



# What We've Learned Thus Far: What Has Changed From ICD-10- to ICD-11?

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# ICD Revision History (Mortality and Morbidity)

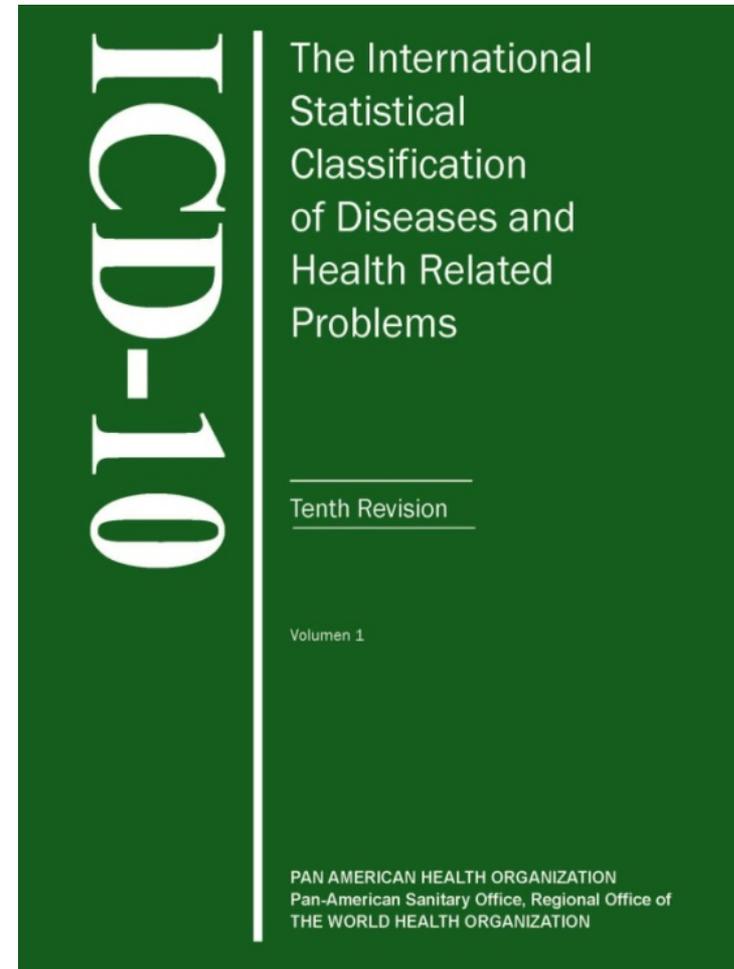


<i>ICD Revision No.</i>	<i>Year of Conference When Adopted</i>	<i>Year in Use in the U.S. Mortality</i>	<i>ICD, Clinical Modification Morbidity</i>	<i>Year in Use in the U.S.</i>
First	1900	1900-1909		
Second	1909	1910-1920		
Third	1920	1921-1929		
Fourth	1929	1930-1938		
Fifth	1938	1939-1948		
Sixth	1948	1949-1957		
Seventh	1955	1958-1967	ICDA-7	1958-1967
Eighth	1965	1968-1978	ICDA-8 H-ICDA-1 H-ICDA-2	1968-1978 1968-1972 1973-1978
Ninth	1975	1979-1998	ICD-9-CM	1979
Tenth	1989	1999-	ICD-10-CM	Oct. 1, 2015
Eleventh	2019	?	?	?

# ICD-10



- Approved by World Health Assembly in 1989 with Jan. 1, 1993 effective date
- Translated into **43** languages
- Used in over **100** countries, including more than 2 dozen national modifications
- Basis for global cause-specific mortality statistics
- Tabular List published in 1992; Index published in 1994
- Implemented in the US for mortality in 1999
- Updated periodically
  - Minor updates every year
  - Major updates every three years
  - Now more than 25 years old



# ICD-11: Revision Impetus

- Capture advances in health science and medical practice
- Make better use of the digital revolution
- Better address multiple topics; e.g. quality & safety, traditional medicine, etc.
- Address persistent major gaps in basic use for mortality statistics
- Improve morbidity statistics
- Easier use
- Manage national clinical modifications in more effective manner
- Improve integration of other classifications and terminologies
- Improve comparability of translations

