Coding Tool leads the mapper to a Z code where it is expected that an ‘other’ specified term would be classified to a Y code (residual category).

ICD-10 Code	ICD-10 Code Description	WHO Map	CIHI Map
E56.9	Vitamin deficiency, unspecified	5B7Z	5B7Y

Conclusions

The review and validation of the first batch of the ‘no match’ map provided valuable insights. However, the process took longer than initially estimated due to volunteer availability, and lower-than-expected consensus. This led to additional MTF subgroup meetings and required further review and input from WHO. Although the validation work is ongoing, preliminary results have highlighted issues with the mapping tables, particularly with mappings to the residual categories in ICD-11. As a result, we have decided to temporarily remove the ‘Other specified’ residual category from the remaining batches until a clear strategy for handling them is established. We aim to begin reviewing the second batch shortly.

Acknowledgements

We would like to extend our thanks to the MTF members and all the volunteers for their invaluable participation in this important work. Special thanks to Victoria Tudge¹, David Dawes¹, Greg Tait¹, Debbie Maitre¹, Lisa Swain¹, Joshua Somerville¹, Laura Faedo², Søren Bang³ and Oystein Hebnes ⁴.

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Questionnaire to Survey the WHO-FIC Mapping Needs and Plans for ICD-10/ICD-11 Mappings

14-18 October 2024

WHO-FIC

Poster Number
321

Samson Tu¹, Sharon Baker², Alana Lane², Eva Krpelanova³,
Members of Mapping Task Force
Stanford University CC, USA¹, Canadian CC², WHO Liaison³

Abstract The Mapping Task Force conducted a survey to understand the requirements, use cases, challenges, and plans for ICD-10/ICD-11 mappings various Collaborating Centres may have. The results demonstrate a widespread requirement for validated WHO ICD-10/ICD-11 mappings, facilitation in coordinating mappings for country-specific modifications, and improvement of the Foundation. MTF is already engaged in some of the tasks but more can be done in the future.

Introduction

The Mapping Task Force (MTF) was established based on the recommendation of the WHO-FIC Council meeting at the WHO-FIC Annual Meeting in 2022. It is asked to serve as an independent crosscutting working group within the WHO-FIC Network to provide advice to WHO regarding planning and prioritizing mapping between WHO-FIC classifications and terminologies. During the transition to ICD-10, multiple maps were independently developed by WHO and other users. The initial aim of the MTF is to avoid future duplication of mapping efforts within the WHO-FIC Network. To help with MTF's coordination role, MTF conducted a survey to understand the requirements, use cases, challenges, and plans for ICD-10/ICD-11 mappings the Collaborating Centres may have. This poster describes the main takeaways of the questionnaire results.

Methods & Materials

The co-chairs of MTF iteratively developed the questionnaire items with inputs from members of MTF. The Canadian Collaborating Centre assisted in implementing the questionnaire using Microsoft Forms. Several MTF members test-drove the questionnaire before it was distributed to heads of WHO-FIC collaborating centres in November 2023. As responses came back, MTF members encouraged or helped their centres to complete the questionnaire.

Initially, questionnaire responses in Microsoft Form were organized as a large spreadsheet. One of the co-chairs extracted the information into a Word document either manually or by utilizing Stanford Medical School's secure version of ChatGPT. The AI output was checked against the spreadsheet and heavily edited. The draft document was iteratively revised after multiple requests for comments.

Results

As of 1 August 2024, we received 17 responses from collaborating centres in the Netherlands, Nordic countries, United Kingdom (UK), Australia, Japan, Thailand, Brazil, United States of America (USA), Canada, France, University of Barcelona Academic Centre, Kuwait, Germany, China, Korea, Mexico, and Italy. Based on the responses gathered from the questionnaire, the following are the main takeaways.

Current mapping work

The current mapping work in different countries is mostly uncoordinated. They are at varying stages of development: some have not started, some have mapping work in progress, and China has completed ICD-10 CH's mapping to ICD-11. All expressed resource constraints, including access to mapping experts, as a main challenge in their work.

The mapping efforts largely relied on available tools such as MS Excel and Access, the WHO Coding Tool, and CodeFusion when it became available. China developed its own tool for managing consensus and Canada is planning to use a mapping tool originally developed for SNOMED CT. Only the French CC explored the use of general automated matching tools such as Bertmap.

Mapping needs

Validated WHO ICD-10/ICD-11 mapping tables are the most urgent mapping need of the respondents. Respondents listed numerous use cases for the WHO maps, yet those who have examined the WHO maps indicated that the current maps have numerous problems. Additional mapping needs include assistance with tooling and complex mappings (e.g., 1: n or no match), and shared guidance. Furthermore, while there is an available list of use cases that mappings should satisfy, there is a void in directing how such satisfaction for a use case can be demonstrated.

One of the main goals of the mapping of country modifications to ICD is to enable the addition of country-specific entities to the WHO-FIC proposal platform. All countries that describe their country modifications mapping plans will use post-coordination in their mappings. Anything that can be done to facilitate that process will be very useful. Bringing their country modifications into closer alignment with ICD-11 will facilitate the transition to ICD-11. Several countries indicate that maintenance and quality assurance of the country modification maps, once they are created, presents a problem. Both planning and obtaining resources for such work present challenges.

Several countries (including the UK, Canada, Nordics, Australia, and Barcelona) indicated that they may start projects mapping between SNOMED CT and ICD-11. France, Germany, and Barcelona indicated that they are interested in developing mappings to Orphanet.

Role of MTF

The potential roles for MTF were identified: improving WHO mapping tables, identifying similar mapping needs, providing software tool advice, developing shared mapping guidance, reducing duplication of efforts, sharing mappings between ICD-10 country modifications and ICD-11, coordinating the development of the Foundation, and providing expert advice on or advocating for SNOMED CT to ICD-11 mapping.

Discussion

The three workstreams that MTF has been focusing on in recent months match some of the roles indicated in the questionnaire responses: validating the WHO ICD-10-map-to-one-category table using mismatches with Canadian mappers, distributing the questionnaire to assess mapping needs and plans, and a project to evaluate the ability of multiple automated tools to replicate several manually created reference maps. In the future, MTF may take up projects to develop a standard format and guidance on country modification mapping and a repository of country-modification mappings to ICD-11. Such projects would build on MTF's current work and help fulfill the mission of MTF.

Abstract The Canadian Institute for Health Information (CIHI) continues to assess the clinical, business and statistical implications of transitioning to ICD-11; our goal is to provide a comprehensive understanding of the benefits and challenges associated with this transition. This poster is a companion to a prior WHO-FIC poster titled “Canadian Stability Analysis: Comparing v2018 ICD-10-CA With ICD-11.” It delves deeper into the Canadian-specific codes (concepts) and their mapping to a broader ICD-11 MMS (*ICD-11 for Mortality and Morbidity Statistics*) target stem code, identifying challenges with achieving equivalency. One challenge is that some of the Canadian-specific codes exist as entities in the WHO-FIC Foundation and have Uniform Resource Identifiers (URIs) but lack a corresponding equivalent statistical code in the MMS linearization. This is consistent with the observation in the ICD-11 Reference Guide (1.6.4) that “The use of ICD in the specific context of the health care system of a country may require detail that is not currently part of ICD-11, for example, due to specific settings or due to reimbursement system requirements.”

Introduction

Like many countries, Canada has expanded on the World Health Organization (WHO) version of ICD, adding clinical detail to meet specific data needs. The national standard used in Canada to report morbidity statistics is ICD-10-CA. Developed by CIHI in collaboration with an expert panel of physicians and external field reviewers, ICD-10-CA includes modifications and additions to better meet the country’s clinical, epidemiological and health information needs. Throughout the development of ICD-11, CIHI has been assessing the specificity of the new classification and providing recommendations for content enhancement. This has been achieved by comparing the content of ICD-10-CA and ICD-11. Furthermore, to support the transition to and implementation of ICD-11 in Canada, CIHI has developed a crosswalk between v2018 ICD-10-CA and v2022 ICD-11.

Approach

We assessed the Canadian-specific codes that mapped to a *broader* ICD-11 target stem code. **Challenge A** was assigned when an equivalent Foundation entity was found (i.e., with all the detail of the Canadian concept) but there was no equivalent ICD-11 MMS target stem code. **Challenge B** was assigned when there was *no equivalent* Foundation entity *and* there was no applicable extension code available to achieve equivalency. **Challenge C** was assigned when there was *no equivalent* Foundation entity *but* equivalency could be achieved with optional extension codes — this is considered challenging because the optional nature of extension codes could lead to inconsistent data capture. Mapping errors and residual Canadian codes were assigned **Challenge D** — not applicable to assess.

Table Challenge descriptions and examples

Challenge description	Example ICD-10-CA source code	Example ICD-11 target code (broader)	Example equivalent ICD-11 Foundation entity
A: Equivalent Foundation entity, no equivalent ICD-11 target stem code	O70.21– Third degree perineal laceration during delivery, type 3a, so described	JB09.2 Third degree perineal laceration during delivery	Third degree perineal laceration during delivery, Type 3a Foundation URI: http://id.who.int/icd/entity/2142820674
B: No equivalent Foundation entity, no applicable extension codes to specify detail	Z51.81 Assistance in dying	QB9Y Other specified contact with health services for nonsurgical interventions not involving devices	Not applicable
C: No equivalent Foundation entity, optional extension codes to specify detail (i.e., clustering required to achieve equivalency)	C34.00 Malignant neoplasm of right main bronchus	2C25.Z Malignant neoplasms of bronchus or lung, unspecified	Cancer of the main bronchus is not an equivalent Foundation entity but there is an optional extension code: XA3L52 Right main bronchus Cluster achieves equivalency: 2C25.Z&XA3L52

Limitations

These findings represent results from v2018 ICD-10-CA and v2022 ICD-11, which are older versions of the classifications. Subsequent releases of ICD-11 may include updates to potentially missing/erroneous content, which may impact the results.

Acknowledgements

We gratefully acknowledge CIHI’s classifications and terminologies specialists for their contributions to this project.

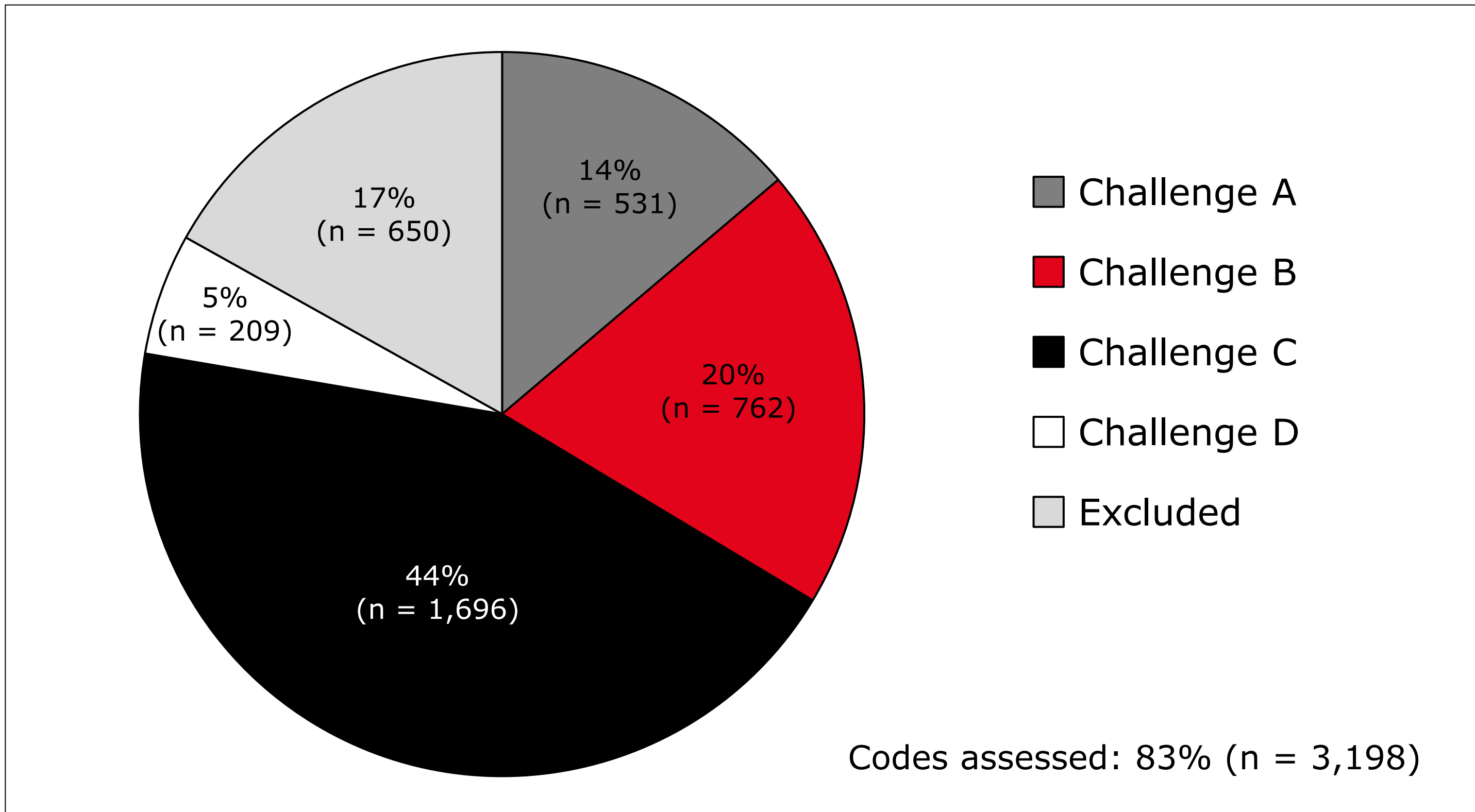
Results

83% (n = 3,198) of the total 3,848 Canadian-specific codes (concepts) — which mapped to a broader (less specific) ICD-11 MMS stem code — were assessed to determine why equivalency could not be achieved. The findings are as follows:

- Challenge A: 14% (n = 531)
- Challenge B: 20% (n = 762)
- Challenge C: 44% (n = 1,696)
- Challenge D: 5% (n = 209) were not applicable to assess as part of this study (i.e., mapping errors [1%, n = 45] and residuals [4%, n = 164])

- 17% (n = 650) of the Canadian-specific codes were excluded from the assessment for the following reasons:
- Equivalent: The ICD-11 MMS target stem code was equivalent (9%, n = 355)
 - Narrower: The ICD-11 MMS target stem code was narrower (greater specificity) (2%, n = 64)
 - Not applicable: No map was possible at a single ICD-11 MMS target stem code (6%, n = 231)

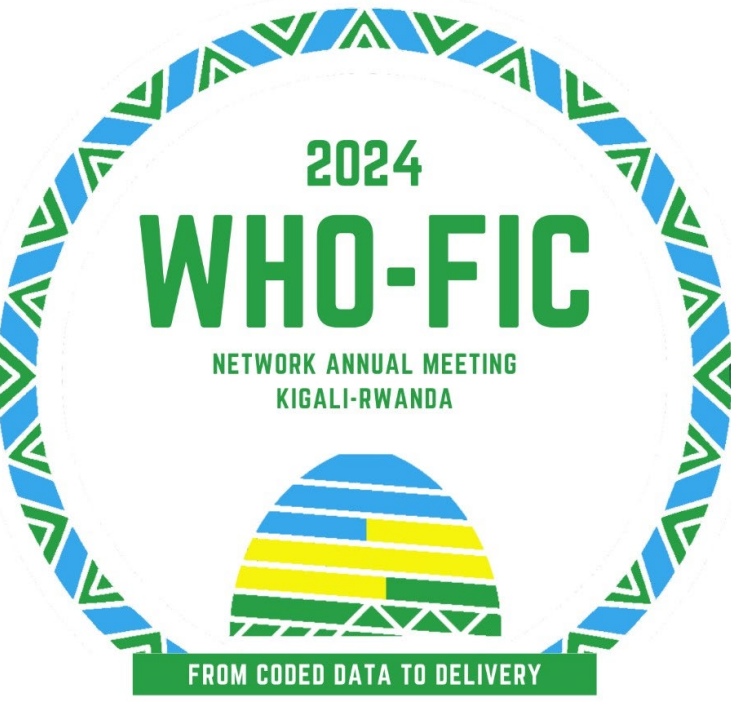
Figure Challenges with achieving equivalency



Conclusion

Our analysis indicates that if a Canadian linearization was developed, Canadian-specific concepts were elevated to become codeable entities and extension codes became mandatory, equivalency would be achieved for 67% of Canadian-specific codes. Further assessment is required to determine whether, for the 20% of Canadian-specific codes that do not have an equivalent Foundation entity, there is a need for this detail. If so, proposals to add entities to the Foundation would be required, along with proposals to add extension codes to capture specific details. Assessing the impact on case-mix grouping methodologies and CIHI’s national indicator reporting, including a review of code utilization patterns, will help determine requirements and how a Canadian linearization could benefit health system data and analytical reporting needs.

