



International Statistical Classification of Diseases and Related Health Problems (ICD)

National Resource Centre for EHR Standards (NRCeS)
C-DAC, Pune

- Ministry of Health and Family Welfare (MoHFW), Government of India notified EHR Standards for India in August 2013. Revised in December 2016
- Notified Classification Coding Standards:
 - WHO Family of International Classifications (WHO-FIC)



WHO Family of International Classifications (WHO-FIC)



Chapter number and designation	Range of codes
I Certain infectious and parasitic diseases	A00-B99
II Neoplasms	C00-D48
III Disease of the blood and blood forming organs and certain disorders involving the immune mechanism	D50-D89
IV Endocrine, nutritional and metabolic diseases	E00-E90
V Mental and behavioural disorders	F00-F99
VI Diseases of the nervous system	G00-G99
VII Diseases of the eye and adnexa	H00-H59
VIII Diseases of the ear and mastoid process	H60-H95
IX Diseases of the circulatory system	I00-I99
X Diseases of the respiratory system	J00-J99

The meaning of classification in Health



- There are many diseases, & one needs to establish a common language for reporting & data analysis.
- Standard grouping of diseases by a set of principles is called classification, and it allows:
 - Easy storage, retrieval and analysis of data
 - Comparison and transmission of data between hospitals, provinces and countries
 - Comparison in the same location across different time periods.

- ICD is designed as a health care classification system, providing a system of diagnostic codes for classifying diseases, including nuanced classifications of a wide variety of signs, symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or disease-
 - To be used for aggregated information & statistical/epidemiological analysis
 - As mandated by the health regulatory, intelligence, & various research bodies
 - ICD is maintained by the World Health Organization (WHO)
 - Current Version for implementation : ICD-10 – 2016 (as MoHFW Notification 2016)