# Better integration with other classifications



## OTHER REFERENCE Classifications

International Classification of Functioning, Disability, & Health

International Classification of Health Interventions

## RELATED Classifications

International Classification of Primary Care (ICPC)

International Classification of External Causes of Injury (ICECI)

The Anatomical, Therapeutic, Chemical (ATC) classification system with Defined Daily Doses (DDD)

ISO 9999 Technical aids for persons with disabilities – Classification and Terminology

**ICD-11**

## DERIVED Classifications

International Classification of Diseases for Oncology, Third Edition (ICD-O-3)

The ICD-10 Classification of Mental and Behavioural Disorders

Application of the International Classification of Diseases to Dentistry and Stomatology, 3rd Ed.(ICD-DA)

Application of the International Classification of Diseases to Neurology (ICD-10-NA)

ICF, Children & Youth Version (ICF-CY)

## Terminologies

e.g. SNOMED-CT

# ICD-11 Development Process



- Cross-cutting Topic Advisory Groups (TAGs):
- Content
  - Foundation layer
  - Descriptions
  - Content model parameters
- Structure (linearizations)
  - Mortality, morbidity, primary care, quality/patient safety
- Joint Task Force (JTF)
  - Mortality & morbidity experts including statistical experts

# ICD-11 Development Process



## U.S. Involvement

- Cross-cutting Topic Advisory Groups (TAGs):
  - RSG Co-chair – Christopher Chute, MD (Johns Hopkins)
  - RSG SEG – Donna Pickett
  - Co-chair Mortality TAG – Robert Anderson, NCHS
  - Co-chair Morbidity TAG – Donna Pickett, NCHS
  - Co-chair Functioning TAG – Cille Kennedy, ASPE
  - Co-chair Pediatrics TAG - Jeffrey Linzer, MD (Am. Acad. Pediatrics)
  - Co-chair Quality/Safety TAG – Harold Pincus, MD (Columbia Univ.)
- Joint Task Force (JTF)
  - U.S. participation (NCHS: mortality & morbidity)

# ICD-11 Foundation

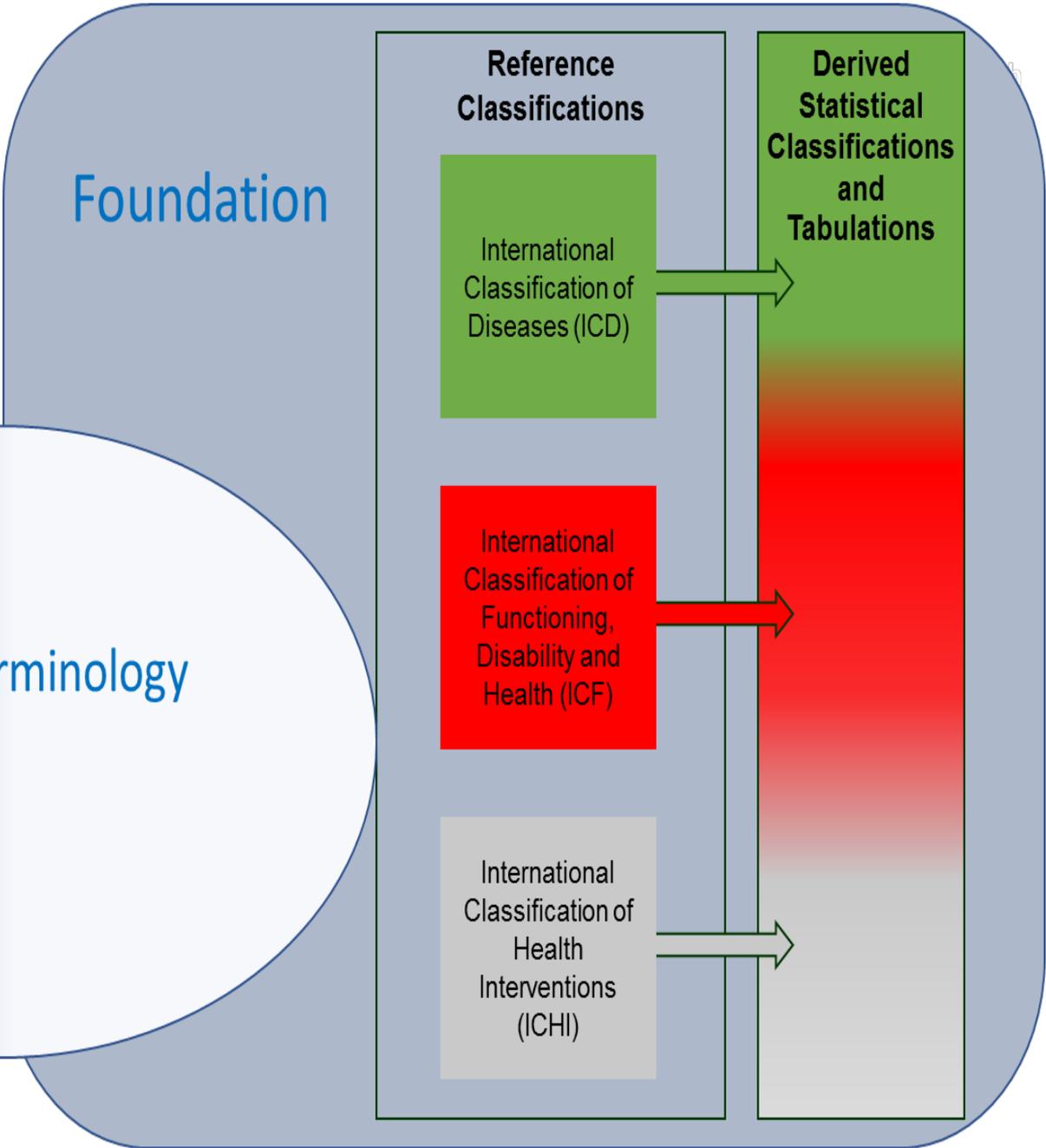
- Represents the knowledge base for the reference and derived classifications
- Constantly changing in response to advances in science and medicine
- Flexibility
  - Multiple classifications and tabulation lists can be derived from the foundation
- Consistency
  - All derived classifications will be consistent in terms of the knowledge base