While no decision has been made regarding a timeline for implementing ICD-11 MMS for morbidity statistics in Canada, CIHI’s ongoing and forthcoming work will inform strategies and guide decision-making on its implementation for health system use in Canada.



Mapping of KCD-8(ICD-10 Korean Modification) to ICD-11 : implementation and challenges

14-18 October 2024

WHO-FIC

Poster Number 323

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StatisticsKorea³⁾, Busan Catholic University⁴⁾

Abstract We performed 6,489 mappings of KCD-8 (ICD-10-KM), the Korean modification of ICD-10, to ICD-11. In ICD-11, most codes were mapped using postcoordination, but some codes, such as tuberculosis, liver fibrosis and cirrhosis and pregnancy & childbirth, had incomplete or impossible mapping. The codes that are deemed essential through domestic agreement should be proposed to WHO; for successful implementation of ICD-11 in Korea, sophisticated mapping guidelines and continuous advancement mappings are required.

Introduction

Korea is currently using KCD-8 (ICD-10-KM), the Korean revised version of ICD-10, from January 1, 2021, which is being revised every five years by Statistics Korea. Korean Modification reflects specifications of diseases with frequent usage in Korea and rare diseases, and includes TM classification. KCD-8 is used in various fields, including OECD statistics, nationally approved statistics on disease and death, and the health insurance payment system (DRG). Currently, there are 6,489 Korean Modification codes based on ICD-10, excluding TM classification. Statistics Korea conducted ICD-11 mapping for KCD-8(ICD-10-KM) to identify problems in domestic use, including time series analysis of causes of death, for the smooth implementation of ICD-11 in Korea.

Methods & Materials

Before performing mapping, five coders with more than 10 years of experience identified mapping problems and performed pilot mapping to minimize trial and error. Mapping was performed by 12 coders with more than 2 years of experience. To ensure consistent and unified mapping, training on ICD-11 and mapping guidelines were provided. Mapping was conducted for 3 months on 6,489 Korean modification codes in KCD-8 (ICD-10-KM), excluding TM.

Table 1. Mapping level

Mapping level	description
1. stem code	stem code only(e.g. stem, stem)
2. foundation entity	Included in All Index Terms
3. postcoordination	e.g 1) stem/stem, 2) stem&extension code 3) manual postcoordination
4. Not mapping	do not have a complete mapping code or need a new code
5. Others	Code changes in ICD-11, etc.

The mapping level is divided into 5 levels.
1. When the stem code is mapped only to the stem code without postcoordination,
2. When the foundation entity has a foundation URL or has diagnostic terms in all index terms
3. Postcoordination is provided when postcoordination is presented or mapped manually.
4. Not mapping refers to cases where there is no complete mapping code or a new code is needed,
5. Others refers to cases where the diagnosis in ICD-10 has changed from ICD-11, etc.

Results

In Korean modification codes, endocrine, nutritional, and metabolic diseases accounted for the most with 1,684 cases, followed by musculoskeletal and connective tissue diseases with 1,052 cases, and injuries, poisoning, and certain other consequences of external causes with 987 cases.

Table 2. Number of Korean modification code

Chapter	code	Chapter	code	Chapter	code
A00-B99	296	H60-H95	110	O00-O99	285
C00-D48	250	I00-I99	127	P00-P96	37
D50-D89	9	J00-J99	129	Q00-Q99	63
E00-E90	1,684	K00-K93	620	R00-R99	55
F00-F99	25	L00-L99	95	S00-T98	987
G00-G99	152	M00-M99	1,052	Z00-Z99	89
H00-H59	354	N00-N99	60	U00-U99	10

Korean Modification types included 3,366 disease subdivisions and 1,313 anatomy site subdivisions. Diseases, anatomical regions, and laterality subdivisions were mostly mapped through postcoordination, but gestational age and growth period were not mapped because the period was different from ICD-11.

Table 3. Korean Modification category

Korean Modification category	N
disease subdivision	3,366
anatomical region subdivision	1,313
moderate subdivision	959
Gestational weeks subdivision	368
laterality subdivision	311
Viruses, causative bacteria subdivision	101
Growth period subdivision	40
insert subdivision	11
U code	10
weight subdivision	10
Total	6,489

Mapping results show that 4,138 codes (63.8%) were mapped through postcoordination (presented or manual), and 1,047 codes (16.1%) were not completely mapped or need a new code. There were 775 code (11.9%) mapped to stem code, and 513 code (7.9%) were mapped to foundation entity level.

Table 4. Level of mapping recoding KCD-8 codes in ICD-11

Level of mapping	n	%
1. stem code	775	11.9
2. foundation entity	513	7.9
3. postcoordination	4,138	63.8
4. Not mapping	1,047	16.1
5. Others	16	0.2
Total	6,489	100.0

As shown in Table 5, some cases of 'not mapped' cases include 'with cavitation' in tuberculosis (A15-A16), 'early, advanced' in stomach cancer, 'with/without intractable epilepsy' in epilepsy, and 'duration pregnancy' in obstetrics & result of delivery.

Table 5. Cases of Not mapping

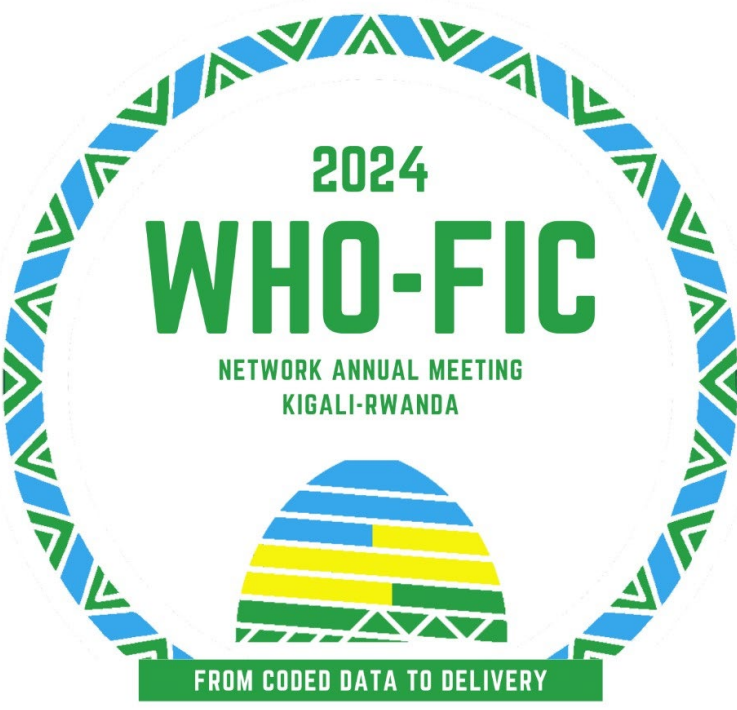
Chapter	KCD-8		ICD-11		Not mapping
	Code	Dx.	Code	Dx.	
I	A15.00	Tuberculosis of lung with cavitation, confirmed by sputum microscopy with or without culture	1B10.0 &XY19 M6	1B10.0 Respiratory tuberculosis, confirmed diagnosis confirmed by microscopy XA57M6Lung	with cavitation
II	C16.00	Malignant neoplasm of cardia, early	2B72.Z &XA28 28	2B72.Z Malignant neoplasms of stomach, unspecified &XA2828Gastric cardia	early, advanced
VI	G40.91	Epileptic convulsions with intractable epilepsy NOS	8A6Z	8A6Z Epilepsy or seizures, unspecified	with intractable epilepsy
XV	O34.0-XXI	Duration of pregnancy less than 22 weeks 1. Duration of pregnancy more than 22- less than 34 weeks 2. Duration of pregnancy more than 34-less than 37 weeks 3. Duration of pregnancy more than 37- less than 42 weeks 4. Duration of pregnancy more than 42 weeks 9. Unspecified duration of pregnancy	Duration of pregnancy less than 5 completed weeks	Duration of pregnancy less than 5 completed weeks	Duration of pregnancy
	Z34.0- Z34.9		XT09 Duration of pregnancy 5-13 completed weeks	XT09 Duration of pregnancy 5-13 completed weeks	
			XT65 Duration of pregnancy 14-19 completed weeks	XT65 Duration of pregnancy 14-19 completed weeks	
			XT5N Duration of pregnancy 20-21 completed weeks	XT5N Duration of pregnancy 20-21 completed weeks	
			XT0T Duration of pregnancy 20-25 completed weeks	XT0T Duration of pregnancy 20-25 completed weeks	
			XT4J Duration of pregnancy 26-33 completed weeks	XT4J Duration of pregnancy 26-33 completed weeks	
			XT84 Duration of pregnancy 34-36 completed weeks	XT84 Duration of pregnancy 34-36 completed weeks	
			XT6G Duration of pregnancy more than 36 completed weeks	XT6G Duration of pregnancy more than 36 completed weeks	
			XT6K Unspecified duration of pregnancy	XT6K Unspecified duration of pregnancy	

Conclusions

63.8% of the mappings from KCD-8 to ICD-11 were mapped through postcoordination, and most anatomical regions, severity, and laterality were mapped through cluster coding. However, due to the high prevalence in Korea, appropriate codes could not be found in ICD-11 for tuberculosis, stomach cancer, epilepsy, and liver diseases, for which the codes were modified to the Korean codes. In pregnancy and childbirth, gestational age was different from ICD-11 and could not be mapped. Among diagnoses that do not have appropriate mapping codes, it seems necessary to propose to WHO that they be reflected as new stem codes or foundation entities through domestic agreement in cases that require domestic classification. Mapping is a time-consuming and labor-intensive task, and mapping guidelines need to be updated for the proper mapping work. In order to successfully implement ICD-11 domestically and produce consistent national statistics, mapping advancement work is continuously needed.

Acknowledgements or Notes

This study was conducted as part of Statistics Korea's research to introduce ICD-11 domestically, and we would like to express gratitude to Statistics Korea for supporting the study and the researchers who devoted themselves to the study.



(ICD-10-KM)의 ICD-11 매핑 : 적용과 과제

14-18 October 2024

WHO-FIC

Poster Number
WHO/CTS to insert

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Abstract ICD-10 한국 수정판인 KCD-8(ICD-10-KM)의 6,489 코드를 ICD-11으로 매핑하였다. ICD-11은 후조합을 이용하여 대부분의 코드가 매핑이 되었으나, 결핵, 간의 섬유증 및 간경변, 임신 및 출산 등 일부 코드는 매핑이 불완전하거나 불가한 경우가 있었다. 국내 합의를 통해 반드시 필요한 코드는 WHO에 제안이 필요해 보이며, ICD-11의 성공적인 국내 이행을 위하여 정교한 매핑 가이드라인과 지속적인 매핑 고도화가 필요하다.

Introduction

한국은 현재 ICD-10의 한국 수정판인 KCD-8(ICD-10-KM)을 2021년 1월 1일부터 사용중으로 통계청에서 5년 주기로 개정하고 있다. 한국수정판에는 사용빈도가 많은 질환에 대한 세분화와 희귀질환 등을 반영하고 있으며, TM 분류를 포함하고 있다.

KCD-8은 OECD 통계, 질병 및 사망 관련 국가승인통계 및 건강보험 지불제도(DRG) 등을 비롯한 다양한 분야에서 활용 중이다. 현재 ICD-10 기반의 한국 수정판 코드는 TM분류를 제외하고 6,489건이다.

한국 통계청에서는 ICD-11의 순조로운 국내 이행을 위해 사망원인 시계열 분석을 포함한 국내 사용처에 대한 문제점을 파악하고자 KCD-8(ICD-10-KM)에 대한 ICD-11 매핑을 수행하였다.

Methods & Materials

매핑 수행 전 경력 10년 이상의 코더 5명이 매핑 시 문제점을 파악하고, 시행착오를 최소화하기 위해 pilot 매핑을 수행하였다. 매핑은 경력 2년 이상의 코더 12명이 수행하였으며. 일관된 매핑을 위하여 매핑 전 ICD-11 및 매핑 방법에 대한 교육을 시행하였고, 매핑 가이드라인을 제공하였다. KCD-8 (ICD-10-KM)에서 한의 분류를 제외한 한국형 확장 코드 6,489건에 대하여 3개월간 매핑을 시행하였다.

Table 1. Level of mapping

Level of mapping	설명
1. stem code	stem code only(e.g. stem, stem)
2. foundation entity	All Index Terms 포함
3. postcoordination	e.g 1) stem/stem, 2) stem&extension code 3) manual postcoordination
4. Not mapping	완전한 매핑 코드가 없거나 새로운 코드가 필요한 경우
5. Others	ICD-11에서 코드가 바뀐 것, 기타

매핑 level은 Table 1과 같이 5개로 구분하였으며, 1. stem code는 후조합 없이 stem code만으로 매핑이 되는 경우, 2. foundation entity는 all index terms에 포함 용어 및 foundation URL이 있는 경우, 3. postcoordination은 후조합을 통해 매핑이 된 경우(manual postcoordiantion 포함), 4. Not mapping은 완전한 매핑 코드가 없거나 새로운 코드가 필요한 경우, 5. others는 ICD-10의 진단이 ICD-11에서 다르게 바뀌거나 한 경우로 구분하였다.

Results

한국형 확장코드는 내분비,영양 및 대사질환이 1,684건으로 가장 많고, 근골격계통 및 결합조직의 질환이 1,052건, 손상, 중독 및 외인에 의한 특정 기타 결과가 987건 순이다.

Table 2. Number. of Korean modification code

Chapter	code	Chapter	code	Chapter	code
A00-B99	296	H60-H95	110	O00-O99	285
C00-D48	250	I00-I99	127	P00-P96	37
D50-D89	9	J00-J99	129	Q00-Q99	63
E00-E90	1,684	K00-K93	620	R00-R99	55
F00-F99	25	L00-L99	95	S00-T98	987
G00-G99	152	M00-M99	1,052	Z00-Z99	89
H00-H59	354	N00-N99	60	U00-U99	10

KM유형은 질환을 세분화한 것이 3,366건, 해부학적 부위 세분화한 것이 1,313건으로 가장 많았다. 질환, 해부학적 부위 및 laterality 세분화는 후조합을 통해 대부분 매핑이 되고 있었으나 임신주수, 성장기는 ICD-11과 기간이 달라 매핑이 되지 않았다.

Table 3. Korean Modification 유형

KM 유형	개수
질환 세분화	3,366
해부학적 부위 세분화	1,313
중증도 세분화	959
임신주수 세분화	368
laterality 세분화	311
바이러스,원인균 세분화	101
성장기 세분화	40
삽입물 세분화	11
U code	10
몸무게 세분화	10
합계	6,489

매핑 결과 후조합을 통해(제시된 또는 manual) 매핑된 경우가 4,138건(63.8%)으로 가장 많았고, 완전한 매핑 코드가 없거나 새로운 코드가 필요한 매핑 되지 않는 경우가 1,047건(16.1%), stem code로 매핑된 경우 775건(11.9%), foundation entity level로 매핑된 건이 513건(7.9%) 이었다.

Table 4. Level of mapping recoding KCD-8 codes in ICD-11

Level of mapping	n	%
1. stem code	775	11.9
2. foundation entity	513	7.9
3. postcoordination	4,138	63.8
4. Not mapping	1,047	16.1
5. Others	16	0.2
Total	6,489	100.0

주요 챕터별로 다빈도 Not mapping된 사례는 Table 5.와 같이 결핵(A15-A16)에서 ‘with cavitation’, 위암에서 ‘early, advanced’, 뇌전증에서 ‘with/without intractable epilepsy’, K74%(간의 섬유증 및 경변증)에서 compensated 여부, 산과 또는 분만의 결과에서 ‘duration pregnancy’가 달라 매핑되지 않았다.