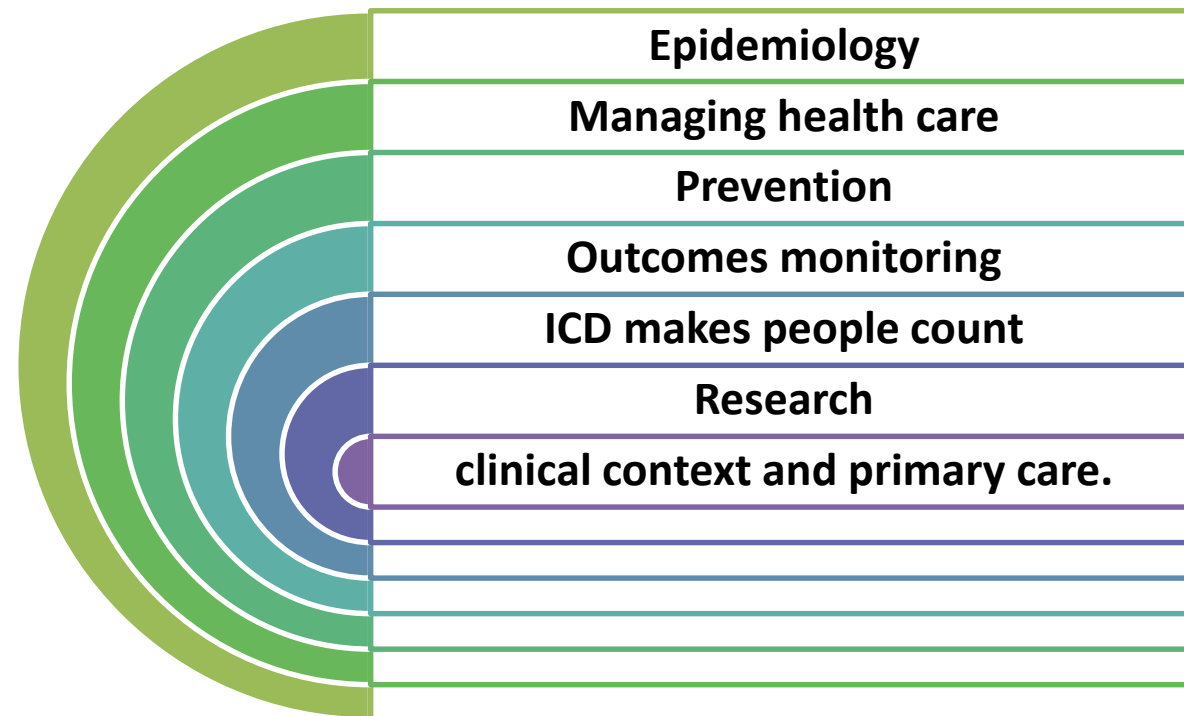
Purpose of Health Classifications



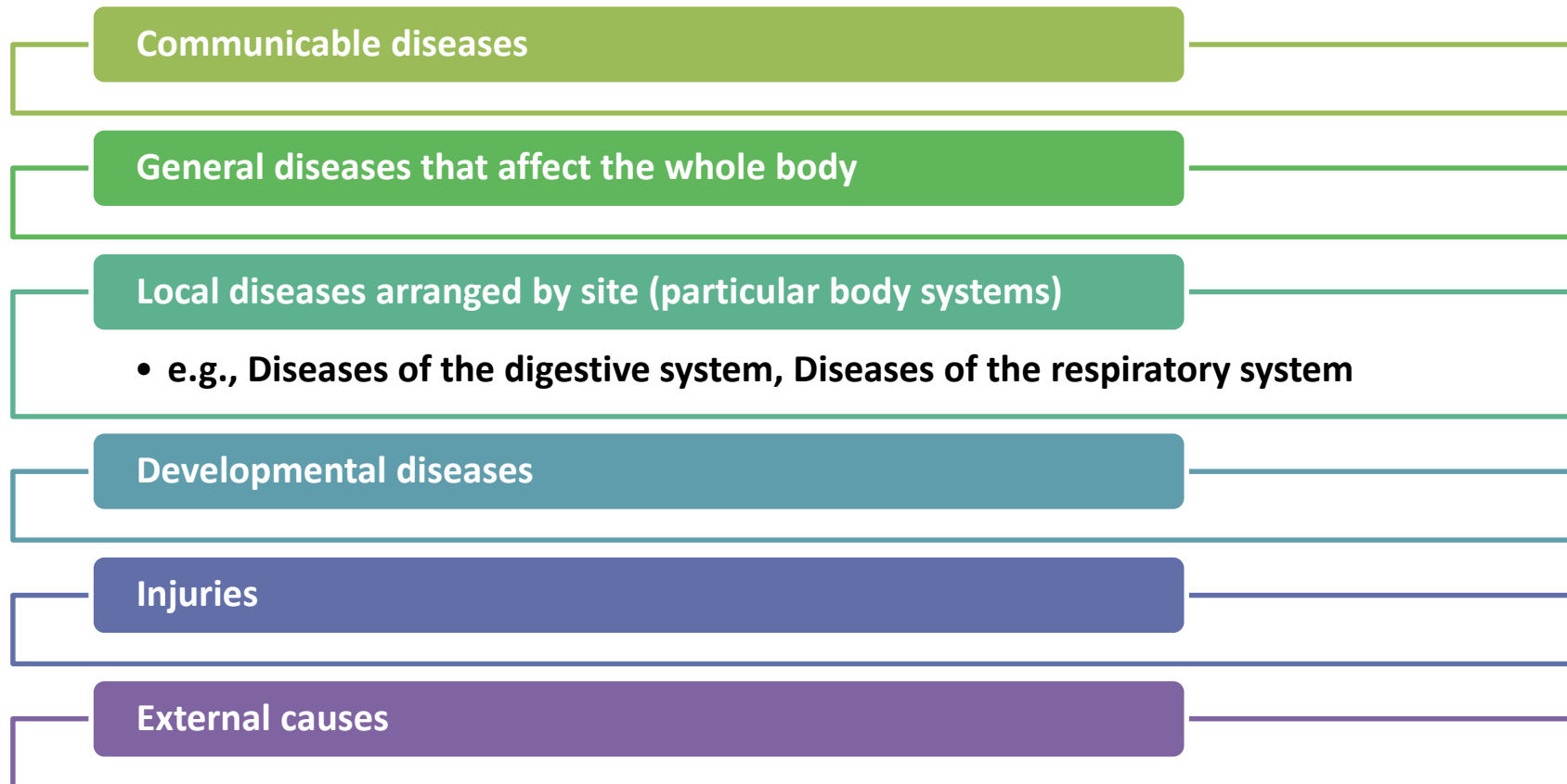
- To support clinical care:
 - Monitoring of the incidence and prevalence of a disease
 - Observing reimbursements and resource allocation trends
 - Keeping track of safety and quality guidelines
- To allow for immediate and longitudinal data management and retrieval across a number of different groups
- Allows HIMs and others to retrieve aggregated data to support their decisions and policies
- Provides mechanism for activity based funding
- Allows government bodies to conduct epidemiological research of health trends
- Allows health data comparisons in the same location across different time periods.