# Foundation: Content Model

- 1. ICD Concept Title**
- 2. Classification Properties**
- 3. Textual Description**
- 4. Terms**
  - 4.1 Base Index Terms
  - 4.2 Inclusion Terms
  - 4.3 Exclusions
- 5. Body Structure Description**
  - 5.1 Body System(s)
  - 5.2 Body Part(s) [Anatomical Site(s)]
  - 5.3 Morphological Properties
- 6. Manifestation Properties**
  - 6.1 Signs & Symptoms
  - 6.2 Investigation findings
- 7. Causal Properties**
  - 7.1 Etiology Type
  - 7.2 Causal Properties – Agents and Mechanisms
  - 7.3 Risk Factors
  - 7.4 Genomic Linkages
- 8. Temporal Properties**
  - 8.1 Biological sex
  - 8.2 Life-cycle properties
- 9. Severity of Subtypes Properties**
- 10. Functioning Properties**
- 11. Specific Condition Properties**
  - 11.1 Biological sex
  - 11.2 Life-cycle properties
- 12. Treatment Properties**
- 13. Diagnostic Criteria**

Related Classifications and Terminologies

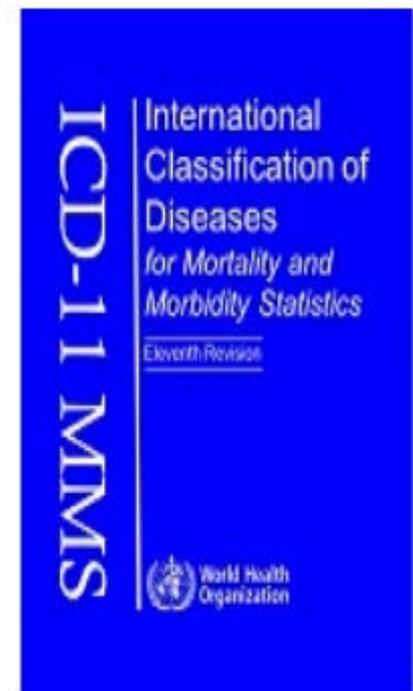
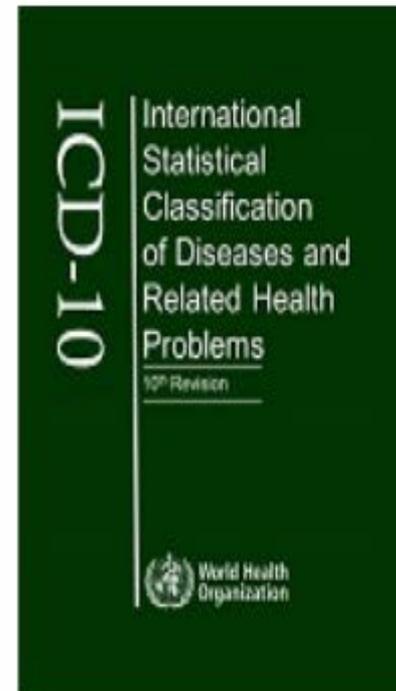
Clinical terminology