Table 5. Frequent ‘Not mapping’ cases

Chapter	KCD-8		ICD-11		Not mapping
	Code	Dx.	Code	Dx.	
I	A15.00	Tuberculosis of lung with cavitation, confirmed by sputum microscopy with or without culture	1B10.0 &XY19 M6	1B10.0 Respiratory tuberculosis, confirmed diagnosis confirmed by microscopy XA57M6Lung	with cavitation
II	C16.00	Malignant neoplasm of cardia, early	2B72.Z &XA28 28	2B72.Z Malignant neoplasms of stomach, unspecified &XA2828Gastric cardia	early, advanced
VI	G40.91	Epileptic convulsions with intractable epilepsy NOS	8A6Z	8A6Z Epilepsy or seizures, unspecified	with intractable epilepsy
XV-XXI	O34.0- O34.9	Duration of pregnancy 0 Duration of pregnancy less than 22 weeks 1. Duration of pregnancy more than 22- less than 34 weeks 2. Duration of pregnancy more than 34-less than 37 weeks 3. Duration of pregnancy more than 37- less than 42 weeks 4. Duration of pregnancy more than 42 weeks 9. Unspecified duration of pregnancy	Duration of pregnancy n Pregna ncy	Duration of pregnancy XT3X Duration of pregnancy less than 5 completed weeks XT09 Duration of pregnancy 5-13 completed weeks XT65 Duration of pregnancy 14-19 completed weeks XT5N Duration of pregnancy 20-21 completed weeks XT0T Duration of pregnancy 20-25 completed weeks XT4J Duration of pregnancy 26-33 completed weeks XT84 Duration of pregnancy 34-36 completed weeks XT6G Duration of pregnancy more than 36 completed weeks XT6K Unspecified duration of pregnancy	Duration of pregnancy

Conclusions

KCD-8에서 ICD-11으로의 매핑은 63.8%가 후조합으로 매핑 되었으며, ICD-11의 특징인 cluster 코딩을 통해 대부분의 해부학적 부위, 중증도 및 laterality 등이 매핑 되었다 . 그러나 일부 한국에서 유병률이 높아 코드를 세분화해서 사용하는 결핵, 위암, 뇌전증 , 간 질환 등의 상세정보는 ICD-11에서 적절한 코드를 찾을 수 없었으며, 임신 및 출산에서는 임신 주수가 ICD-11과 기간과 달라 매핑이 되지 않았다. 적절한 매핑코드가 없는 진단 중 반드시 분류가 필요한 경우는 국내 합의를 통해 새로운 stem 코드 또는 foundation entity로 반영되도록 WHO에 제안이 필요해 보인다. 매핑은 시간과 노력이 많이 드는 작업으로 정확한 매핑 작업을 위해 매핑 가이드라인에 대한 업데이트가 필요해 보이며, 비교적 짧은 기간에 매핑 연구가 수행되었으므로 ICD-11의 국내 성공적인 이행과 일관된 국가통계 작성을 위하여 매핑 고도화 작업이 지속적으로 필요하다고 판단된다.

Acknowledgements or Notes

본 연구는 ICD-11 국내 도입을 위한 통계청 연구의 일환으로 진행되었으며, 연구를 위해 지원해 주신 통계청과 연구에 헌신해주신 연구원들께 감사의 마음을 전한다.



PARTICIPANTS LEVEL OF SATISFACTION TOWARDS ICD-11 COC IN MALAYSIA

14-18 October 2024

WHO-FIC

Poster Number
325

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Abstract The present study focuses on evaluating the level of satisfaction among the participants of ICD-11 Certification of Coders (COC). ICD-11 COC is a coding training programme on ICD-11 among clinical coders in Ministry of Health (MOH) that is organized by the Health Informatic Centre (HIC). Around 100 MOH’s clinical coders have participated in the study. An online questionnaire was given, that measures their reaction level using a 5-point Likert scale. In this study, the participants' overall satisfaction with the training courses was 93%. Suggestion for future improvements in terms of programme delivery and assessment process is also gained from the participants’ feedback.

Introduction

Since the beginning of ICD-10 use in Malaysia, COC has been the main coding training programme for the MOH clinical coders. It aims to be the platform for MOH to identify the “Expert Coder” who will then be the reference point for other coders in MOH facilities. The expert coders were tasked to provide support to the fellow staffs and HIC in terms of other clinical coder training session and coding dispute matter. During COC, participants’ knowledge will be assessed with examinations which consisted of a list of diagnoses that need to be coded using ICD-11. Similar to previous ICD-10 training programme, the participants will be introduced to the basic and foundation of ICD-11 coding principles and detailed guide on how to use the ICD-11 coding tool. After that, participants will undergo hands-on training in diagnosis coding from different ICD-11 chapters and reflecting different assessment difficulty levels. The main objective of the study is to evaluate the participants satisfaction with the COC programme conducted by HIC, MOH through a post-training survey. Insight from the study provide valuable information to the programme organiser on future programme improvement strategies.

Methods & Materials

A cross-sectional study of post-training experience was conducted among 100 clinical coders at the MOH. An online self-administered questionnaire includes the reaction level using a 5-point Likert scale and general feedback for the training programme was given to all participants. For data analysis, the descriptive statistics were applied to the reaction level feedback and qualitative analysis was done for the general feedbacks. The reaction level section of the questionnaire was adopted from the literature and consisted of five close-ended questions using the 5-point Likert scales to assess the satisfaction of ICD-11 COC participants after attending the training. These consisted of “Completely Disagree”, “Somewhat Disagree”, “Neither Agree nor Disagree”, “Somewhat Agree” and “Completely Agree” which were represented by 1 to 5 respectively in ascending order. The content reliability of the questionnaire was assessed using Cronbach’s alpha (α= 0.96).

Results

The reaction level analysis assessed participants' satisfaction using a 5-point Likert scale. Notably, 77% (n=77) strongly agreed that the ICD-11 training programme improved their knowledge, while 52% (n=52) strongly agreed that the method of delivery was appropriate. Regarding relevance to their job, 59% (n=59) strongly agreed that the training was relevant. Overall satisfaction and the likelihood of recommending the course were 66% (n=66) and 71% (n=71) strongly agreeing with the statements, respectively. These findings are detailed in Table 1.

Criterion	Strongly Disagree No. (%)	Somewhat Disagree No. (%)	Neither Agree nor Disagree No. (%)	Somewhat Agree No. (%)	Strongly Agree No. (%)
This course improved my knowledge and awareness of the topic.	0 (0.0)	1 (1.0)	5 (5.0)	17 (17.0)	77 (77.0)
The expression and presentation of the content by the instructor (the method of instruction) were appropriate.	0 (0.0)	1 (1.0)	5 (5.0)	42 (42.0)	52 (52.0)
The content presented in this course was relevant to my job.	0 (0.0)	0 (0.0)	2 (2.0)	39 (39.0)	59 (59.0)
I was generally satisfied with the course.	0 (0.0)	1 (1.0)	6 (6.0)	27 (27.0)	66 (66.0)
I will recommend this course to others.	0 (0.0)	0 (0.0)	8 (8.0)	21 (21.0)	71 (71.0)

Table 1: The Frequency Distribution of the Participants’ Satisfaction with the ICD-11 COC Training Programme

For general feedback analysis, participants’ feedback can be group into two major themes as shown below in Table 2. First theme shown the commendable thing about ICD-11 COC training programme, while second theme looks into the comments that delve into improvement suggestion from the participants.

Themes	Participants’ General Feedback
Commendable	Programme Continuity “The course needs to continue to give exposure to the participants”
Improvement	Programme Duration “More time and exercise for better understanding”
	Programme Venue “The training place should have good WIFI access”
	Programme Assesment “The duration of answering questions for each level should vary according to difficulty. If the time period needs to be maintained then the number of questions should be reduced according to the level”

Table 2: The Themes for General Feedbacks on ICD-11 COC Training Programme

Conclusions

The evaluation of the level of satisfaction towards the ICD-11 COC training programme revealed positive results. At the reaction level, 94% of participants noted a significant improvement in knowledge and awareness, and 94% were satisfied with the instruction method. A substantial 98% found the course content directly relevant to their roles, with 92% likely to recommend it. Overall satisfaction was reported by 93% of respondents. While the from the participants’ general feedback shows that ICD-11 COC programme need to be continue for the purpose of ICD-11 coding training. Despite that, some improvement in terms of programme delivery needs to be look into in future COCs. In summary, the study emphasized the importance of participants It identified strategies for improving the ICD-11 training programme design and delivery based on participant feedback, offering lessons for future implementations.

Acknowledgements or Notes

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Mexico Leads the Way: Cutting-Edge ICD-11 Training and Coding for Quality and Patient Safety

14-18 October 2024

WHO-FIC

Poster Number

326

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Abstract In Mexico, significant efforts are being made to train and disseminate the morbidity component in the healthcare sector, promoting patient quality and safety through the implementation of the ICD-11. A specific tool has been designed for training and coding, identifying key variables such as damage, cause, and mode, and organizing them into a structured framework. The results show significant improvements in the understanding and application of the ICD-11, facilitating the identification and coding of diseases by healthcare professionals.

Introduction

Health is one of the most valuable treasures, and in Mexico, great strides are being made to protect and improve it. One of these crucial steps is the implementation of the International Classification of Diseases, 11th Revision (ICD-11), in the healthcare sector. This new classification not only represents a technical update but also serves as a powerful tool that enhances patient quality and safety. Through training in the ICD-11, the healthcare sector in Mexico is learning to code diseases and conditions more accurately and comprehensively, which has a direct impact on the care each patient receives. Let's discover how this implementation transforms clinical practice, benefiting both patients and healthcare professionals.

Methods & Materials

For the design of the training and coding tool (Image 1) within model for quality and patient safety using the ICD-11, key variables related to code assignment were identified and analyzed. The conceptual model has three components:

•**Harm to the patient:** What was the main consequence for the patient's health?

•**Cause or source of harm:** What caused the harm?

•**Mode or mechanism:** In what way? How did the source of harm actually produce harm?

The structure of the tool is organized into columns for each of these variables, with specific rows indicating where they are coded in the chapters of the ICD-11. In the row "Where do we code it?", the corresponding chapters of the ICD-11 are included, such as Chapter 23 "External causes of morbidity or mortality". Additionally, training sessions and exams were conducted to ensure that healthcare professionals correctly understand and apply this new classification. The results showed significant improvements in the understanding and application of the ICD-11, facilitating the identification and coding of diseases.

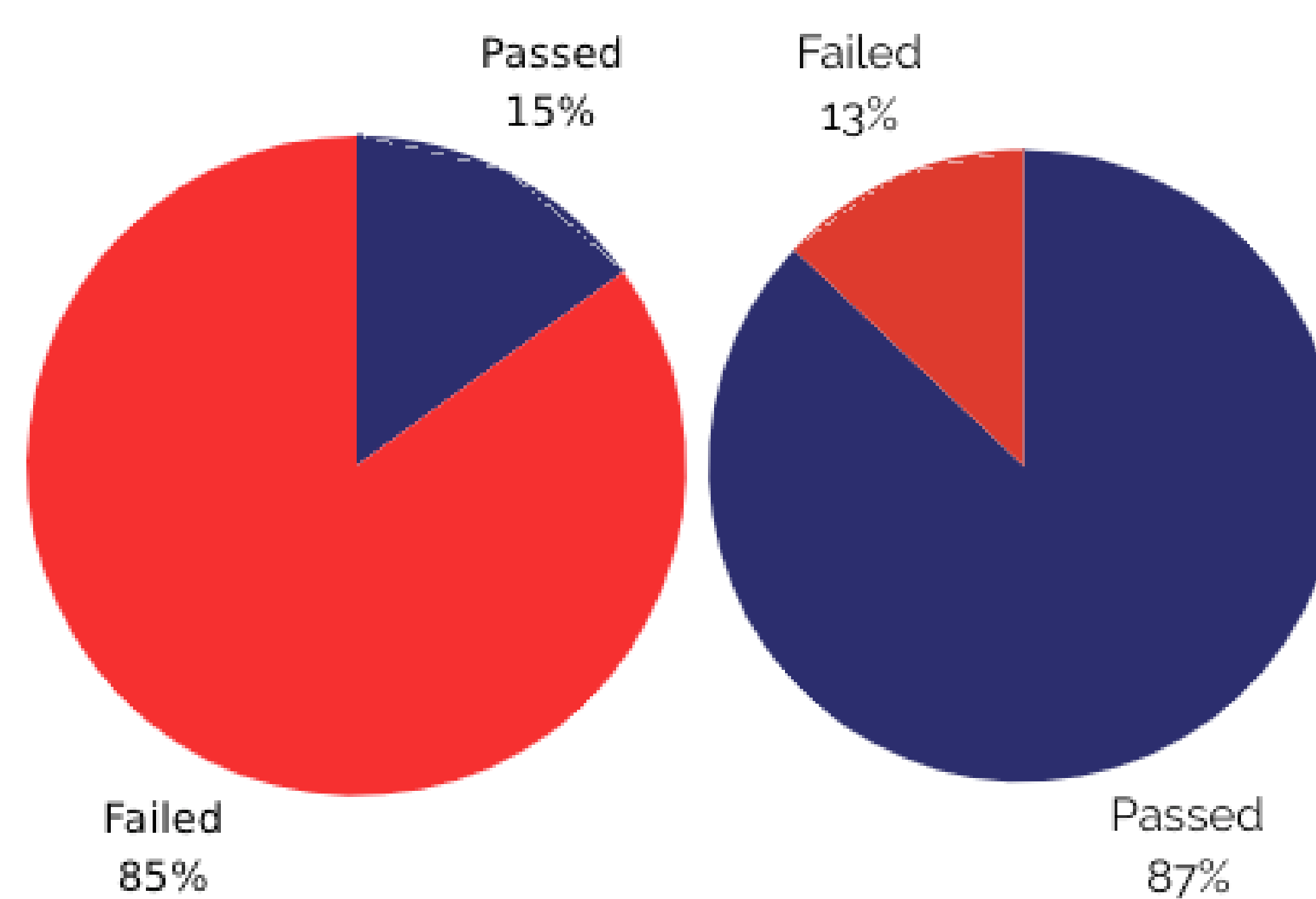
Results

As a result of the training courses conducted in Mexico, significant improvements were observed by applying initial and final diagnostic assessments that allowed measuring the understanding of the coding and application process using this tool within the quality and patient safety model. This will enable healthcare professionals to identify and code diseases more easily and comprehensively using the ICD-11.