- Information is
 - Storage
 - Reported
 - Categorized,
 - Analysed
 - Interpreted

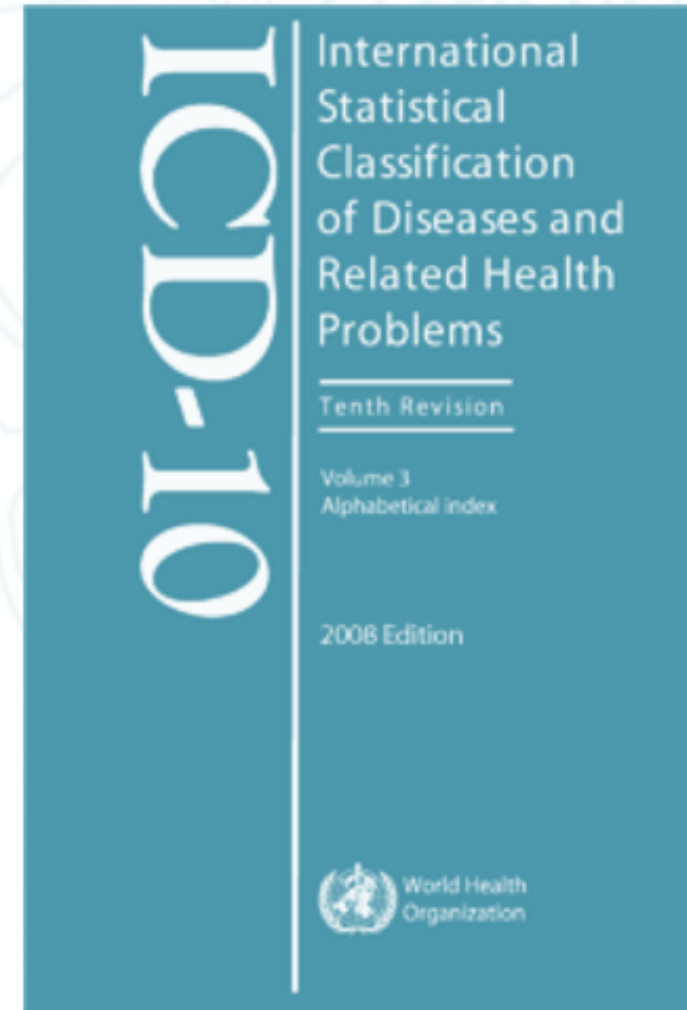
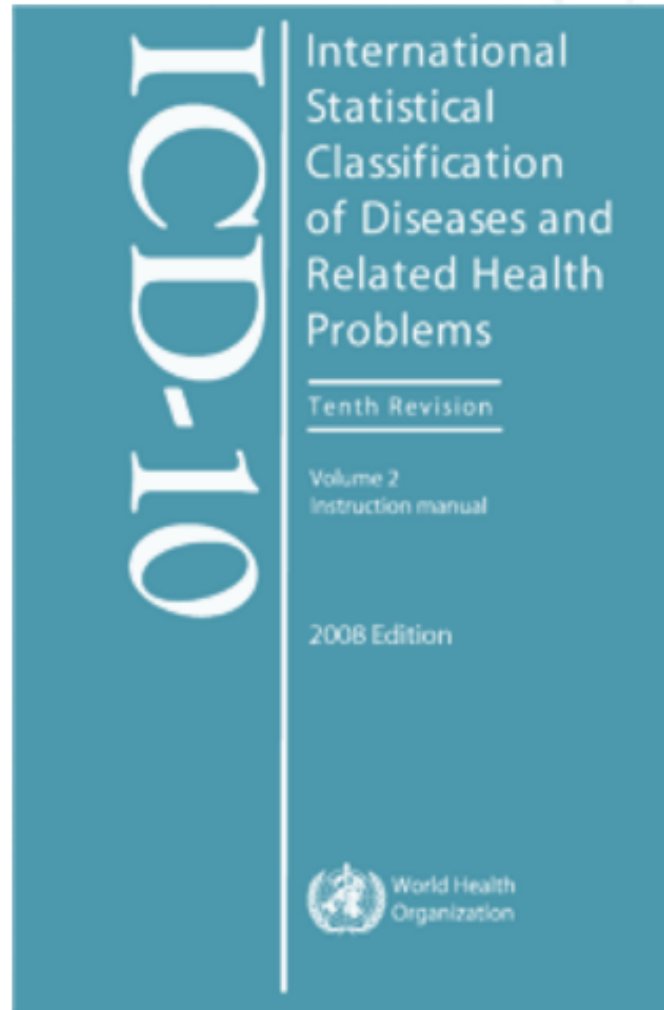
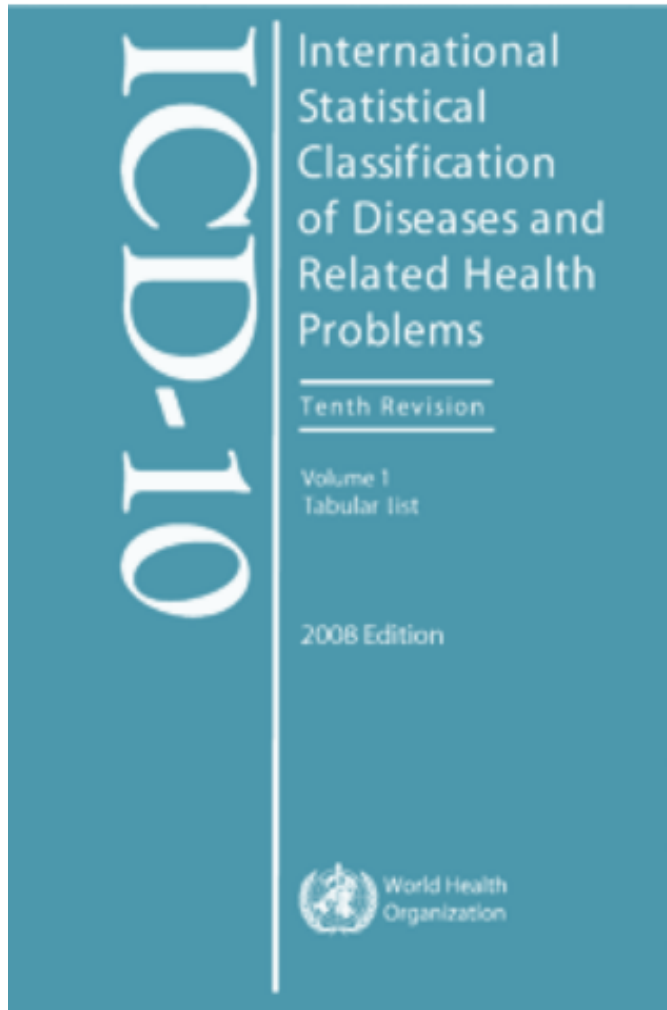
And decisions are based on this information at any level of a health system (e.g. causes of death) in following area-