# Major differences between ICD-10 and ICD-11

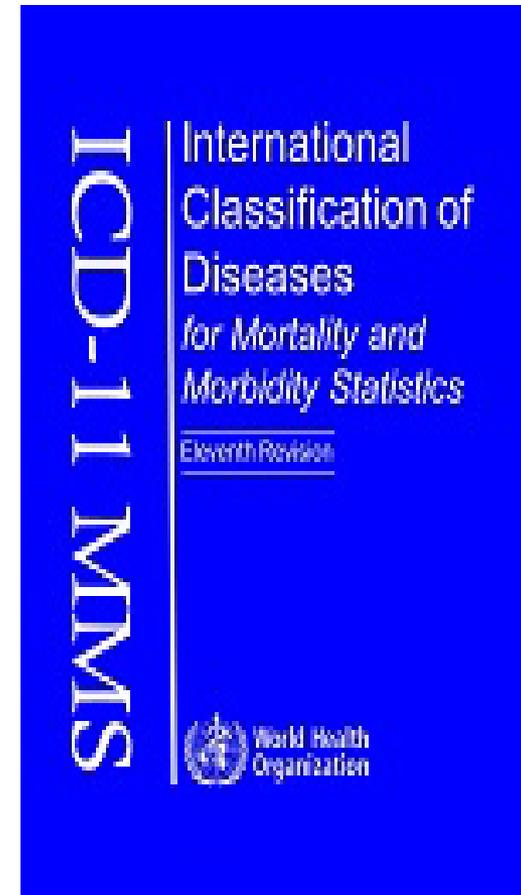


- Simplified code structure
  - Extension codes (e.g., temporality, severity, dimensions of injury and external causes)
  - Clustering of codes – combining 2 or more codes in an explicit post-coordinated way to describe a diagnostic entity (Stem Code: DA63 Duodenal ulcer, unspecified Has manifestation (use additional code, if desired): ME24.90 Acute gastrointestinal bleeding, not elsewhere classified Cluster: DA63/ME24.90)



# ICD-11-MMS

- MMS = Mortality and Morbidity Statistics
- Derived from the foundation component
- Incorporating advances in science and medicine
- Structural consistency with ICD-10, where possible
- Better representation for public health prevention
- Migration expected to be cheaper than previous migrations due to automation and new tools



# ICD -11: What's different

## Tabular Lists

Fit for a particular purpose: reporting mortality, morbidity, or other uses

Entities of the foundation become categories that are *Jointly Exhaustive* and *Mutually Exclusive* of each other

## New methods

- Precoordination and stem codes
- Post-coordination (**optional** extension codes); cluster coding
- Sanctioning rules
- Multiple parenting
- Linearizations

## New Contents – 27 Chapters

- Disorders of the Immune system
- Dis. of blood & blood forming organs
- Conditions related to Sexual Health
- Sleep-wake disorders
- Traditional medicine
- Extension codes
- Restructured chapters
- Diseases relocated

## New and improved tools

- Coding tools
- Browsing tools
- Translation tools
- Mapping tool
- Proposal tool

# Change in Structure

## **ICD-10 (14,400 codes)**

- Alphanumeric 3 - 5 characters
- Character 1 is alpha (all letters except U are used)
- Character 2 is numeric
- Character 3 is numeric
- Use of decimal after 3 characters
- Alpha characters are not case-sensitive

## **ICD-11 (55,000 codes)**

- Alpha numeric (1A00.00 to ZZ9Z.ZZ)
- Codes starting with 'X' are extension codes (More than 7200 4-character categories)
- Clustering Stem code;
- Extension codes
- Pre-coordination;
- Post-coordination and clustering (Left inguinal hernia with acute obstruction expressed as DD51&XK8G/ME24.2&XT5R)
- Linear syntax preferred for international reporting to WHO; national reporting is a member state decision