To illustrate these advances, two graphs (A and B) are presented:

Initial assessment

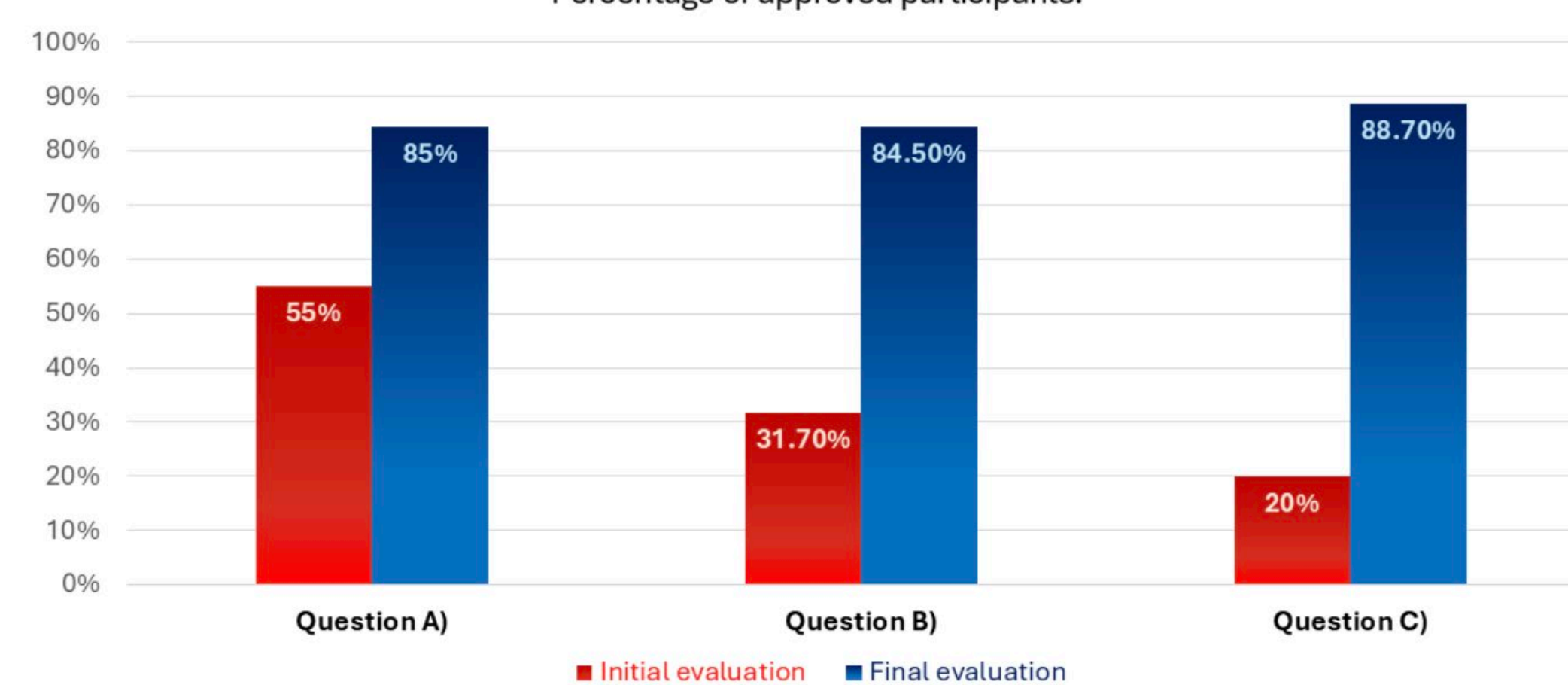
Final assessment



Graph A: Pass rates before and after training.

Graph A, in pie chart format, shows the proportion of participants who pass and fail the initial and final assessments. The results reflect a remarkable progress: in the initial assessment, only 15% of the participants pass, while in the final assessment, 87% manage to pass.

CONCEPTUAL MODEL FOR QUALITY AND PATIENT SAFETY
Percentage of approved participants.



A) In the model for quality and patient safety, this component refers to the source of harm: What caused the harm?
B) In the model for quality and patient safety, this component refers to the primary mechanism by which the cause produces harm.
C) The model for quality and patient safety consists of three parts (components). This component is usually represented by a standard ICD-11 diagnosis code, from (almost) any chapter of the classification.

Graph B: specific questions related to patient quality and safety

Graph B details specific questions related to patient quality and safety before and after the training process.

These graphs demonstrate a significant improvement in initial and final scores, highlighting the positive impact of the training. The framework used in the training is essential for healthcare professionals to understand and apply the key concepts of the ICD-11 more effectively. This structured and detailed approach facilitates better coding and recording of diseases, resulting in more accurate and safer patient care. These data underscore the importance of proper training and the use of effective tools to improve the quality of healthcare in Mexico.

Conclusions

The implementation of the International Classification of Diseases, 11th Revision (ICD-11), in the healthcare sector in Mexico has proven to be a crucial step in improving patient quality and safety. Through intensive and well-structured training, healthcare professionals in Mexico are learning to code diseases and conditions more accurately and comprehensively. This training effort has been fundamental in ensuring that the key concepts of the ICD-11 are understood and effectively applied. The training tool implemented during this process has been essential, as it organizes key variables such as damage, cause, and mode, facilitating better coding and recording of diseases. Thus, the ICD-11 is consolidated as a "cornerstone of health information," highlighting the importance of optimal training to improve the quality and care of health in Mexico. As stated by the World Health Organization, "ICD-11 is a significant step forward that will help countries to reduce the burden of disease and improve health outcomes".



2.23.20.1 Overview of code-set in ICD-11 for quality and patient safety

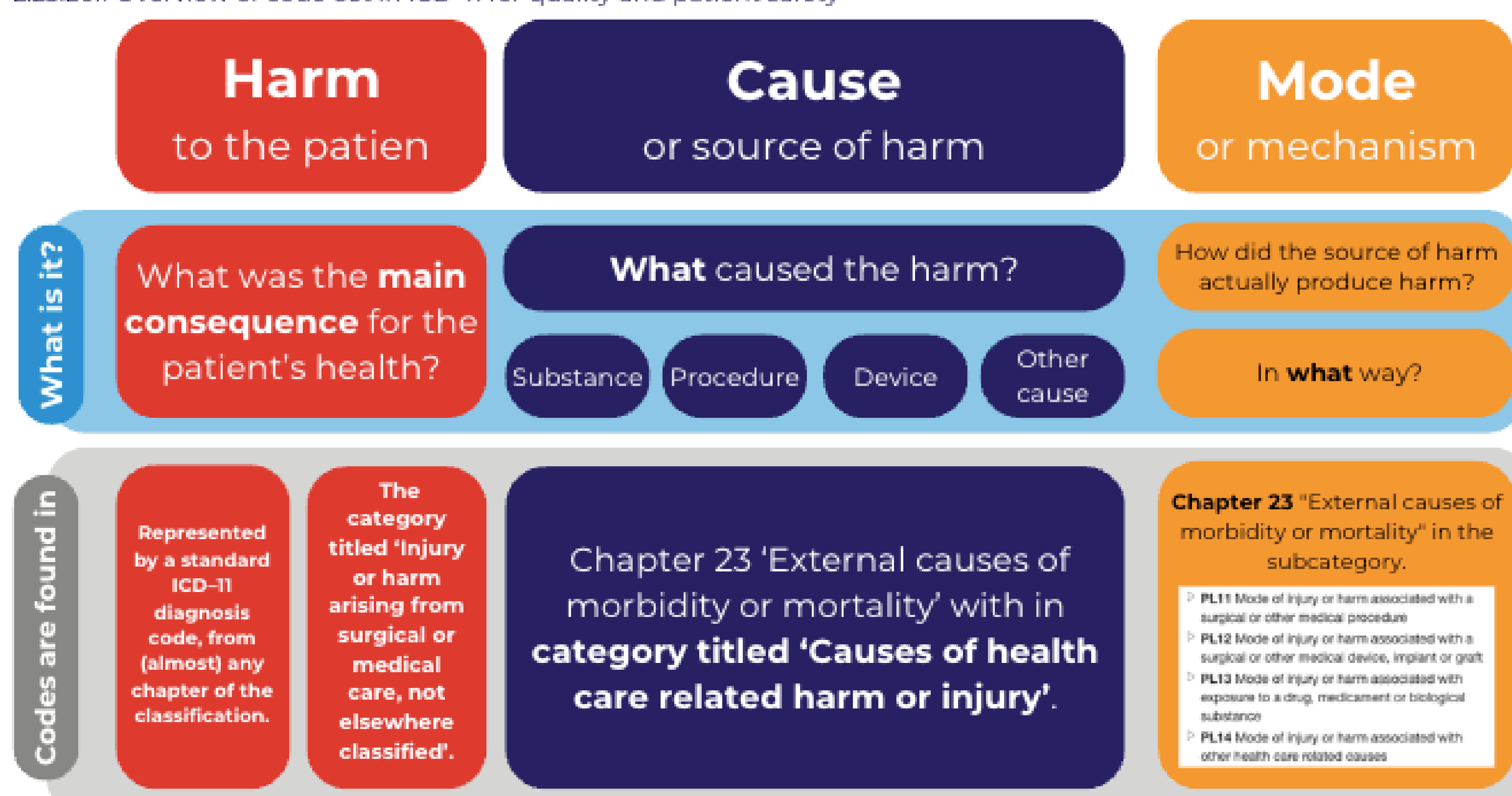


Image 1: Training tool for ICD-11 coding in patient safety and quality model.

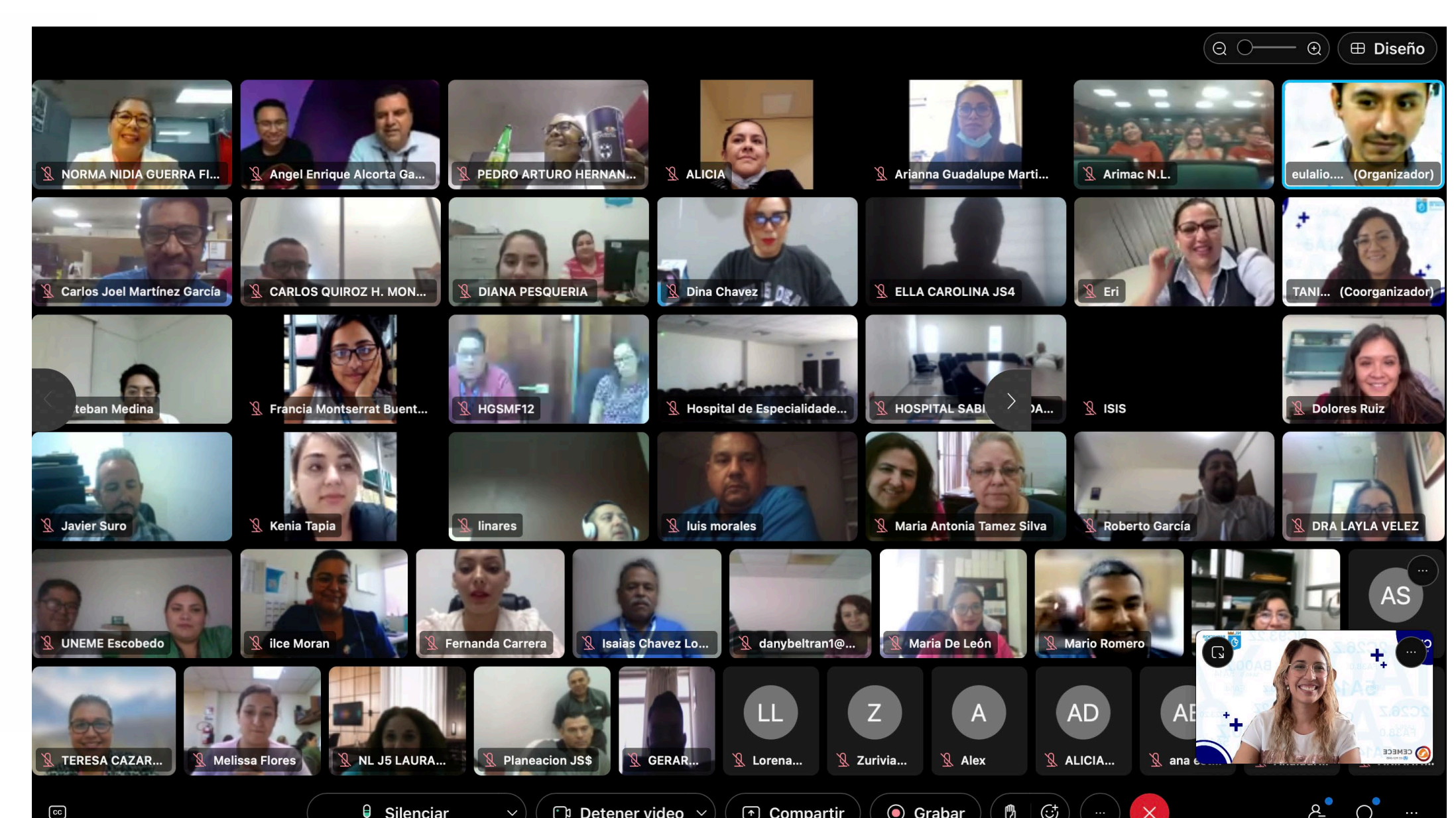


Imagen 2,3 Photos during these training sessions.



Developing a framework to implement ICD-11 in Australian health services

14-18 October 2024

WHO-FIC

Poster Number 327

Authors: Anne Elsworthy, Nicole Rankin, James Katte, Joanne Fitzgerald
Independent Health and Aged care Pricing Authority, Australia

Abstract Australia uses morbidity data for a range of activities including safety and quality monitoring, benchmarking, research and funding models, including public hospital funding through activity based funding (ABF). Australia is currently assessing the gaps and opportunities that ICD-11 can offer as a replacement to the Australian Modification of ICD-10.

Current use of ICD in Australian health services

Since 1998, Australia has used the International Classification of Diseases, Tenth Revision (ICD-10) as the basis for the Australian Modification (ICD-10-AM) which is used to classify admitted patient care morbidity and activity in Australian health services.

Regular refinement has produced new releases called editions. The Independent Health and Aged Care Pricing Authority (IHACPA) took over classification development under Australia’s National Health Reform Act in 2011 and transitioned its development. IHACPA established a [Governance Framework](#) outlining a principles-based approach for the process, decisions and priorities for ICD-10-AM development.

Since the cessation of ICD-10 development, IHACPA has updated the decision principles to limit ICD-10-AM development in preparation for a potential move to ICD-11 and to ensure any updates that are made align with ICD-11.

An example of this approach was to replace outdated and stigmatising content in ICD-10-AM Twelfth Edition. While the content was replaced in code and category titles, ICD-11 offers additional benefits to ICD-10(-AM) due to its structural differences making a further argument to limit, if not freeze, further development of ICD-10-AM.

ICD-10-AM content	Alignment with ICD-11	Added benefits in ICD-11 structure
F64 Gender identity disorder	Updated category to Gender incongruence	Gender incongruence removed from Mental and Behavioural Disorders chapter, further reducing stigma
F84.5 Asperger’s syndrome	Converted to category F84 Autism spectrum disorder	Autism spectrum disorder pre-coordinates presence or absence of impairments, the ability to due this in ICD-10-AM is limited due to its structure

Mapping ICD-10-AM to ICD-11 the most important first step

In Australia IHACPA commenced a rigorous mapping process between ICD-10-AM and ICD-11 in 2023 to create an enduring cross-walk between the classifications. The process is outlined in documentation that sets out the scope, method, quality assurance and maintenance of the project and is based on the [WHO-FIC mapping guidance](#).

It is important for Australia to understand the ICD-10-AM codes represented as stem codes in ICD-11 given the role they may play in casemix classifications, such as the [AR-DRG](#) classification. Below are some preliminary results of mapping ICD-10-AM codes from Chapter 15 Pregnancy, childbirth and the puerperium to ICD-11 MMS stem codes.

Results: Chapter 15 ICD-10-AM codes to ICD-11 MMS stem without post-coordination			
Category	Maps	Example source ICD-10-AM	Example target ICD-11
Exact match	329	O24.29 Pre-existing other specified diabetes mellitus in pregnancy, childbirth and the puerperium, unspecified	JA63.Y Other specified diabetes mellitus in pregnancy
Greater specificity	1	O21.9 Vomiting in pregnancy, not elsewhere classified	JA60.Z Excessive vomiting in pregnancy, unspecified
Lesser specificity	86	O35.6 Maternal care for (suspected) damage to fetus by radiation	JA85.Y Maternal care for known or suspected other specified fetal abnormality or damage
Stem match not possible	7	O09.1 Duration of pregnancy 5-13 completed weeks	(XT09 Duration of pregnancy 5-13 completed weeks)

The matches categorised as ‘Lesser specificity’ were then fully mapped using post-coordination to ensure the mapping process yielded multiple benefits.

The results indicated that while post-coordination could achieve an exact match for some, development proposals may need to be submitted to ensure Australian concepts are still able to be captured.

The ICD-10-AM code O71.02 **Traumatic** rupture of uterus before onset of labour has the closest match in ICD-11 to JB0A.0 Rupture of uterus before onset of labour, but there are no options to post-coordinate the rupture to distinguish traumatic from spontaneous.

Results: Lesser specificity with post-coordination			
	Browser options only	Manual post-coordination required	Match not possible
Exact match	22	13	-
Partial match	7	3	41

Framework for a decision

IHACPA’s implementation framework to support a decision to move from ICD-10-AM to ICD-11 in Australian health services:

1. Mapping project to assess maturity
2. Early implementation of cluster coding
3. Assess classification impacts
4. Cost-benefit analysis
5. Determine if an Australian linearisation is necessary
6. Replace ICD Toolkit to support change

Opportunities in ICD-11

Significant gaps between ICD-10-AM and ICD-11 will be reviewed with the potential for ICD-11 development proposals to be lodged on the WHO-FIC maintenance platform for consideration by CSAC.

