NCVHS ICD-11 Expert Roundtable Meeting August 3, 2023

A practical strategy to use the ICD-11 for morbidity coding in the United States without a clinical modification

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ICD-11

- Official version of ICD
- Used by at least 35 countries for
  - Causes of death
  - Cancer registries
  - Primary care
  - Reimbursement

What's new in ICD-11

- Moderate increase in size
  - 4,000 more (stem) codes than ICD-10 (40% increase)
- Foundation
  - Knowledge base from which classifications ("linearizations") are derived
  - Frequent (daily) update
  - > 120,000 codable terms
- Postcoordination (cluster coding)
  - > 14,000 extension codes, potentially millions of different combinations
- WHO's vision: common Foundation and extension for the WHO Family of International Classifications (WHO-FIC)
    - ICD (International Classification of Diseases)
    - ICHI (International Classification of Health Interventions)
    - ICF (International Classification of Functioning, Disability and Health)

NCVHS
National Committee on Vital and Health Statistics

November 25, 2019

The Honorable Alex Azar II
Secretary
Department of Health and Human Services
200 Independence Avenue, S.W.
Washington, D.C. 20201

Re: Preparing for Adoption of ICD-11 as a Mandated U.S. Health Data Standard

Dear Secretary Azar:

As stipulated by the Health Insurance Portability and Accoun
National Committee on Vital and Health Statistics (NCVHS) m
effectiveness of adopted health data standards pursuant to t
administrative simplification provisions. This includes makin
adoption of the International Classification of Diseases, versi

The ICD is a classification system developed by the World He
as the foundation for identifying health trends and statistics
standard for reporting diseases and health conditions. WHO
2018 and the World Health Assembly formally adopted this v
effective beginning January 1, 2022. Adoption of ICD-11 by t
dimensions:

- **First, adoption for mortality,** i.e., cause of de
membership in the World Health Organizat
surveillance. It is led by the National Cen
with state vital registration and statis
- **Second, adoption for morbidity,** i disorc
conditions, however, requires H king since
code set. Its use for morbidit atory for hospi
health care provider and s ettings. Uses include monitoring the incidence and
prevalence of diseases, orting claims for reimbursement, tracking of safety and
quality guidelines, po ation health monitoring, research as well as state health data
reporting.

The U.S. implemented ICD-10 for mortality reporting in 1999. It implemented it for morbidity in 2015, 25 years after it was endorsed by the WHO, and after a protracted regulatory process. As

Research topics the Committee recommends include:

Whether ICD-11 can fully support morbidity classification in the U.S. without development of a U.S. clinical modification (CM) and if not, are there areas to be targeted in a CM version.

Benefits of avoiding a Clinical Modification

- Avoid the cost of creating and maintaining ICD-11-CM
- Earlier use of an up-to-date, international medical classification
- Avoid divergence of the US Clinical Modification from the international core
  - Theoretically, ICD-10-CM should be totally compatible with ICD-10
  - However, significant differences can be observed e.g.
    - *E14 Unspecified diabetes mellitus* is not found in ICD-10-CM (diabetes unspecified is coded as type 2)
    - *K68 Disorders of retroperitoneum* is not found in ICD-10
- ICD-11 Foundation can be leveraged for
  - Alignment with other terminologies e.g., SNOMED CT
    - In the original design, SNOMED CT was to be used directly to build the Foundation. However, that was not realized for various reasons.
    - There is renewed interest to align the Foundation with SNOMED CT, a pilot project mapped a sample of codes.
  - Automated coding

Options to augment coverage in ICD-11

- Use of the stem codes alone in the ICD-11 MMS (Mortality and Morbidity Statistics) linearization will be insufficient
- Options for expanding coverage
  - US Linearization
    - Exposing Foundation entities for coding
  - Postcoordination
    - Using existing postcoordination capability, with the option of adding US-specific extension codes (“US Extension of Extension”)
  - Adding new stem codes
    - Not linked to the Foundation
    - Likely to be a small set (“ICD-11-CM Lite”)

A practical strategy of replacing ICD-10-CM

- Rank the available options according to
  - Level of effort in development and maintenance
  - Ease of implementation by users
  - Risk of divergence from the core ICD-11
- Proposed strategy
  1. Use MMS stem codes
  2. Use additional Foundation entities
  3. Postcoordination with existing extension codes
  4. Postcoordination with new extension codes
  5. New stem codes

Study design

- Test the strategy on 2 samples of ICD-10-CM codes
  - Commonly used codes from all chapters (horizontal sample)
  - All codes in a single chapter (vertical sample)