# New Feature: Section X – Extension Codes

Type 1	Type 2	
<b>Severity scale value</b>	<b>Discharge diagnosis types</b>	
<b>Temporality</b> course of the condition; time in life; duration of pregnancy	<b>Diagnosis timing</b>	
<b>Etiology</b>	<b>Diagnosis timing in relation to surgical procedure</b>	
<b>Topology Scale Value</b>	<b>Diagnosis method of confirmation</b>	
<b>Specific Anatomic Detail</b>	<b>Diagnosis certainty</b>	
<b>Histopathology</b>	<b>Obstetrical diagnosis timing</b>	
<b>Dimensions of Injury</b>	<b>Capacity or context</b>	
<b>Consciousness</b>		
<b>Dimensions of external causes</b>		
<b>Substances</b>		

# New Feature: Section X – Extension Codes

Diagnosis Method of Confirmation	Diagnosis Types	Diagnosis Timing
Laboratory examination	Main Condition	Present on Admission (XY6M)
Serology	Reason for encounter/admission	Developed After Admission (XY69)
Histology	Main Resource Condition	Uncertain timing of onset relative to admission (XY85)
Genetics	Initial reason for encounter or admission	
Imaging		

# ICD-11 IT friendly

<https://icd.who.int/>

- Coding tool – [https://icd.who.int/ct11\\_2018/icd11\\_mms/en/release#/](https://icd.who.int/ct11_2018/icd11_mms/en/release#/)
- Browser - <https://icd.who.int/browse11/l-m/en>
- Web services – full functionality available in the software of choice
- Online services – everyone can use ICD without any local software
- Offline services – all functionality available on a local computer with updates when internet is available
- Output files – formats include CSV, Excel, ClaML, and others as necessary
- Print version – Real paper version gives the look and feel of the past

# ICD-11 – Implementation Package



- Advocacy materials
- Training materials
- Quick guide
- Maps from and to ICD-10  
(transition tables)
- Training and test platform

# Process of agreeing and adopting ICD-11



- Submission of ICD-11 through the EB to the 72<sup>nd</sup> World Health Assembly in May 2019 to come into effect on 1 January 2022.
- Outcome – Approved by WHA May 25, 2019
- WHO has noted that the switch to ICD-11 is unlikely to happen overnight; while there will be a few early adopters, not many countries are likely to adapt that quickly

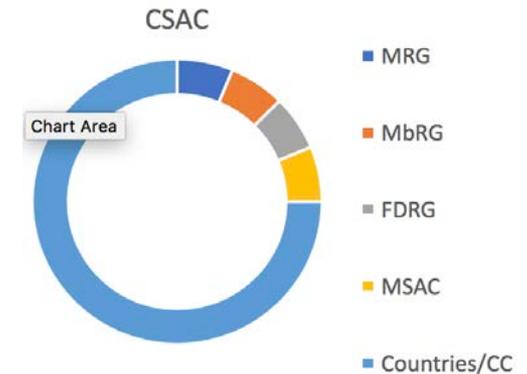
# International Statistical Classification of Diseases and Health Related Problems, Tenth Revision (ICD-10)



- Approved by the International Conference for the Tenth Revision of the International Classification of Diseases in 1989; adopted by the 43<sup>rd</sup> World Health Assembly in 1990, effective date Jan. 1, 1993
- Morbidity implementation dates for several countries using ICD-10 or a clinical modification in casemix and reimbursement systems
  - United Kingdom [1995]
  - Nordic countries (Denmark, Finland, Iceland, Norway, Sweden) [1994-1997]
  - France [1997]
  - Australia [1998]
  - Belgium [1999]
  - Germany [2000]
  - Canada [2001]

# WHO Way forward

- Maintenance and updates
  - Governance – WHO-FIC Network
- Development of new tools
  - e.g. mobile coding
  - Ongoing crosswalks, i.e. SNOMED-CT
- Country support
  - Workshops and integration of tooling



Classifications and Statistics  
Advisory Committee (CSAC)