Once it is known whether these proposals will be progressed, Australia will be in a better position to determine whether an ICD-11 national linearisation is required.

Australia’s classification outputs such as the Tabular Lists, Alphabetic Indices, electronic code lists and mapping tables are managed by bespoke software known as the ICD Toolkit. Currently the ICD Toolkit has limited flexibility and is being investigated for replacement by a product that can manage multiple classifications and terminologies. It is anticipated that the updated ICD Toolkit will be able to use the ICD-10-AM/ICD-11 cross-walks, manage any Australian linearisation's required in ICD-11 and flow this into the relevant casemix classifications.

Future considerations

Creation of a cross-walk is the first step in Australia’s implementation framework for ICD-11. Once the cross-walk is created it will be used to assist with the impacts on casemix classifications such as those based on ICD-10-AM which are used in acute admitted care ([AR-DRGs](#)) or emergency care ([AECC](#)). It will also be an opportunity to review other casemix classifications to determine if ICD-11 could be used in place of existing arrangements.

The introduction of new metadata reporting standards introduces the concept of cluster coding in an environment of ICD-10-AM which will socialise the workforce with the concept of post-coordination prior to ICD-11. More on this topic is covered in another poster.

Abstract To guide and facilitate a decision about adopting ICD-11 for health system use in Canada, the Canadian Institute for Health Information (CIHI) continues to assess its clinical, business and statistical implications. This poster presents the process used to create the backward crosswalk from ICD-11 to ICD-10-CA and the results, and describes how bidirectional crosswalks were used to create comprehensive mappings for the Canadian Congenital Anomalies Surveillance System (CCASS) to evaluate compatibility with and impact on current national reporting practices.

Introduction

The national standard used in Canada to report morbidity statistics is ICD-10-CA, the Canadian modification of ICD-10. CIHI developed ICD-10-CA in collaboration with an expert panel of physicians and external field reviewers to better meet the country’s health information needs. More recently, CIHI has been assessing ICD-11 for use in Canada. In 2022, CIHI developed a forward crosswalk between v2018 ICD-10-CA and v2022 ICD-11 to understand gaps and challenges, and to propose improvements to ICD-11 to facilitate the evaluation of the impact of adoption on Canada’s health care systems. To evaluate the statistical continuity of ICD-11 in its entirety, a backward crosswalk was recently developed to gain further knowledge of the benefits of ICD-11 and identify how it will impact health systems, case mix and indicator reporting in Canada.

Results

- All ICD-11 concepts were mapped to a target code in ICD-10-CA, with the following results:
- 26% (n = 3,784) of the ICD-10-CA target codes are **equivalent** to a single ICD-11 code
 - 65% (n = 9,478) of the ICD-10-CA target codes are **broader**, which means 65% of ICD-11 concepts have greater specificity (see Table 1)
 - 9% (n = 1,386) of the ICD-10-CA target codes are **narrower**, which means 9% of ICD-11 concepts have less specificity
 - 0.03% (n = 4) of the ICD-10-CA target codes did **not** have an **applicable** ICD-11 code map (i.e., source codes are for special purposes, such as emergency use codes)

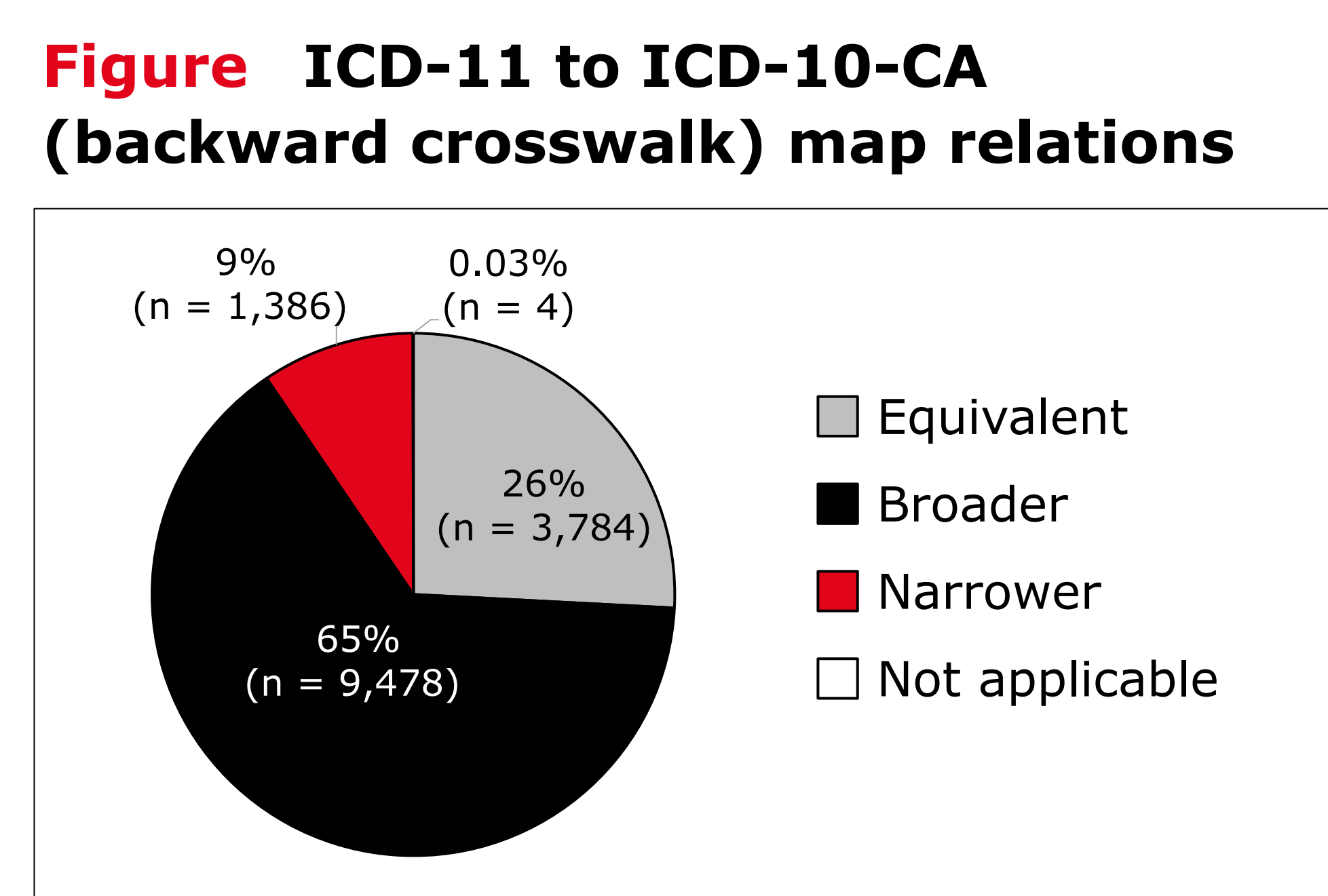


Table 1 Example of narrower ICD-11 concepts providing greater detail than ICD-10-CA

ICD-10-CA code	Narrower ICD-11 codes
I50.0 Congestive heart failure	BD10 Congestive heart failure
Includes: - Right ventricular failure - Biventricular failure	BD13 Right ventricular failure
	BD14 Biventricular failure

Approach

Using the World Health Organization (WHO) ICD-11 to ICD-10 mapping tables (which used v2022 ICD-11), all 14,652 ICD-11 codes were mapped to v2022 ICD-10-CA target codes. Each ICD-10-CA target code was reviewed to identify its map relation (level of equivalence) to the source ICD-11 code. The map relation characterized the ICD-10-CA target codes as equivalent to or broader or narrower than the source ICD-11 codes:

- Equivalent: Both source and target code have same detail/meaning
- Broader: The target is less specific than the source
- Narrower: The target is more specific than the source
- Not applicable: No applicable target code

Interrater reliability was assessed through dual mapping and validation. CIHI’s maps from ICD-11 to ICD-10-CA were compared with the outputs of WHO’s ICD-11 to ICD-10 mapping tables; there was a 40% (n = 5,921) agreement between CIHI’s and WHO’s selected target codes.

Limitations

The greater specificity of ICD-11 posed challenges in finding an appropriate ICD-10-CA map, due to ICD-10-CA being outdated. Also, many ICD-11 concepts could not be found using ICD-10-CA’s alphabetical index, necessitating team discussion and review to determine the ICD-10-CA target code.

Leveraging crosswalks — Canadian use case

We used the forward and backward maps to create a bidirectional crosswalk in order to determine whether the 12 congenital anomaly categories and conditions found in the CCASS data map¹ can be accurately represented using ICD-11. When comparing the 139 ICD-10-CA codes used in the CCASS data map with the ICD-11 target codes in the **forward** crosswalk, 55% (n = 77) of the ICD-11 target codes had either an exact match or provided greater specificity than ICD-10-CA, whereas 45% of the ICD-11 target codes were broader.

Reviewing the ICD-10-CA congenital anomaly codes in a **backward** direction, 57% of the ICD-10-CA target codes were broader. This was largely due to missing detail and/or multiple ICD-11 codes mapping to the same ICD-10-CA code (see Table 2). Thus ICD-11 offers greater specificity for the congenital anomaly conditions used in the CCASS data map.

Table 2 Example of narrower ICD-11 concepts compared with ICD-10-CA

Condition	ICD-11 code (source)	ICD-11 code title	ICD-10-CA code (target)	ICD-10-CA code title
Tetralogy of Fallot	LA88.20	Tetralogy of Fallot with absent pulmonary valve syndrome	Q21.3	Tetralogy of Fallot
	LA88.21	Tetralogy of Fallot with pulmonary atresia	Q21.3; Q22.0	Tetralogy of Fallot; Pulmonary valve atresia
	LA88.22	Tetralogy of Fallot with pulmonary atresia and systemic-to-pulmonary collateral artery	Q21.3; Q22.0	Tetralogy of Fallot; Pulmonary valve atresia
	LA88.2Y	Other specified tetralogy of Fallot	Q21.3	Tetralogy of Fallot
	LA88.2Z	Tetralogy of Fallot, unspecified	Q21.3	Tetralogy of Fallot

Conclusions

While the backward crosswalk assessment highlighted the benefits of ICD-11’s increased specificity, these findings must be considered alongside those from the forward crosswalk work, which indicated a loss of approximately 37% in specificity. This suggests that some ICD-11 target codes or clusters are less specific than their corresponding ICD-10-CA counterparts.

Further analysis will be needed to assess the impact of ICD-11’s narrower concepts on case mix and national health indicator reporting, as well as to determine whether content enhancements are required to address the broader concepts. As demonstrated in the CCASS example, the bidirectional crosswalks can be leveraged to help inform the impacts of ICD-11 adoption.

Reference

1. Government of Canada. [Congenital Anomalies in Canada: Data Map](#). Accessed July 2024.



Perspectives of Canadian family physicians & policy- / 14-18 October 2024
decision-makers on updating ICD-9 used for billing claims

WHO-FIC

Poster Number
330

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Abstract Canada adopted the International Classification of Diseases version 9 (ICD-9) in 1979. ICD-9 is still used across most of Canada when physicians are submitting billing claims to be paid for their medical services. ICD-9 is outdated and is no longer adequate for today's healthcare system. The decision to update ICD-9 lies with each provincial and territorial government in Canada, in collaboration with physician/medical groups. The objectives of this study were to explore family physician perspectives on the potential replacement of ICD-9 in Canada, and to understand the impacts on policy/decision makers and their respective organizations. We used a qualitative approach, including virtual focus groups and semi-structured interviews, to capture information on the current use & challenges of ICD-9, barriers & facilitators to implementing a new diagnostic coding system for physician billing, and anticipated impacts.

Introduction

- ICD-9 is still used in Canada when outpatient physicians submit billing claims to their provincial/territorial governments for payment.
- These ICD-9-coded billing data are used extensively for research, policy decisions, costing & disease surveillance.
- ICD-9 is outdated & we need to understand preferences & concerns to better inform future implementation of a newer classification system.
- Facility-based (hospital) coding in Canada will move to ICD-11 but no decision has been made yet for physician billing requirements.
- Family physician perspectives were the focus, as they use the widest range of ICD-9 codes compared to specialists, due to their varied scope of practice & management of multiple social & medical concerns during patient visits.

Study Objectives: 1) to obtain feedback from family physicians in Canada about replacing ICD-9 in the future; 2) to understand potential impacts on various organizations across Canada.

Methods

Family Physician Focus Groups

- Practicing family physicians across Canada recruited through participation in a previous coding exercise study & by primary care research networks.
- Semi-structured virtual focus groups were conducted (each 60-90 minutes).
- Discussion topics: current use & challenges of ICD-9, barriers & facilitators to implementing a new coding system for physician billing.

Policy/Decision-Maker Interviews

- Individuals with relevant knowledge of or experience with ICD-9 were asked to participate, including individuals in government, medical associations/physician groups, EMR/EHR vendors, national health organizations, etc.
- 30-minute virtual interviews were conducted.

Analysis

- Hybrid deductive-inductive thematic analysis. Three study team members independently coded all transcripts & met frequently to discuss emerging concepts & reach consensus on interpretation of results.

Results

Family Physician Focus Groups

- 29 participants across 5 focus groups
 - 59% women
 - Mean age 41 years
 - Mean 11 years in practice
- **Barriers** to implementing a new classification system to replace ICD-9:
 - Provincial variability & EMR differences
 - Difficulty adjusting to a new system
 - Concerns about integration & acceptability by government, EMR vendors, physicians
 - Time
 - Not sure a new system is needed
- **Facilitators** to support replacing ICD-9:
 - Integration with EMR & user-friendly/easy to search
 - Perceived benefits of a new system
 - Support for implementation (education, training, financial incentives)
 - Communicate clear reason for change/benefits
 - Pilot first, implement in phases
 - Billing integration
 - Lessons learned from other real-world scenarios

"I think the first thing that needs to happen is that everyone's **Ministry of Health needs to be on board and logistically capable of transitioning to the new billing...**It doesn't matter how prepared we are, like, that technology's always more archaic than the ones we're using on our end. So that's like, don't even bother involving us until that is confirmed and solid and tested and bugs are, you know, smoothed out." (Family Physician Participant)

"It's important to let the policymakers know that ICD-9 is not a good system, that we've been waiting, **we've been wanting to get a new system for years**, and we are disappointed that it's taken this long. ICD-9 is archaic, its terminology is, is not patient-centered, it is not trauma informed, it actively causes harm and it is a waste of our time, because the data that we submit with using ICD-9 is not usable. So garbage in, garbage out, **we need to have proper tools to be able to report proper data.**" (Family Physician Participant)

Policy/Decision-Maker Interviews (preliminary results)

- 22 interviews completed with 24 participants
 - 7 with health ministries
 - 10 regional/national medical associations/colleges
 - 3 national health-related organizations
 - 2 EMR/EHR vendors
- **Organizational challenges** for replacing ICD-9:
 - Cost
 - Integration with existing billing workflow
 - Considering unintended consequences
 - Difficulty adjusting to a new system
 - Provincial/territorial & EMR system differences
 - Unsure this is a priority & whether a new system is needed
 - Time & considering current burnout of physicians
- **Facilitators to support organizations:**
 - Understanding benefits & reason for change
 - Multi-stakeholder buy-in
 - Integration with EMR/EHR systems
 - Integration with existing billing workflow/processes
 - Implementation & change management support (funding, education, training, etc.)
 - Mandatory / centralized decision
 - Lessons learned from other jurisdictions

"It always comes down to, how much is it going to **cost?** ...who's going to bear the **cost of the implementation?** And what's the **disruption** going to be?" (P402)

"There's huge issues with respect to technologies that have, you know, **legacy technologies** that have current standards for ICD 9. And so, there's a cost and upgrade that would be a necessary modification of software to be able to accommodate the new standards. So that's, that's an issue, **one would have to really have a compelling reason why the new standard is preferable.** (P403)

"**The main thing is the provinces and territories buy-in**, because we have no control over that from our perspective, so it's really, we're really wondering how that's going to happen. Because 13 different jurisdictions may have 13 different processes." (P420)

"If you came to us independently and said, 'Let's do this' it probably won't happen, right? It's not enough to just give a couple of sheets to our peer leaders & to go in & tell docs - we'd have to **build a campaign around it, a change management piece**, we'd have to **really understand what it is that we're selling**, because it's our reputation also on the line. And it would be a bit of a hard sell, unless the **government makes it a priority**, and they fund us to do it." (P417)

Funding & Contact

This study is supported by the Canadian Institutes of Health Research (CIHR).