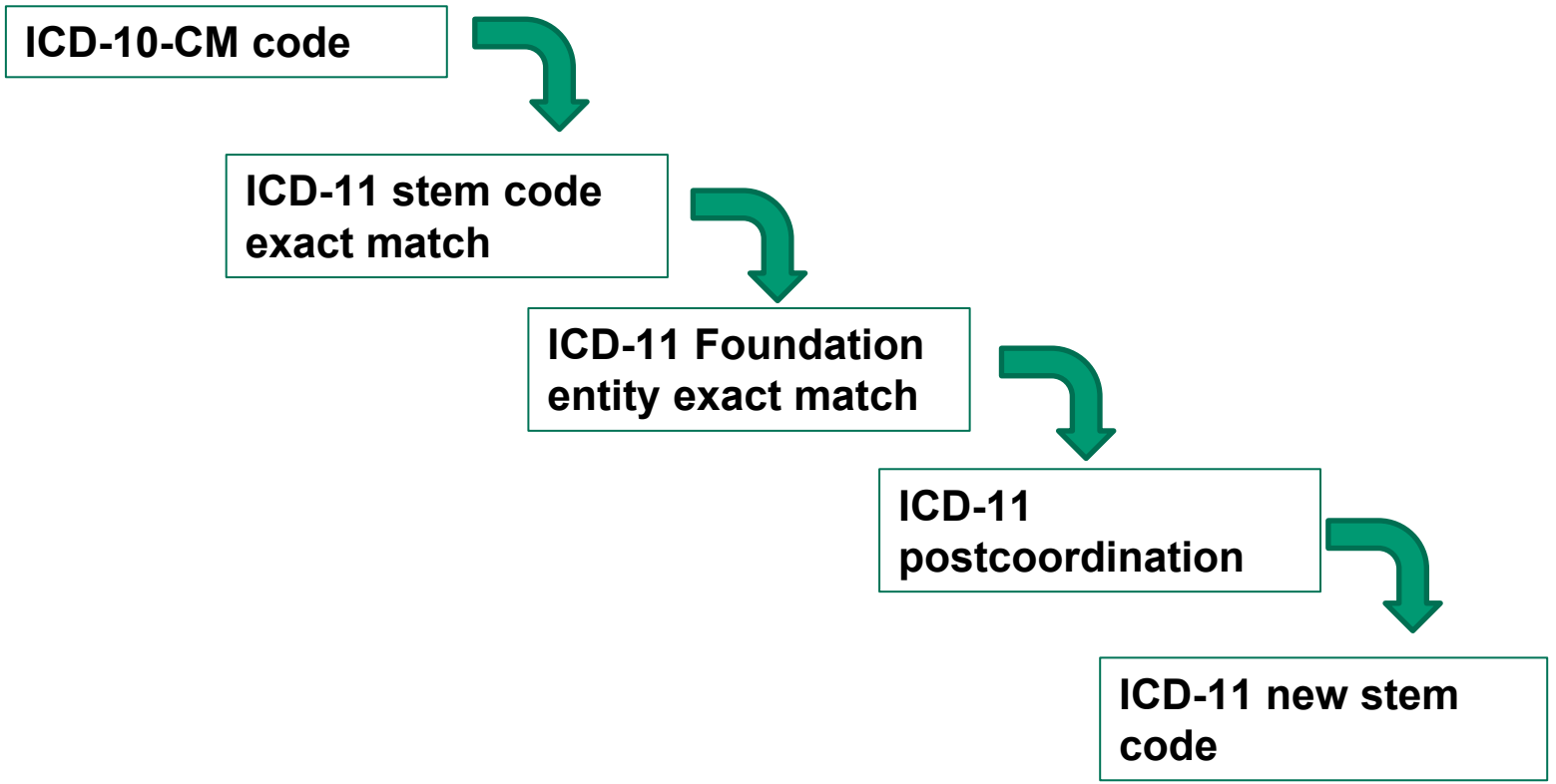
Commonly used ICD-10-CM codes

- Medicare claims
  - One of the biggest collections of ICD-10-CM codes in use
  - De-identified data available to researchers through the CMS Virtual Research Data Center
- However, Medicare patients are mostly > 65 and so missing codes from 3 chapters
  - *Chapter 15 Pregnancy, childbirth and the puerperium*
  - *Chapter 16 Certain conditions originating in the perinatal period*
  - *Chapter 17 Congenital malformations, deformations and chromosomal abnormalities*
- Alternative source of ICD-10-CM codes for these 3 chapters: University of Nebraska Medical Center (thanks to James Campbell and Ellen Kerns)
- 909 codes covering at least 60% usage in each chapter (excluding digestive diseases)