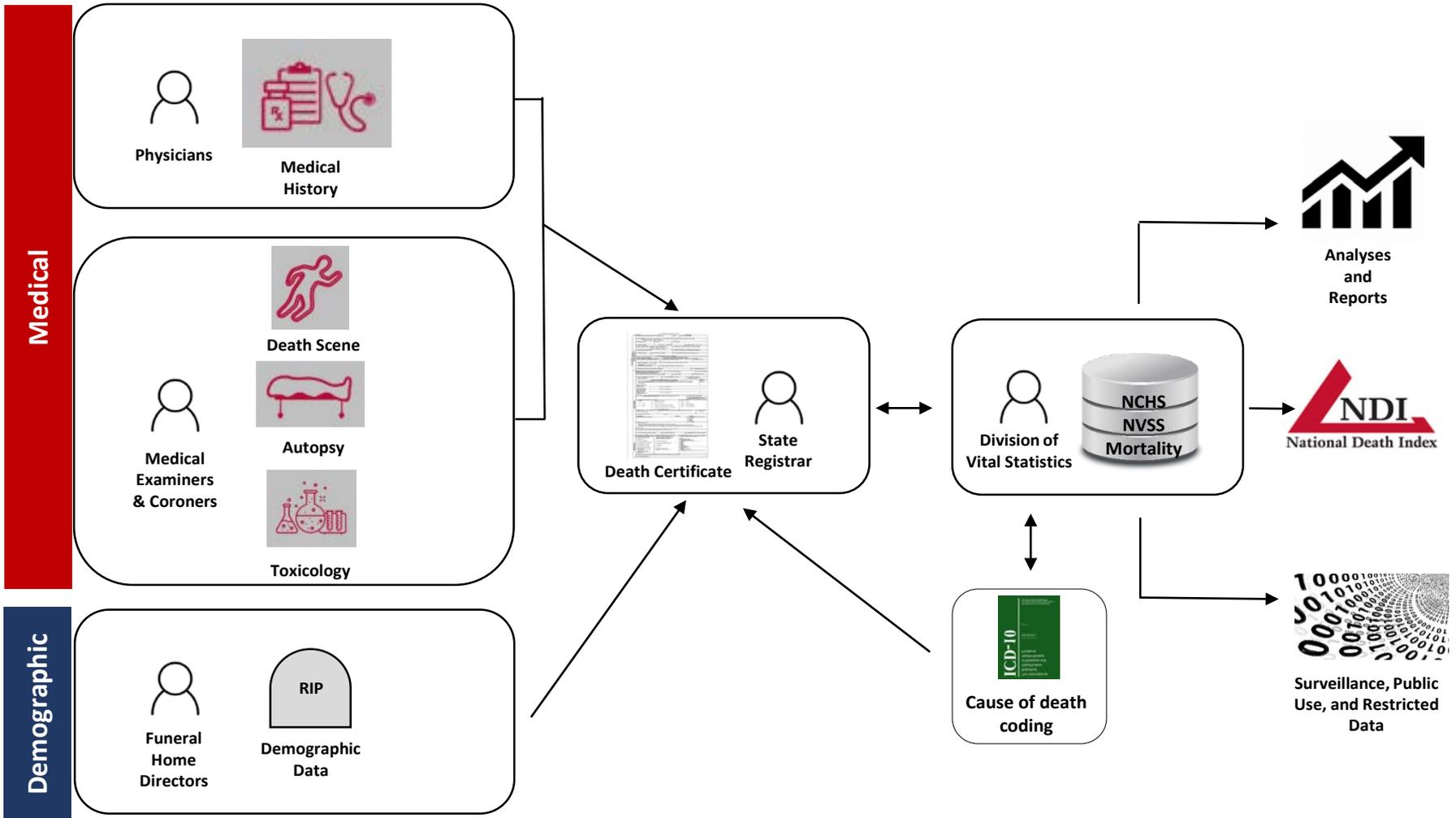
# Application of the ICD to mortality statistics in the US

- WHO Nomenclature Regulations

Article 2 – Members compiling mortality and morbidity statistics shall do so in accordance with the current revision of the International Statistical Classification of Diseases, Injuries and Causes of Death as adopted from time to time by the World Health Assembly. This Classification may be cited as the International Classification of Diseases.