For more information, contact
Dr. Stephanie Garies at
sgaries@ucalgary.ca

Conclusions

- Replacing ICD-9 in Canada will be complex & requires additional consultation, change management & implementation support for physicians, medical associations, governments & other relevant organizations.
- If implementation concerns are adequately addressed, a new system to replace ICD-9 could enable more efficient coding & produce better representation of primary care tasks, workload & patient complexity.



IFHIMA's ICD-11 Education and Implementation Support

14-18 October 2024

WHO-FIC

Poster Number

331

Authors: Kathy Giannangelo & Mary Stanfill

International Federation of Health Information Management Associations

Abstract The International Federation of Health Information Management Associations (IFHIMA), a non-governmental organization (NGO) in official relations with WHO, has a commitment to helping the healthcare industry prepare for ICD-11. This work supports the WHO-FIC Network Strategic Framework and Work Plan priority areas of Education and Implementation with a focus on ICD-11.

Introduction

IFHIMA has been in official relations with the WHO for 44 years and has committed to working closely with the WHO on specific projects of particular concern or interest in the field of health records and health information. IFHIMA also specifically focuses on supporting the WHO-FIC Network Strategic Framework and Work Plan priority areas of ICD-11, Education, and Implementation.

IFHIMA now has 56 nations represented across our Associate/Individual, National, Educational Institution and Corporate categories.

IFHIMA's goals are to:

- promote the development and practice of health information management (HIM) in all countries
- advance the development and use of international HIM standards
- provide for the exchange of information on HIM education requirements and training programs
- provide opportunities for education and communication between persons working in the field of HIM in all countries
- promote the appropriate and effective use of technology and the electronic health record.

Methods & Materials

Toward the goal of education, IFHIMA is updating their Learning Modules and a module on ICD-11 is planned for 2024. IFHIMA develops these learning modules to provide opportunities for education and communication between persons working in the field of health records/information management around the world. They are PDF modules that can be reviewed at one's own pace and are available on the website (<https://ifhima.org/education-and-training/>). IFHIMA encourages sharing with colleagues who may benefit from the information.

IFHIMA's Global News, published on a tri-annual basis, is another venue for member education. Each issue strives to include at least one article on ICD-11 adoption and implementation.

Methods & Materials continued

Implementation support has focused on the launch of Communities of Practice (CoPs). The ICD-11 CoP provides opportunities for members to to advance knowledge sharing and collaboration among members. The purpose of the IFHIMA ICD-11 CoP is to provide a forum for discussion of common interests, information sharing, and to promote best practices related to ICD-11 implementation and use.

Results



2024

March – *Innovative approaches to ICD-11 implementation* authored by Michelle Badore, the Global Clinical and Nosology Content Manager at Solventum (formerly 3M Health Information Systems).

2023

December – *ICD-11 at the IFHIMA Congress* authored by Breanna Harnetty, IFHIMA Editorial Team, Australian Institute of Health and Welfare.



July - *Efforts for prevailing with the implementation of ICD-11 in Japan* authored by Tokiko Inagaki, Assistant Manager of the Medical Information Management Office at the Public Noto General Hospital, Japan.

Results continued

Below are highlights from the ICD-11 CoP meetings.

2024

September – Guest speaker, Meng Zhang, provided an update on China's methodologies and key considerations for implementing ICD-11.

June - Guest speaker, Erwyn Ooi Chin Wei, provided an update on Malaysia's progress since his first report to the CoP in September 2023.

March - Members from Japan, United States, Australia, Saudi Arabia, United Kingdom, Korea, and Canada reported on the current state of ICD-11 adoption and implementation in their respective countries.

2023

December - Members from Korea, United States, and Canada reported on the current state of ICD-11 adoption and implementation in their respective countries.

Conclusions

IFHIMA's involvement with the WHO-FIC Network Strategic Framework and Work Plan includes contributions to the priority areas of ICD-11 education and implementation. The publication of the ICD-11 Learning Module and articles in the Global News support this work, as do the quarterly ICD-11 CoP meetings. Future ICD-11 CoP agenda items include discussion on:

- The biggest challenges countries have had or are having regarding adoption and implementation
- Country-specific standards, mapping, use cases, data capture, and the world digitization of health information
- Governance regarding ICD-11 linearization.

Acknowledgements

Gowri Sriraman, Deputy Chair ICD-11 CoP
Michelle Badore, Secretariat ICD-11 CoP
IFHIMA Executive Board



Discrepancy between Japanese understanding and the principles of ICD-11 regarding the interpretation of the adjective 'metastatic'

14-18 October 2024

WHO-FIC

Poster Number
332

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Abstract Concerns about discrepancies in vocabulary recognition regarding the adjective 'metastatic' between Japan and the principles of ICD-11 made us directed a questionnaire survey using Google Forms®. Its findings composed of 311 replies imply that the expression 'metastatic XX cancer' is understood in Japan as a secondary cancer that has spread from another primary site/organ. We would like to present our understanding of the adjective 'metastasis' in Japan as fundamental data to academic committees and the World Health Organization.

Introduction

ICD-10 Instruction manual

G. 'Metastatic' cancer

Neoplasms qualified as metastatic are always malignant, either primary or secondary.

However, the adjective 'metastatic' is used in two ways, sometimes meaning a secondary from a primary elsewhere and sometimes denoting a primary that has given rise to metastases.

ICD-11 Reference Guide

2.21.5.6 'Metastatic' cancer

Neoplasms qualified as metastatic are always malignant. The adjective 'metastatic' can be used in two ways: mostly describing a primary tumour that has spread = metastasised to another site or organ (e.g. metastatic breast cancer), and sometimes describing the secondary site or location where the primary tumour has spread = metastasised (e.g. metastatic cancer in liver).

In the ICD-11 Foundation the adjective 'metastatic' followed by a site/organ (without a preposition) is always used in the meaning of a primary neoplasm of that particular site/organ that has spread into another site.

Figure1: Changes in the description of the adjective "metastatic" between ICD-10 and ICD-11.

According to the ICD-11 Reference Guide (Fig.1), the adjective "metastatic" followed by a site/organ (without a preposition) is 'always' used in the meaning of a primary neoplasm of that site/organ that has spread into another site'. Additionally, when the ICD-10 Instruction Manual was revised to the ICD-11 Reference Guide, the wording at the beginning of this section was changed from "sometimes primary, sometimes secondary" to "mostly primary, sometimes secondary (Fig.1)." Concerns exist about discrepancies in vocabulary recognition regarding the adjective 'metastatic' between Japan and the principles of ICD-11. Specifically, we wonder whether the phrase 'metastatic liver cancer' should be understood to mean primary or secondary cancer(Fig.2).

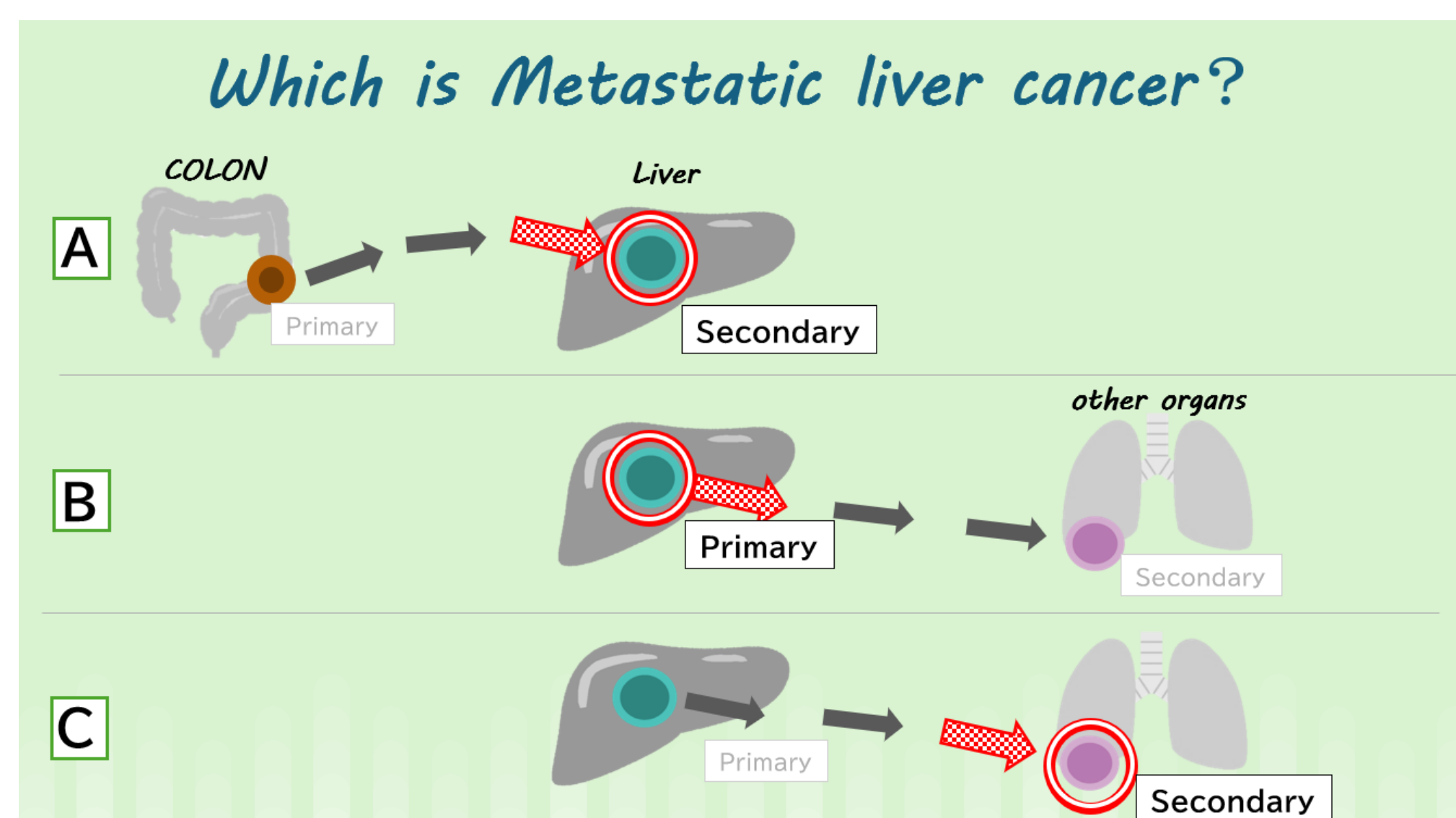


Figure 2: The obscure caused by the phrase "metastatic lever cancer. We can imagine three types of such conditions.

We aimed to not only investigate the understanding of the adjective 'metastatic' in Japan but also inform influential individuals globally about our findings.

Methods & Materials

We conducted a questionnaire survey using Google Forms® via the homepage of the Japan Society Health Information Management(Fig3). The question posed was: 'How would you interpret the expression "metastatic liver cancer"?' The answer options were: (A) Cancer that has spread to the liver from other organs, (B) Liver cancer that has spread to other organs, and (C) Cancer that has metastasized from the liver. In addition, the same question phrase was posed, substituting the word 'liver' with 'brain', 'lung', 'breast', and 'colon' (Fig.3).

Question 5

"metastatic brain tumour"の表記について、次のうちどの意味として捉えますか

How would you interpret the expression "metastatic brain tumour" ?

A) Tumors that have metastasized to the brain from other organs.

B) Brain tumors that has metastasized [spread] to other organs.

C) Tumors that have metastasized from the brain.

☐ A) 他の臓器から脳に転移してきた腫瘍

☐ B) 他の臓器に転移巣を有する脳腫瘍

☐ C) 他臓器に脳から転移してきた腫瘍

Figure3: Extraction of the questionnaires actually used on the home page.

Results

We received 311 valid responses from 311 healthcare professionals, including 192 health information managers and 105 medical doctors. ' (A) Cancer that has spread to the XX from other organs' (69.0–90.0%) was the most common answer, followed by '(B) XX cancer that has spread to other organs (5.0–22.0%)' and '(C) Cancer that has metastasized from the XX' (5.0–22.0%). Option (A) was relatively common in relation to the brain (91.0%) and liver (90.0%), while option (B) was slightly more frequently selected in relation to breast (22.0%) and colon (20.0%) (Fig.4). These results varied slightly depending on the organ.

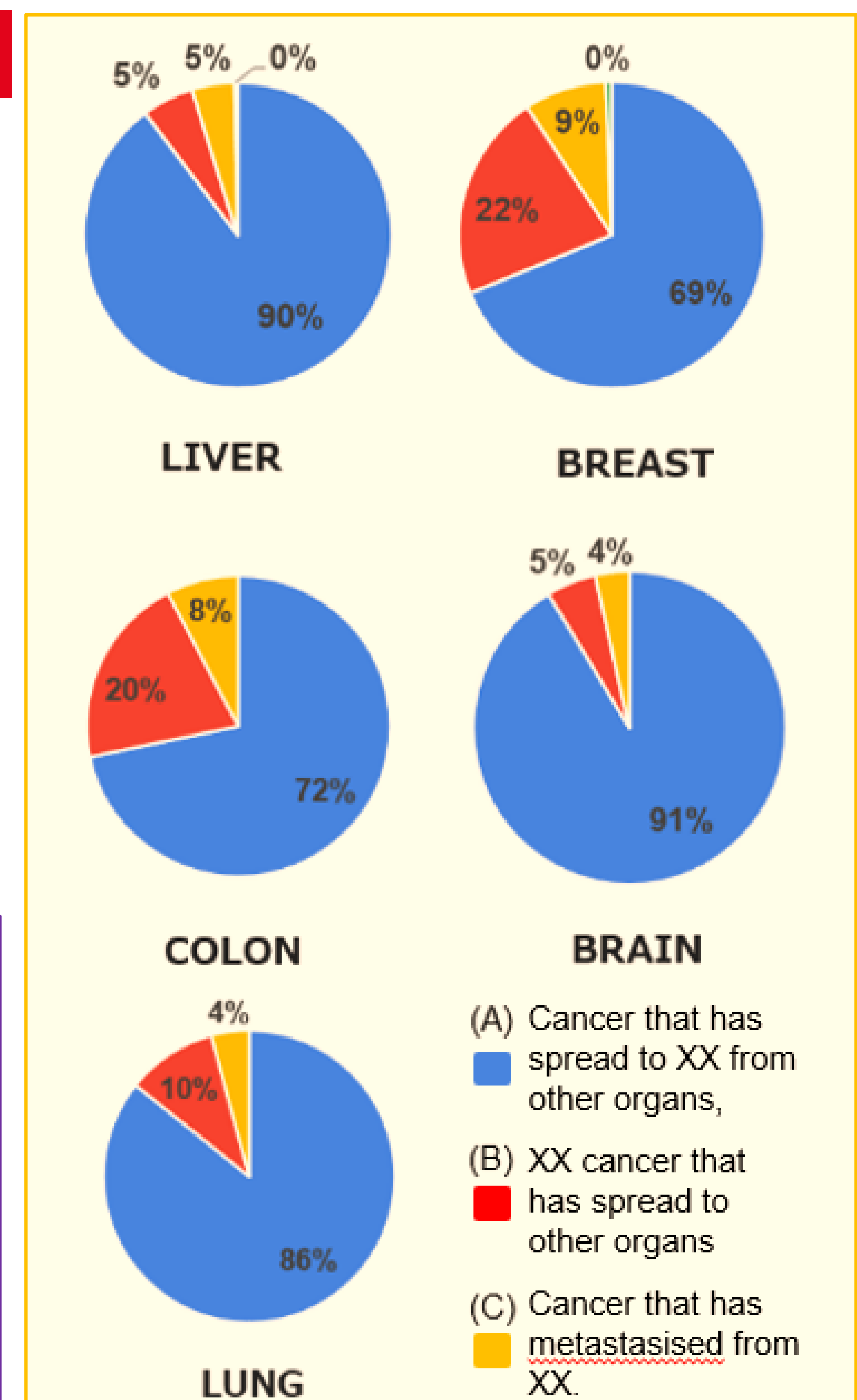


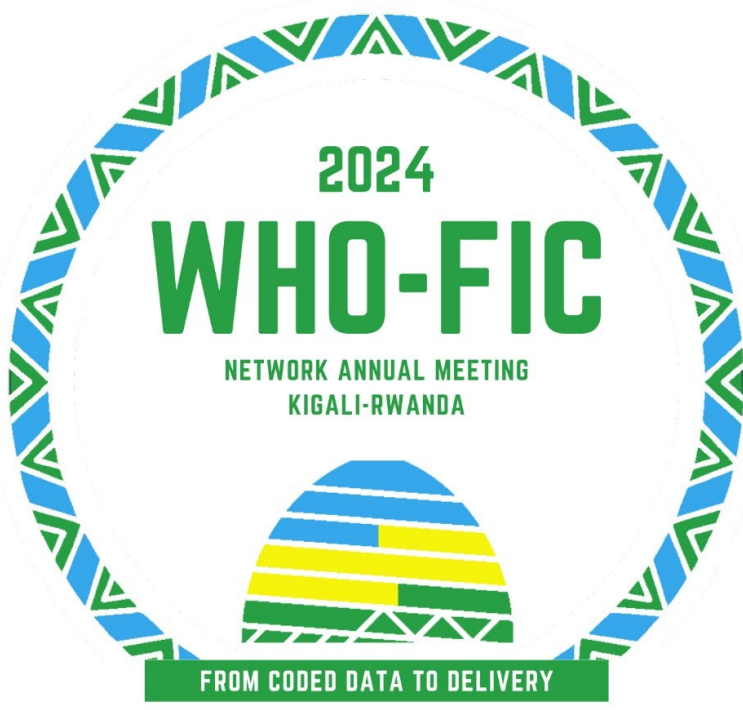
Figure4: Choices of each organ. Although it varied depending on organs, "A: cancer that has spread to the XX from other organs" (69.0–90.0%) was the most common answer.