All codes from one chapter

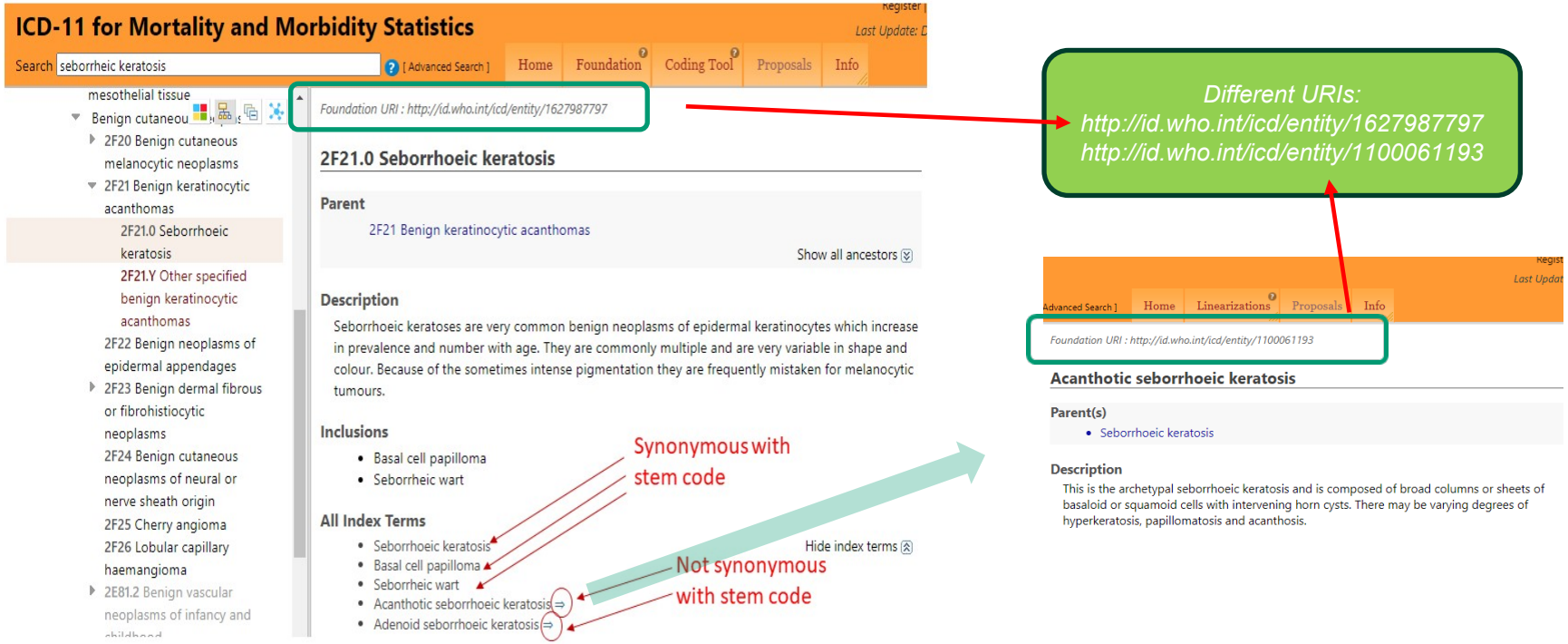
- We selected *Chapter 11 Diseases of the digestive system* because, according to our previous study
  - Good spread of code usage (not overly concentrated)
  - Medium coverage (not extremely high or low) by ICD-11
  - Manageable number of codes – 817 codes

‘Waterfall’ recoding in ICD-11



ICD-11 browser

- Maintenance (“orange”) browser used because more complete display of Foundation entities as inclusions and index terms
- Identification of distinct Foundation entities by URIs



Postcoordination

- Not restricted to options in browser
  - Postcoordination sanction rules in browser are primarily for detecting redundancy arising from post-coordinated expression synonymous with an existing stem code
  - We allow combinations if clinically meaningful e.g.,
    - *MC41 Tinnitus & XK9J Bilateral*
- Allow use of stem codes, extension codes and Foundation entities
- Propose new extension codes if necessary

Use of multiple stem codes

- Apart from their use in postcoordination, multiple stem codes are allowed if that results in exact match
- These are broad-to-narrow matches e.g.,
  - ICD-10-CM code *K56.2 Volvulus* →
    - *DA91.1 Volvulus of small intestine*, OR
    - *DB30.1 Volvulus of large intestine*
- Interpretation is different from postcoordination e.g.,
  - ICD-10-CM CODE *K22.11 Ulcer of esophagus with bleeding* →
    - *DA25.Z Oesophageal ulcer, unspecified*, AND
    - *ME24.A2 Oesophageal haemorrhage*