- International version is used for coding causes of death reported on death certificates
- Adhere to standardized coding and selection rules in order to promote international comparability
- International collaborations
  - Mortality Reference Group
  - Iris Core Group

# National Vital Statistics System



<b>CAUSE OF DEATH (See instructions and examples)</b>				Approximate interval: Onset to death
<p>32. <b>PART I.</b> Enter the <u>chain of events</u>--diseases, injuries, or complications--that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.</p>				
<p>IMMEDIATE CAUSE (Final disease or condition -----&gt; resulting in death)</p>	a. _____	Due to (or as a consequence of):		_____
<p>Sequentially list conditions, if any, leading to the cause listed on line a. Enter the <b>UNDERLYING CAUSE</b> (disease or injury that initiated the events resulting in death) <b>LAST</b></p>	b. _____	Due to (or as a consequence of):		_____
	c. _____	Due to (or as a consequence of):		_____
	d. _____	Due to (or as a consequence of):		_____
<p><b>PART II.</b> Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in PART I</p>				<p>PERFORMED? No</p> <p>CONDITIONS AVAILABLE TO OF DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>35. DID TOBACCO USE CONTRIBUTE TO DEATH?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> Probably</p> <p><input type="checkbox"/> No <input type="checkbox"/> Unknown</p>	<p>36. IF FEMALE:</p> <p><input type="checkbox"/> Not pregnant within past year</p> <p><input type="checkbox"/> Pregnant at time of death</p> <p><input type="checkbox"/> Not pregnant, but pregnant within 42 days of death</p> <p><input type="checkbox"/> Not pregnant, but pregnant 43 days to 1 year before death</p> <p><input type="checkbox"/> Unknown if pregnant within the past year</p>	<p>37. MANNER OF DEATH:</p> <p><input type="checkbox"/> Natural <input type="checkbox"/> Homicide</p> <p><input type="checkbox"/> Accident <input type="checkbox"/> Pending Investigation</p> <p><input type="checkbox"/> Suicide <input type="checkbox"/> Could not be determined</p>		
<p>38. DATE OF INJURY (Mo/Day/Yr) (Spell Month)</p>	<p>39. TIME OF INJURY</p>	<p>40. PLACE OF INJURY (e.g., Decedent's home; construction site; restaurant; wooded area)</p>	<p>41. INJURY AT WORK? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	
<p>42. LOCATION OF INJURY: State: _____ City or Town: _____</p> <p>Street &amp; Number: _____ Apartment No.: _____ Zip Code: _____</p>				
<p>43. DESCRIBE HOW INJURY OCCURRED:</p>				<p>IF TRANSPORTATION INJURY, SPECIFY:</p> <p>Driver/Operator</p> <p>Passenger</p> <p>Pedestrian</p> <p>Other (Specify)</p>

Causal sequence leading to death

Contributing conditions

Injury description including circumstances leading to the injury

## Cause of Death Coding

- As of January 1, 2011, NCHS does all cause of death coding for the U.S. and its territories
- Largely automated using the Mortality Medical Data System software
  - Approximately 75% of records are coded automatically
  - Approximately 25% require some manual intervention
- All information reported on the death certificate that can be coded is coded and stored, including the underlying cause of death
- Cause of death codes are returned to the states
  - Turn around time for the coding is < 1 day for automatically coded records and 1-2 weeks for those requiring manual intervention

# Assessment of ICD-11 for mortality statistics

- Joint Taskforce (JTF) on ICD-11 included experts in mortality coding and statistics from the US, Australia, Germany, Canada and Japan
- From 2015 to 2018, the JTF conducted an extensive assessment to determine whether ICD-11 was fit for purpose
- The JTF recommended substantial structural and content changes in order to meet the standards for a statistical classification suitable for mortality (and morbidity) statistics
- By late 2018, the JTF determined ICD-11 to be fit for purpose
  - the chapter structure and stem codes are stable, the postcoordination mechanism and syntax are in place, the coding tool is functional and useful, the reference guide is mature, and the governance mechanisms for maintenance is in place
- While some additional work is still needed to refine the classification, this can and will be done under the regular maintenance process

# Implementation of ICD-11 in the US for Mortality



- Revision of automated coding systems and decision tables
- Retraining of nosologists and medical coders
- Revision of computer edits and database specifications to accommodate new format
- Revision of tabulation lists and table programming
- Comparability study (bridge coding)
- Development of educational and promotional materials for state vital statistics offices and data users