Discussions

In contrast to the ICD-11 Reference Guide, the findings from this research revealed that in Japan, the phrase 'metastatic XX cancer' commonly refers to the secondary site to which the primary cancer has spread. Although this problem may include linguistic aspects, undeniable differences exist in the use of the adjective 'metastatic' between Japanese practice and the principles of ICD-11. We would like to present our understanding of the adjective 'metastasis' in Japan as fundamental data to academic committees and the World Health Organization.

Conclusions

Our study findings imply that the expression 'metastatic XX cancer' is understood in Japan as a secondary cancer that has spread from another primary site/organ. This recognition was not 'always' same but varied to some extent depending on organs.



An Attempt to Map Japanese Dysphagia Assessment Items to ICD–11 Chapter V Codes

14-18 October 2024

WHO-FIC

Poster Number
333

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Abstract We confirmed the correspondence between the components of the functions of ICD-11V codes in the 10 items of the Japanese Dysphagia Assessment Chart. The ICD-11V code [Functions related to the digestive system > Swallowing] contain “Functions of clearing substances, such as food, drink and saliva through the oral cavity, pharynx and oesophagus into the stomach at an appropriate rate and speed” making it difficult to map the ICD-11 V codes one-to-one to the items in the Assessment Chart.

Background and Purpose

To understand dysphagia, it is important for medical and nursing care professionals involved in diagnosis, treatment, and rehabilitation to understand and share the nature of the disorder, and it is also a major issue for collaboration in the community that supports the lives of patients. In Chapter V (Supplementary section for functioning Assessment) of the International Classification of Diseases, 11th Revision (ICD-11), a part of the International Classification of Functioning, Disability and Health (ICF) was incorporated. ICF is expected to spread to clinical practice worldwide.

On the other hand, in Japan, the Functional Independence Measure (FIM) and the Functional Oral Intake Scale (FOIS) records are required for the calculation of the additional fee for the system to restore feeding and swallowing function in the medical fee system. A correspondence table of FIM, ICF codes, and ICD-11V codes has already been published by Mukaino et al. It also shows the high correlation between FIM and evaluation by the WHO Disability Assessment Schedule 2.0 (WHODAS2.0) and allows international comparison.

The purpose of this study is to examine the correspondence between the ICD-11V codes and the items on the dysphagia assessment items used in Japan.

Table 1-1. ICHI codes mapping

Dysphagia Assessment Chart	
Nutritional Methods (See Evaluation, section 10 Diet) Oral intake: Normal food, soft food, adjusted diet code (), other () Fasting	VD22 Eating[WHODAS] VW24 Eating(Self-care) VV40 Functions related to the digestive system
Level of feeding status *No oral (Lv1: oral care only, Lv2: swallow training without food, Lv3: swallow training with small amount of food)	
*Oral and alternative nutrition (Lv4: Oral swallowing with less than 1 meal, Lv5: Oral swallowing with 1 or 2 meals, Lv6: 3 swallowed meals + deficient support)	
*Oral only (Lv7: 3 swallowed meals orally. No substitutes, Lv8: 3 meals orally except for special foods difficult to eat, Lv9: 3 normal meals orally with medical consideration, Lv10: Normal with no food restrictions)	
Supplemental (alternative) nutrition *None · Nasotracheal tube () · Gastrostomy () · Intravenous drip () · Others: Drug name and daily dose in parentheses	

Methods

We confirmed the correspondence between the components of the functions of ICD-11V codes (Japanese translation of MHLW, Japan and Mukaino et al. 2021) in the 10 items of the Dysphagia Assessment Chart. (The Japanese Society of Dysphagia Rehabilitation) (hereinafter referred to as "the Assessment Chart").

Results and Discussion

Part of [Oral hygiene status] in [2. Oral status and oral function] in the Assessment Chart corresponds to [Self-care > Caring for body parts > Caring for teeth]. [Oral food residues] in [10. Meal] and [Repetitive Saliva Swallowing Test], [Modified Water Swallowing test], [Food test] in [8. Screenig Test] were considered to be included in [Functions related to the digestive system > Intake functions > Swallowing > Oral swallowing], [Sucking], [Biting], [Chewing], [Manipulation of food in the mouth] and [Self-care > Drinking].

Table 1-2.

1. recognition	
aphasia (loss of speech)	VD05 Conversation [WHODAS] VV2Y Other specified voice and speech functions
2. oral condition and oral function	
oral hygiene	VW21 Caring for body parts
Oral Food Processing	VV40 Functions related to the digestive system
tongue atrophy	
oral dyskinesia	
tongue depressor	
3. articulation (with/without air cut)	
Nameandsize oftracheal cannula	VV3Y Other specified functions of the cardiovascular, haematological, immunological and respiratory system
cuff	
Over-the-cuff suction tube	
side hole	VV20 Voice functios VV2Y Other specified voice and speech functions
speaking	
wet hoarseness	
lisp	
speech intelligibility	
hoarseness(Grade,RBAS:0,1,2,3)	
nasal sound change	
Maximum Phonation Time:MPT	VV60 Mobility of joint functions VV61 Muscle power functions
4. Cervical, trunk, and grip strength	

Conclusions

The ICD-11V code [Functions related to the digestive system > Swallowing] contain “Functions of clearing substances, such as food, drink and saliva through the oral cavity, pharynx and oesophagus into the stomach at an appropriate rate and speed” making it difficult to map the ICD-11 V codes one-to-one to the items in the Assessment Chart.

Reference

- Ministry of Health, Labour and Welfare. Japan. 第23回社会保障審議会統計分科会生活機能分類専門委員会 https://www.mhlw.go.jp/stf/newpage_38086.html (2024/08/21 accessed)
- Dysphagia Assessment Chart. (The Japanese Society of Dysphagia Rehabilitation) https://www.jsdr.or.jp/doc/doc_manual1.html (2024/08/08 accessed)

Acknowledgements

This work was supported by KAKENHI Grant Number JP23K17447.

Table 1-3.

5. respiratory function	VV3Y Other specified functions of the cardiovascular, haematological, immunological and respiratory systems
6. cranial nerves	VV6Y Other specified neuromasculoskeletal and movement-related functions VV1Y Other specified sensory functions and pain
7. dehydration and malnutrition	VV4Y Other specified functions of the digestive, metabolic and endocrine systems
8. Screening test	
Repeated Saliva Swallowing Test(RSST)	VV40 Functions related to the digestive system
Modified Water Swallowing Test(MWST), stagnant water use (without and with)	
Food Test, Food:	
Cervical auscultation, Respiratory sounds	
Deglutition	
sounds	
9. imaging tests	
10. meals	VD22 Eating[WHODAS] VW24 Eating(Self-care) VV40 Functions related to the digestive system
Treatment strategy: Completion of instruction only · Instruction and reevaluation · Outpatient training · Inpatient training · Referral to other hospitals · Others	



PyOpenVA: Software for preparing & analyzing Verbal Autopsy data

14-18 October 2024

WHO-FIC

Poster Number
334

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Abstract Verbal autopsy (VA) is a promising and expedient solution for providing cause of death information in areas lacking sufficient medical certification of deaths. A valuable step in capitalizing on the VA method is the development of PyOpenVA, a free and open-source software application that performs the necessary VA data preparation steps and provides access to different computer-coded algorithms, thus facilitating the comparison of VA cause assignment.

Introduction

Verbal autopsy (VA) is an effective tool for providing information on causes of death at the community level that is particularly useful in areas lacking sufficient medical certification of deaths. While civil registration and vital statistics systems build capacity, VA is an expedient solution for providing data needed to inform health policies and interventions. Key to this process is computer-coded verbal autopsy. Relying on computer algorithms to assign causes of death to VA data is an efficient technique that allows medical practitioners to focus their time and effort attending to patients.

Fully capitalizing on the VA method has been hindered by the software developed to process and analyze VA data. Different algorithms are implemented with different software which complicates the analysis and comparison of cause assignments.

Methods & Materials

The openVA Team has recently employed the Python programming language to create the PyOpenVA GUI (Graphic User Interface). This new tool bundles the data processing steps, algorithms, and software dependencies into a single application with a standard point-and-click interface. The PyOpenVA GUI is an open-source application that is freely available and can be installed on Windows or Mac OSX by downloading a single installer file – no additional dependencies need to be installed separately.

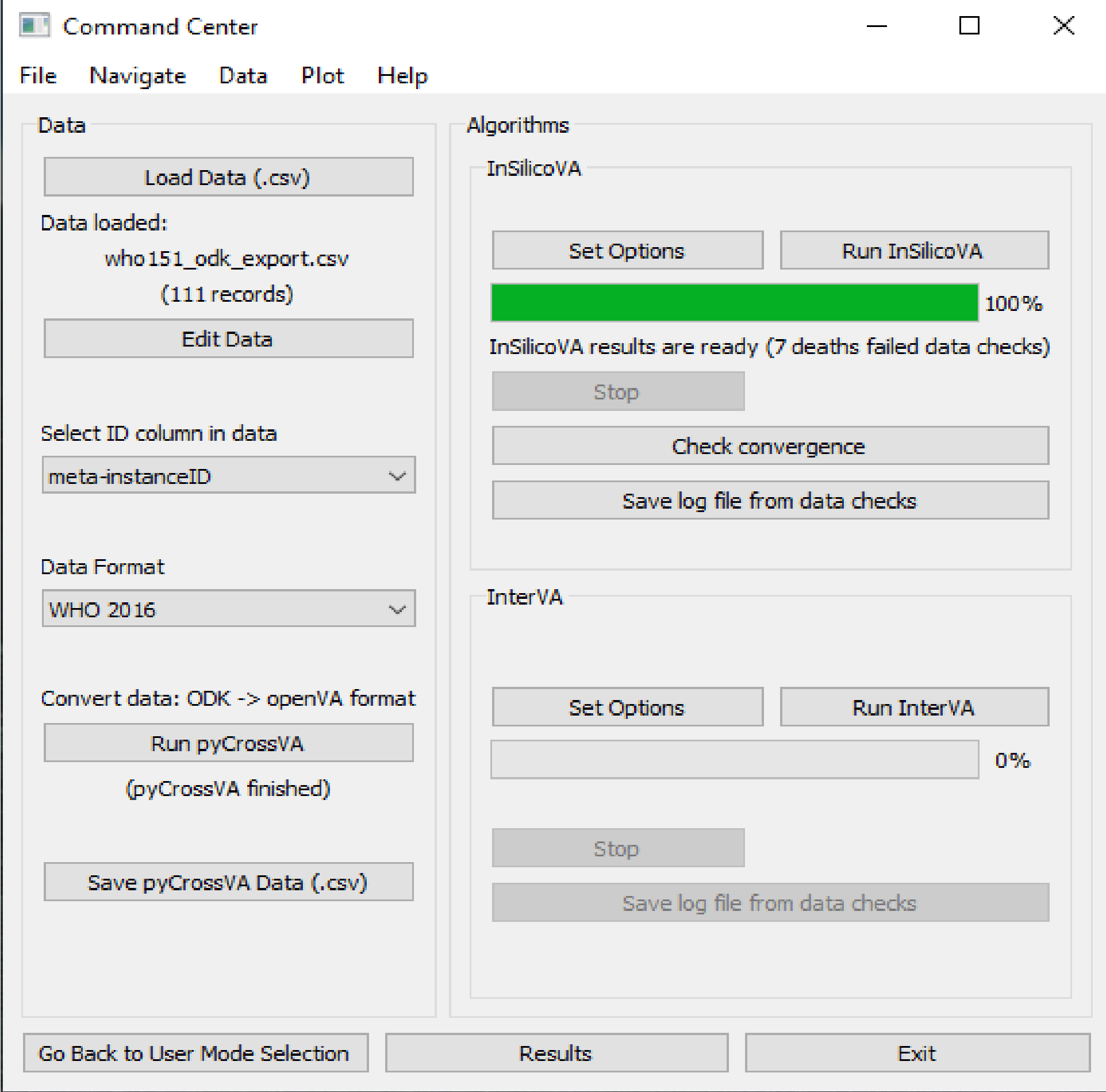
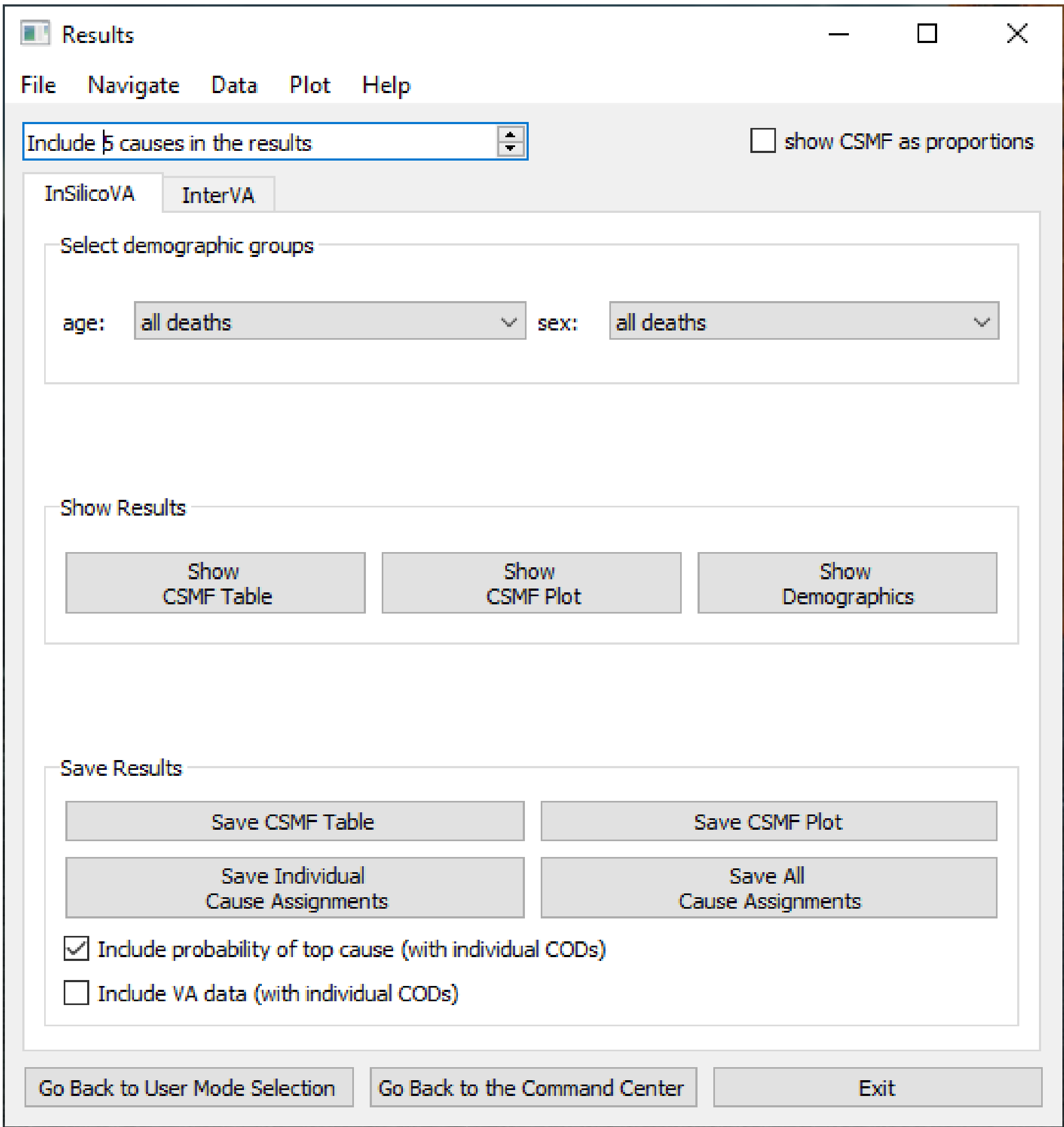


Figure 1: PyOpenVA window for preparing data and running VA algorithms.