Summary of recoding results

Level of recoding	Frequently used codes		Digestive disease codes		Combined	
	Count(%)	Cumulative %	Count(%)	Cumulative %	Count(%)	Cumulative %
L1. Stem code	291(32%)	32.0%	316(38.7%)	38.7%	607(35.2%)	35.2%
L2. Foundation entity	58(6.4%)	38.4%	137(16.8%)	55.5%	195(11.3%)	46.5%
L3a. Postcoordination - existing code	483(53.1%)	91.5%	257(31.5%)	87.0%	740(42.9%)	89.4%
L3b. Postcoordination – new extension code	62(6.8%)	98.3%	60(7.4%)	94.3%	122(7.1%)	96.5%
L4. New stem code	15(1.7%)	100.0%	46(5.6%)	100.0%	61(3.5%)	100.0%
Total	909(100%)		816*(100%)		1725(100%)	

*one unmappable code K56.41 Fecal impaction excluded

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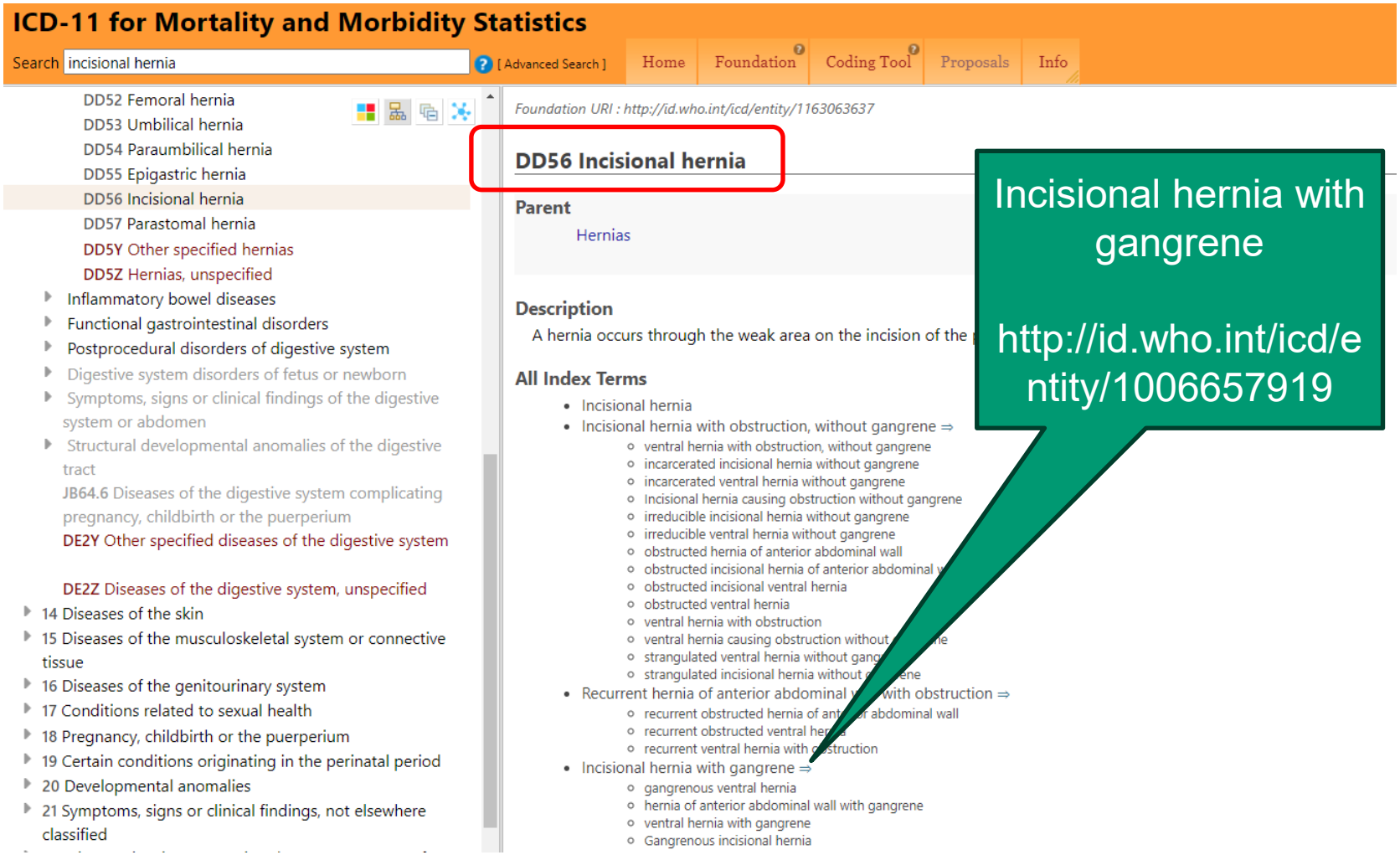
K43.1 Incisional hernia with gangrene