# Timing of US implementation of ICD-11 for Mortality



- ICD-10 was implemented in 1999, 7 years from the publication of the tabular list (1992)
  - Most of the time and expense involved revision of MMDS (automated coding system) and the decision tables for underlying cause selection
- For ICD-11, plans are to collaborate with the Iris Core Group to revise the decision tables
  - An assessment of the work and resources needed to complete this project is already underway
  - With current resources, project is likely to take 4 years minimum
- To complete bridge coding and other work, an additional 1-2 years will be needed

# ICD-11 Implementation Considerations/Challenges (Morbidity)



- WHO Licensing implications
  - Operational mechanisms regarding copyright restrictions have not been spelled out
  - How will “for US government purposes” defined? 1990 NCVHS Report stated that in the US, .....“government use” is not a single definition.....
  - Impact that copyright on ICD-11 would have on cost and use in the US
    - Vendor implications; publishers; data systems;
- WHO intention to limit development of national modifications
  - Specific limitations have not been spelled out
    - Delays in meeting US legislative/regulatory requirements

# Concept Coverage

Concept	ICD-9-CM	ICD-10	ICD-10-CM	ICD-11
Encounter for prophylactic breast removal	1994	No	Yes	No (not as a unique code)
Female genital mutilation	2004	No	Yes - 2005	Yes
Genetic susceptibility to breast CA	2004	No	Yes	No
CKD Staging	2005	Yes - 2010	Yes	Yes
Pressure ulcer stages	2008	Yes - 2010	Yes - 2005	Yes
Laterality	No	No	Yes	Yes – as extension code

# Concept Coverage

Concept	ICD-10	ICD-10-CM Recently requested or approved	ICD-11
Ehlers-Danlos Syndrome	Partial (no unique code for types)	Yes by type (13)	Partial (only one type)
Fournier gangrene	No	Yes	No
Mast Cell Activation Syndrome	No	Yes	No
Fetal inflammatory response syndrome	No	Yes	No
Factitious Disorder	No	Yes	No
Wandering	No	Yes (in dementia and other diseases)	Partial (in dementia only)

# ICD-11 Implementation

## Considerations/Challenges (Morbidity)

- Revisions to existing HIPAA standards (X12, NCPDP, etc.,) to accommodate ICD-11 including:
  - Changes to accommodate code structure, length or syntax
    - Changes to X12 (for example change to 5010 from 4010 to accommodate ICD-10-CM/PCS structure)
    - Timing of changes relative to planned updates
    - Conversion of various payment methodologies (MS-DRGS, APR-DRGS, quality indicators and business decisions based on use case scenarios)
  - Post coordination/clustering; number of codes used to describe one condition
    - Post-coordination
      - Left inguinal hernia with acute obstruction expressed as DD51&XK8G/ME24.2&XT5R
      - DA63 Duodenal ulcer, unspecified Has manifestation (use additional code, if desired): ME24.90 Acute gastrointestinal bleeding, not elsewhere classified Cluster: DA63/ME24.90)

# ICD-10-CM Implementation Timeline



- Evaluation of ICD-10 for U.S. purposes (1994 - 1997)  
Summary document available at  
<http://www.ncvhs.hhs.gov/031105a1.htm>
- NCVHS Hearings (1997-2003)  
Summary document available at  
<http://www.ncvhs.hhs.gov/031105a2.htm>
- NPRM (2008)
- Final Rule (2009)
- NPRM (2012)
- Final Rule (2012)
- Interim Final Rule (2014)

# ICD-10-CM Implementation Timeline and ICD-11 Implications for Morbidity



- NCVHS Letter to the HHS Secretary, February 21, 2019
  - <https://ncvhs.hhs.gov/wp-content/uploads/2019/03/Recommendation-Letter-Regulatory-Simplification-of-ICD.pdf>
- Evaluation of ICD-11 for U.S. purposes (2019?)
  - <https://ncvhs.hhs.gov/wp-content/uploads/2019/03/13th-Report-to-Congress.pdf>
- NCVHS deliberations (June 2019; August 2019)
- NCVHS Letter to the HHS regarding ICD-11 adoption (TBD)
- NCVHS Hearings (TBD)
- NPRM (TBD)
- Final Rule (TBD)

# Thank You!

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Web: <http://www.cdc.gov/nchs/icd/icd10cm.htm>