Results

Figure 2: PyOpenVA results window

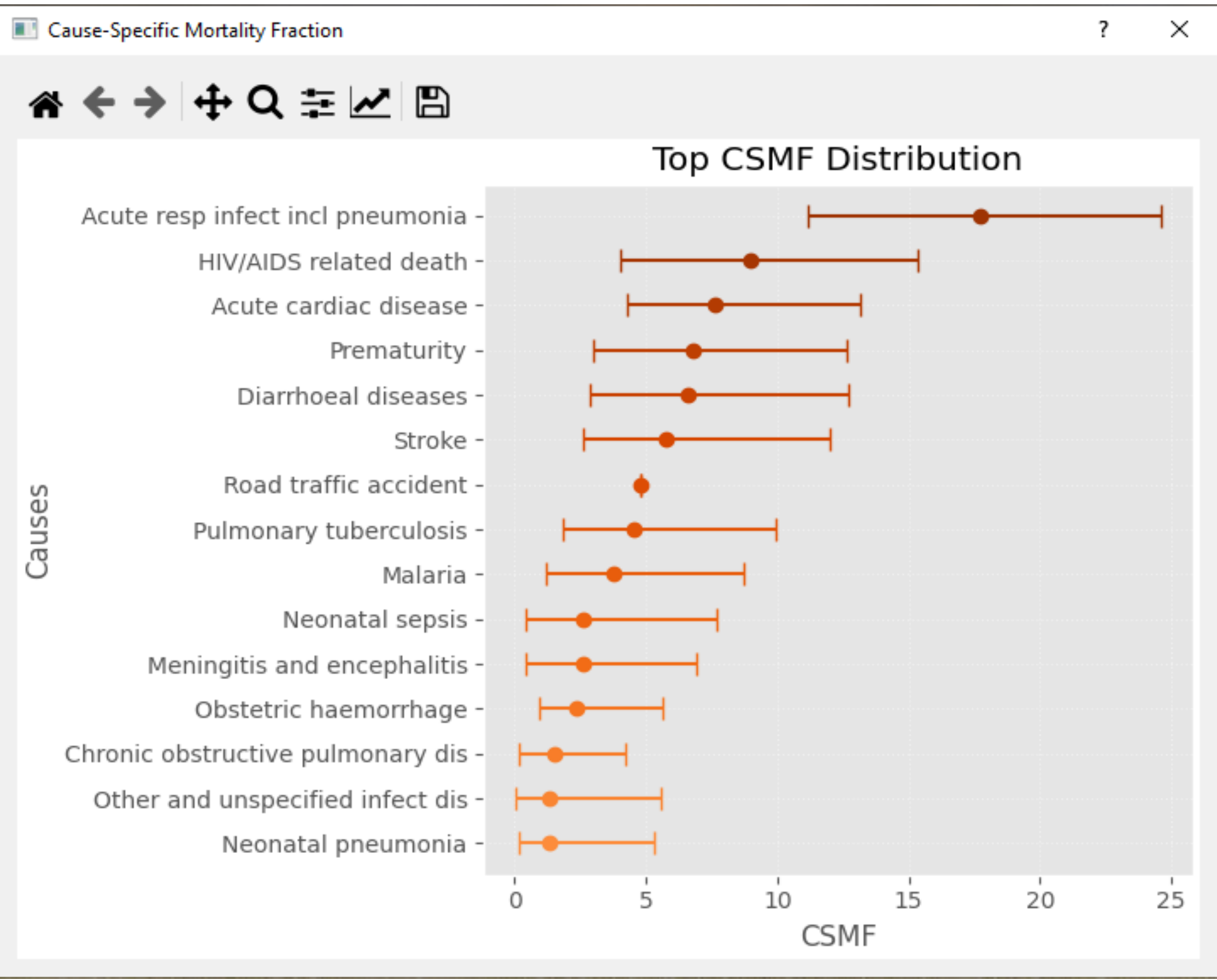


The PyOpenVA GUI has two user modes: (1) a wizard mode that guides new users through the necessary steps to process and assign causes to VA data; and (2) a customizable mode with extended features for those experienced with the algorithms and VA data analysis process. VA data in CSV format (as produced by the ODK or Kobo tool kits) can be loaded into the PyOpenVA application and converted into the format expected by the algorithms. The GUI supports data collected with the 2016 WHO VA Instrument, and will offer support for the 2022 instrument when the algorithms have been updated to work with the new version. Currently, the PyOpenVA GUI implements the InterVA5 and InSilicoVA algorithms; the latter is implemented with a C++ library (automatically included in the application) to enhance performance. Log files from the data conversion and consistency checks, as well as individual cause assignments (merged with the original VA data) are also made available by the app. The GUI also provides tabular and graphical summaries – i.e., cause-specific mortality fractions (CSMFs) as well as cross-tabulations by and age sex -- that can be viewed within the application or saved to the user's computer (as PDF or CSV files). This effort improves on previous tools developed by the openVA Team since it does not require users to learn scripting language (R/Python) or manage software dependencies; all while being much faster.

Conclusions

In summary, the PyOpenVA tool is easy to install and provides an intuitive interface enabling analysts to quickly analyze their VA data and present the results. Different modes are provided to meet more advanced data processing needs, while offering beginners a step-by-step path to assigning causes of death and accessing results. Future advances include adding additional graphical outputs for directly comparing the CSMFs across different algorithms (as available in the openVA R package). The PyOpenVA GUI serves as a single tool equipped with different algorithms to facilitate the comparison of VA cause assignment. The open-source license (GPL3) and modular design of the application also promotes incorporation of additional algorithms and VA data analysis tools. The openVA Team is committed to incorporating additional algorithms and VA analytic tools into the GUI, as well as keeping the application up to date with future releases of the WHO VA instrument. In conclusion, PyOpenVA makes a valuable contribution to the effort to improve the comparison of VA cause assignment.

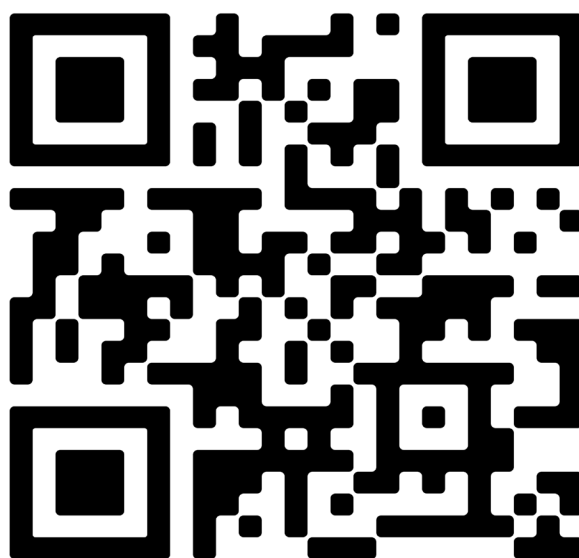
Figure 3: Cause-specific mortality fraction produced by PyOpenVA GUI (InSilicoVA).



Acknowledgements or Notes

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See QR Code for more information on obtaining software, funders, and references





Iris based on ICD-11: results of coding tests on Italian and Canadian data

14-18 October 2024

WHO-FIC

Poster Number

335

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Abstract As ICD-11 is the new standard for mortality statistics, it was necessary to develop a new version of Iris based on ICD-11. This included the decision tables, which contain all the codes and rules of the ICD. In October 2023, a version of Iris based on ICD-11 was released for testing. Iris Institute is currently correcting the tables on the basis of testing results. The poster shows the results of a test on Italian and Canadian death certificates coded with Iris both in ICD-10 and ICD-11. The two selected underlying causes were compared; differences were noted, due to changes in the classification, ICD-11 issues, and errors in the tables that need to be fixed.

Introduction

The mortality coding system Iris is under revision to be compatible with ICD-11. This implies also the revision of the decision tables, the rule base of Iris, containing all ICD codes and rules for coding the multiple causes (MC) and for underlying cause (UC) selection. Decision tables in ICD-11 were obtained by implementing the instructions of the Reference Guide (RG). Additional rules were obtained by transitioning ICD-10 tables by applying WHO mappings to the ICD-10 codes of the tables. The scope of transitioning ICD-10 tables was to generate a more detailed and complete set of instructions compared to the general rules described on the RG hence to guarantee the comparability with previous coding standards. The development of tables is still ongoing, in particular for rules governing multiple causes instruction. This poster illustrates the results of a test performed with the latest version of the tables still to be released.

Methods & Materials

3974 certificates referring to deaths occurred in 2020-2021 were randomly selected from the Italian National Causes of Death Register. Certificates were coded with two different versions of Iris: the ICD-10-based version V5.8.1 (Iris-10) and the new version V6.0.22 based on ICD-11 (Iris-11). Iris-11 used an Italian dictionary, derived from the Iris-10 one by manually coding frequent medical expressions and by using WHO mappings where possible. 2749 certificates (69.2%) were automatically coded with both Iris-10 and Iris-11. UC selected were compared at both chapter and code level. The latter was performed by comparing the ICD-11 UC with that expected by mapping Iris-10 UC through WHO mappings. Certificates where ICD-11 UC was not included in the expected codes were manually checked in order to understand the reason of the coding difference.

Results

Table 1: Test sample.

Certificate	N
Total	3974
Rejected	1225
Automatically coded	2749 (100%)
ICD-11 UC comparable with corresponding ICD-10 UC based on mapping	2558 (93.1%)
ICD-11 UC not comparable	191(6.9%)

The overall agreement at chapter level was 96.8%. Analysis at chapter level highlighted expected differences due to classification changes. For instance, in ICD-11 cerebrovascular diseases moved from circulatory system chapter to nervous system; influenza from respiratory system chapter to infectious or parasitic diseases.

Analysis at code level showed that for 2558 certificates (93.1% of automatically coded certificates) the ICD-11 UC was comparable with the corresponding ICD-10 code. For 191 certificates (6.9%) there was no correspondence between ICD-10 and ICD-11 UCs.

The majority of the differences (78.0% 149 cases out of 191) were a result of changes brought in with the new classification, whether it was location in the classification or changes updated coding rules included in the Reference Guide. For example, cardiac arrest is classified in ICD-11 to Symptoms and signs chapter and, in contrast with ICD-10 rules, is accepted as the UC. Some other entities (e.g. intestinal hemorrhage or perforation) moved to Symptoms and signs as well and listed in ill-defined conditions, making other codes to be preferred as the UC. Many differences were found due to ICD-11 rules on dementia and cerebrovascular diseases: if vascular dementia is selected as the UC and a cerebrovascular disease is reported, the latter is preferred as the UC.

In 23 cases, differences were due to errors in the rules for MC. Most frequent errors involved, for example, rules for the modification of neoplasms of common metastasis sites and for the modification of external causes of death accordingly to the manner of death reported.

For 15 cases differences were ascribable to errors in decision tables regarding the rules for UC selection. These errors mainly involve conditions whose classification structure has radically changed such as some infectious or rheumatic circulatory diseases. For such causes manual revision of the tables is needed. Other errors were due to incompleteness and errors of mapping tables used for the transition of ICD-10 tables.

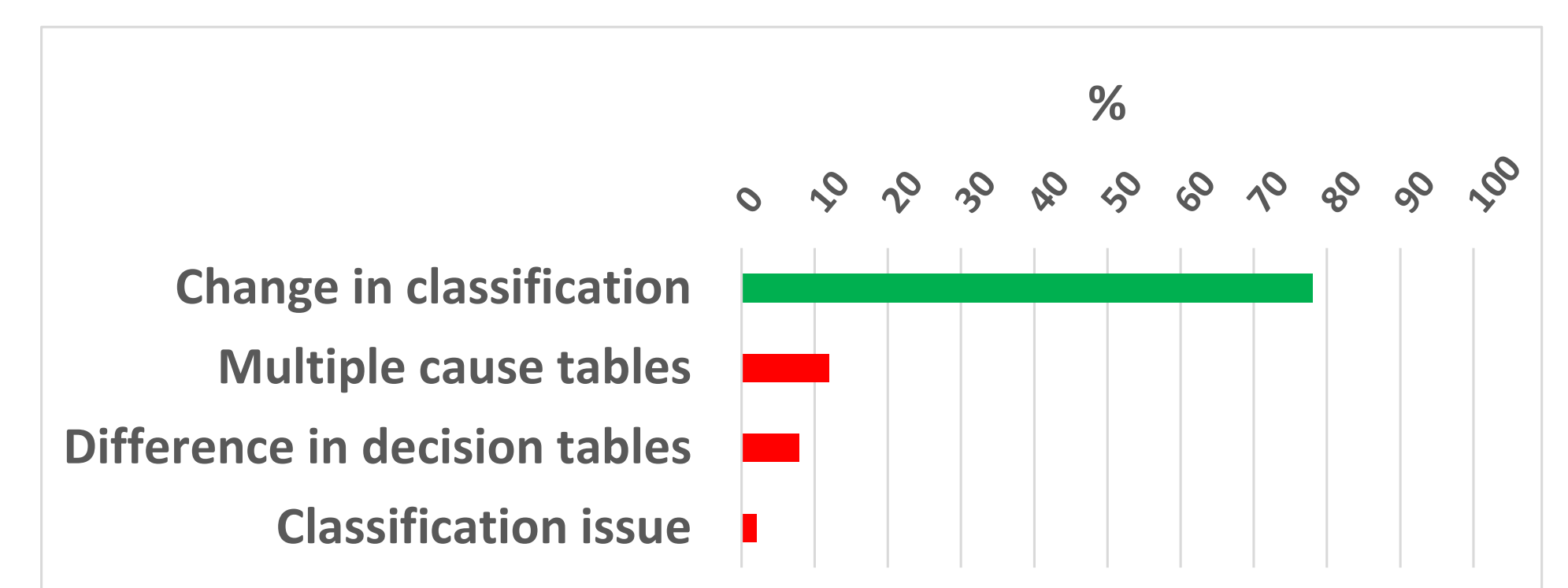


Chart 1: Distribution of 191 certificates with ICD-11 UC not comparable with corresponding ICD-10 UC by the reason of the difference

The analysis based on the miss matches between ICD-11 and ICD-10 UC allowed to highlight the most relevant errors in Iris coding with a relatively limited effort for manual check. Nevertheless, this analysis has some limitations: the small number of certificates; cases with comparable UC may also contain errors which are not considered in this analysis.

Conclusions

Frequently, the deviation of Iris-11 coding from the expected is the result of known changes between ICD-10 and ICD-11. In some cases, discordance in UC is due to decision tables issues that should be revised. Despite a great effort needed for the development and maintenance of decision tables, Iris assures maintaining a high quality of coding and comparability of mortality statistics with previous coding standards.