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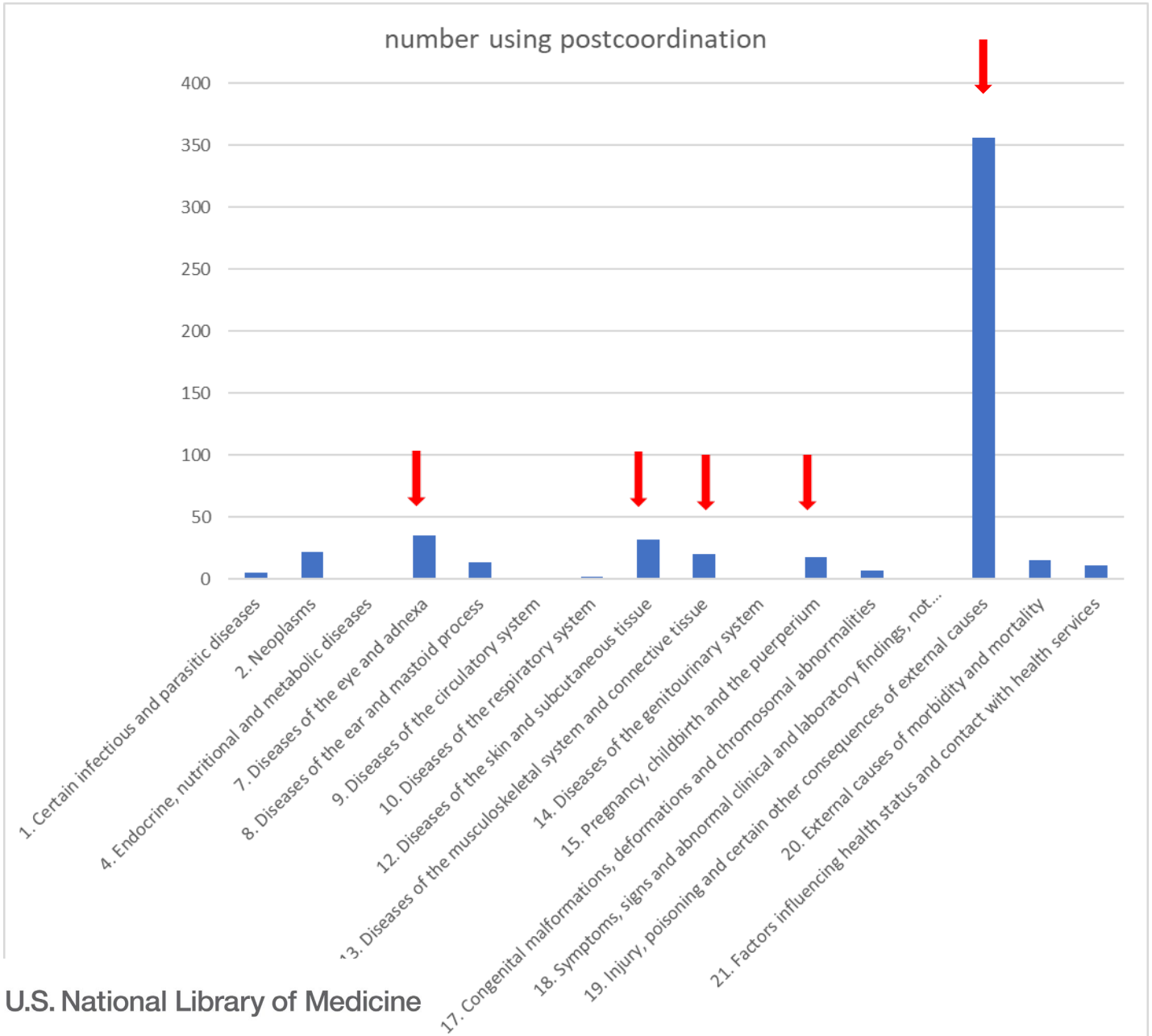
Use of postcoordination among frequently used codes



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New extension codes

Extension code category	Example	Frequently used codes	Digestive disease codes	Combined
Anatomy and topography	fifth metatarsal bone	22(35.5%)	13(20.6%)	35(28%)
Health Devices, Equipment and Supplies	urinary catheter	18(29%)	0(0%)	18(14.4%)
Temporality	First trimester	12(19.4%)	0(0%)	12(9.6%)
Severity Scale Value	loss of teeth class I	7(11.3%)	50(79.4%)	57(45.6%)
Dimensions of injury	Complex tear meniscus	2(3.2%)	0(0%)	2(1.6%)
Dimensions of external causes	prolonged static or awkward postures	1(1.6%)	0(0%)	1(0.8%)
Total		62(100%)	63(100%)	125(100%)

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New stem codes - examples

ICD-10-CM	Closest ICD-11
O36.80X0 Pregnancy with inconclusive fetal viability, not applicable or unspecified	JA86.Y Maternal care for other specified fetal problems
R41.82 Altered mental status, unspecified	MB21.Y Other specified symptoms and signs involving cognition
Z51.81 Encounter for therapeutic drug level monitoring	QB9Y Other specified contact with health services for nonsurgical interventions not involving devices
Z66 Do not resuscitate	QB0Y Other specified health care related circumstances influencing the episode of care without injury or harm
K63.4 Enteroptosis	DE2Y Other specified diseases of the digestive system
Z79.01 Long term (current) use of anticoagulants	QF4Y Other specified factors influencing health status or contact with health services

Postcoordination can reduce number of new stem codes

- Some codes with similar pattern:
  - *Z79.01 Long term (current) use of anticoagulants*
  - *Z79.4 Long term (current) use of insulin*
  - *Z79.82 Long term (current) use of aspirin*
- No existing stem codes
  - Can't use *QC48.0 Personal history of long-term use of anticoagulants* because it lumps the meaning of
    - *Z79.- Long term (current) use* – current use
    - *Z92.- Personal history of medical treatment* - no longer current
- Only 1 new stem code needed, the drug can be added by postcoordination
  - (new stem code) *Long term (current) use of medicaments,* combine with
    - *XM17B1 Anticoagulant and antithrombotic enzymes*
    - *XM1DZ9 Insulin injection, soluble*
    - *XM4G06 Acetylsalicylic acid,*

Postcoordination with other WHO-FIC classifications

- Further code parsimony if postcoordination can extend across WHO-FIC classifications e.g.,
  - *K94.30 Esophagostomy complications, unspecified*
  - *K95.09 Other complications of gastric band procedure*
- Can be represented by postcoordination with ICHI codes
  - ICD-11 stem code *PK80.3Z Gastrointestinal, abdominal, or abdominal wall procedure associated with injury or harm in therapeutic use, unspecified approach*, combine with ICHI codes
    - *KBA.LI.AA Oesophagostomy*
    - *KBF.LL.AB Laparoscopic gastroplasty* (inclusion: Laparoscopic gastric banding)

Cardinality analysis

- Matches that are not 1→1 could present challenges
  - 1 ICD-10-CM → multiple ICD-11 codes
    - 36 (2.1%) codes
    - broad to narrow matches e.g., K56.2 Volvulus →
      - DA91.1 Volvulus of small intestine, 'OR'
      - DB30.1 Volvulus of large intestine
    - Not a big problem for backward compatibility with ICD-10-CM, because the multiple ICD-11 codes will roll up to the same ICD-10-CM code
  - multiple ICD-10-CM → 1 ICD-11 code
    - 59 (3.4%) codes
    - Can be problematic when translating ICD-11 codes back to ICD-10-CM
    - Can be subdivided into 3 categories

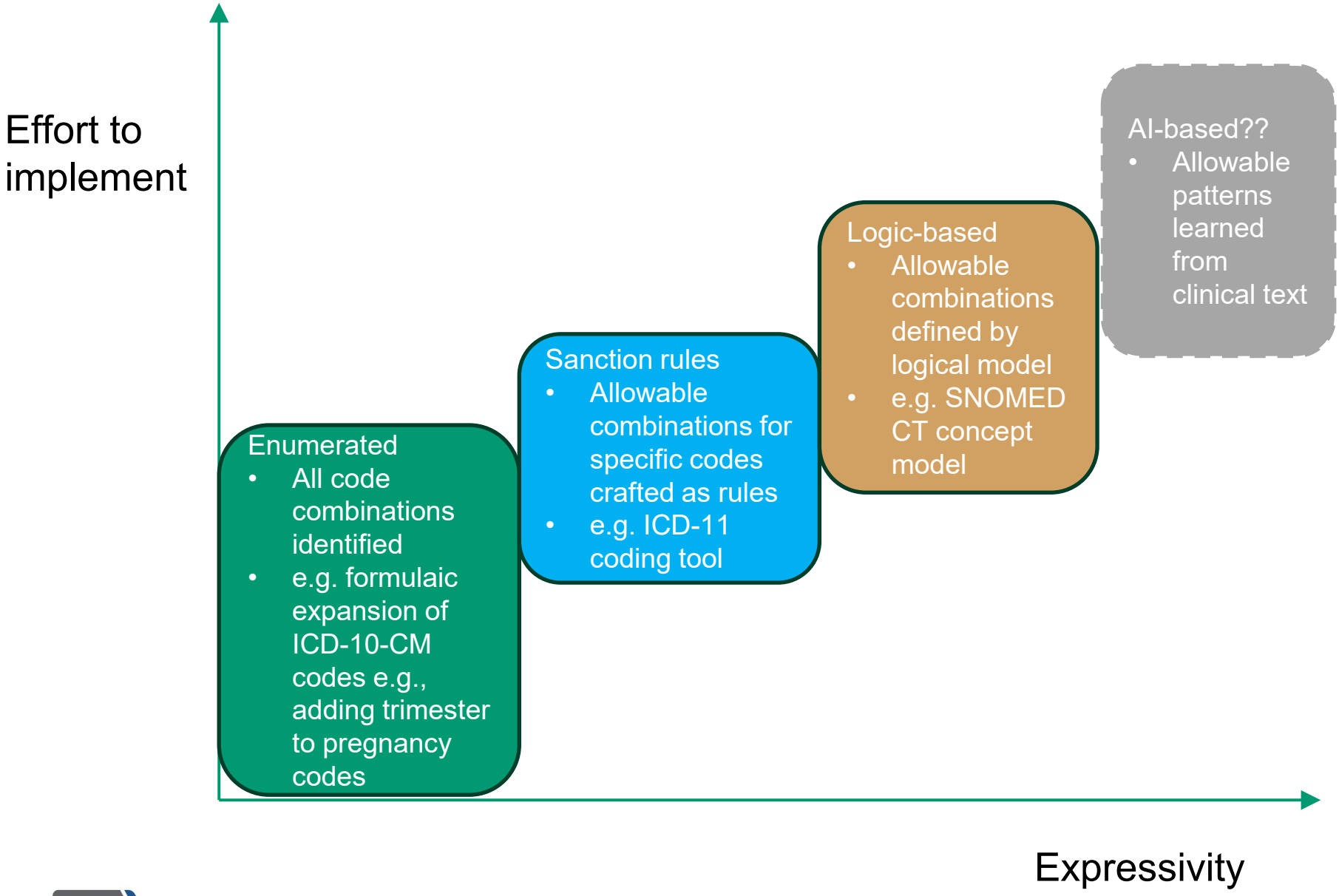
Many-to-one matches

Type	ICD-10-CM	ICD-11
Residual categories	K12.30 Oral mucositis (ulcerative), unspecified K12.39 Other oral mucositis (ulcerative)	DA01.11 Oral mucositis
ICD-10-CM codes indistinguishable	K50.90 Crohn's disease, unspecified, without complications; K50.919 Crohn's disease, unspecified, with unspecified complications	DD70.Z Crohn disease, unspecified site
ICD-11 synonymy questionable	G47.30 Sleep apnea, unspecified; G47.33 Obstructive sleep apnea (adult) (pediatric)	7A41 Obstructive sleep apnoea ("synonymous" index term *sleep apnoea nos*)

Discussion

- Our findings represent the best-case scenario of replacing ICD-10-CM with ICD-11 codes
- Prerequisites to achieve these results
  - Postcoordination can be used, otherwise coverage will reduce drastically (from 96.5% → 46.5%)
    - Impact on tooling, coder education and coding variability
    - Need to be compatible with messaging and other standards (e.g., HL7, FHIR, NCPDP)

Approaches to implement postcoordination



Prerequisites (continued)

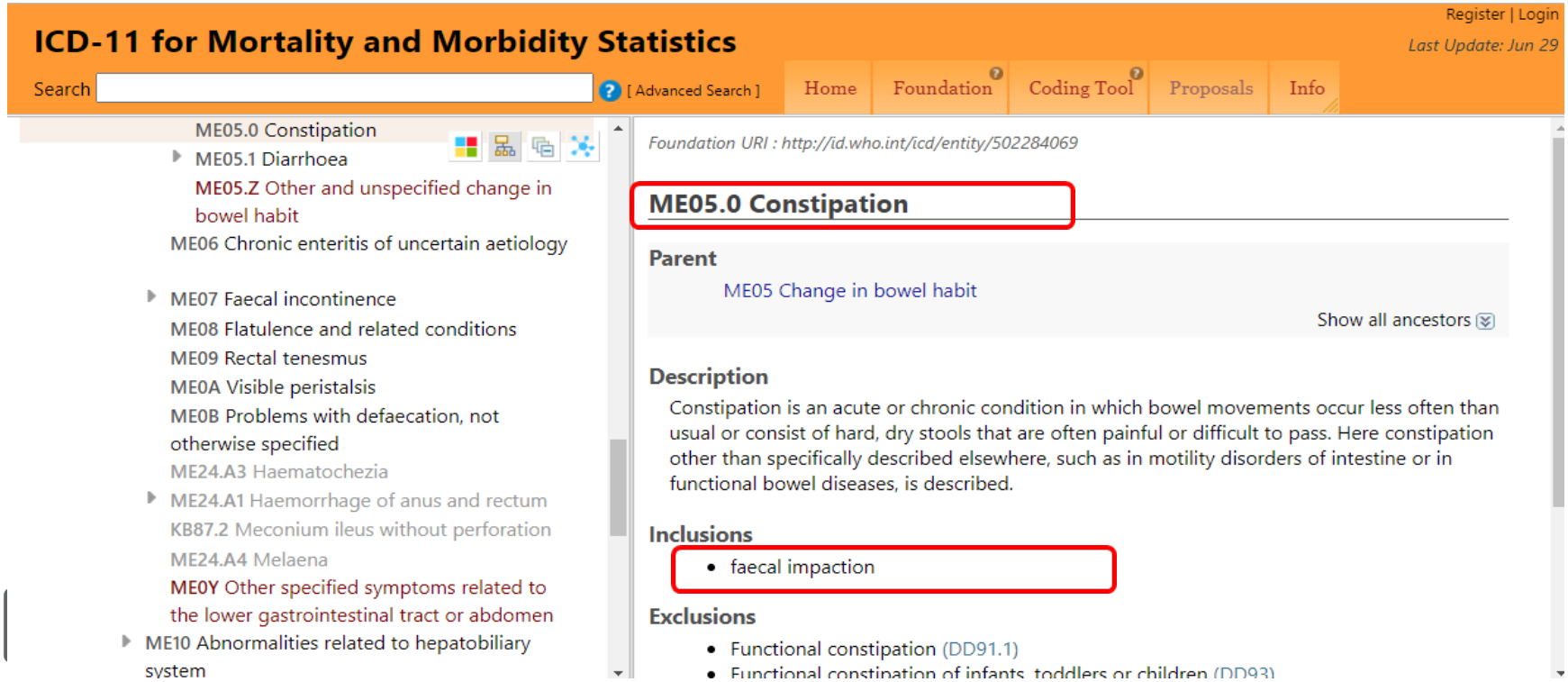
- Residual categories are made compatible – needs alignment of hierarchical structure and coding guidelines
- Coding guidelines are harmonized
  - Inclusions, exclusions and an index provide guidance to coders and delineate the boundaries of a code
  - In our previous study, we found 10% code matches are associated with potential conflicts in the coding guidelines, which may affect coding in specific situations
  - The most severe coding guideline conflict can render a code unmappable

Unmappable code K56.41 Fecal impaction

- K00-K95: Diseases of the digestive system (K00-K95)
  - K55-K64: Other diseases of intestines (K55-K64)
    - K56: Paralytic ileus and intestinal obstruction without hernia
      - K56.4: Other impaction of intestine
        - K56.41 : Fecal impaction

Exclusion
- EXCLUDES1: constipation (K59.0-)
- EXCLUDES2: incomplete defecation (R15.0)

Preferred
- Fecal impaction



Limitations of our study

- Sample codes may not be generalizable to all diseases and settings
- Recoding was done by two terminologies and not externally validated
- Judgment of clinically acceptable postcoordination may be subjective

Conclusion

- Using a U.S. linearization augmented by postcoordination, the existing content of ICD-11 can fully represent 89.4% of the ICD-10-CM codes examined in our study
- The remainder requires new extension or stem codes
- This stepwise strategy should be carefully considered before embarking on building a full-fledged ICD-11-CM

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Thank you!