- In ICD-10 the information about diseases and conditions and their causes is grouped as follows:



ICD 10 Package Structure



ICD 10 Package Structure



Volume 1 The Tabular List

An alphanumeric listing of diseases, disease groups and health related problems

Contains inclusion and exclusion notes and some coding rules (e.g., C03)

22 chapters and over 11400 four-character codes

Volume 2 The Instruction Manual

Instructions on mortality i.e. causes of death & morbidity e.g. hospital statistics coding data

Golden Coding Rule Number 1
Volumes 1 and 3 must be used together to correctly find

Volume 3 The Alphabetical Index

An alphabetical list of the diseases and conditions which have code in tabular list

More entries than Tabular List because some diseases have more than one name and code

ICD 10 : COMPOSITION OF CHAPTERS



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ICD 10 : COMPOSITION OF CHAPTERS



Chapter number and designation	Range of codes
XI Diseases of the digestive system	K00-K93
XII Disease of the skin and subcutaneous tissue	L00-L99
XIII Diseases of the musculo-skeletal system and connective tissue	M00-M99
XIV Disease of the genito-urinary system	N00-N99
XV Pregnancy, childbirth and the puerperium	O00-O99
XVI Certain conditions originating in the perinatal period	P00-P95
XVII Congenital malformations, deformations, and chromosomal abnormalities	Q00-Q99

ICD 10 : COMPOSITION OF CHAPTERS



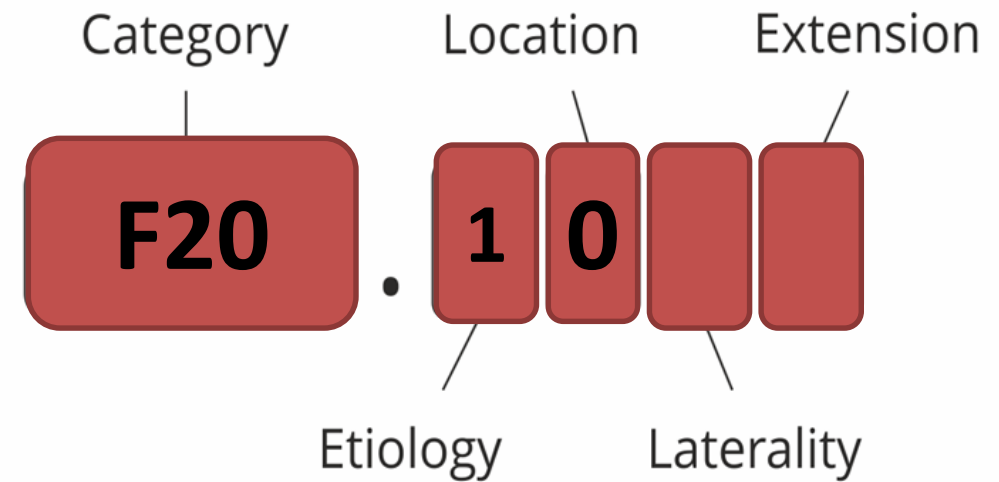
Chapter number and designation	Range of codes
XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00-R99
XIX Injury, poisoning and certain other consequences of external causes	S00-T98
XX External causes of morbidity and mortality	V01-Y98
XXI Factors influencing health status and contact with health services	Z00-Z98
XXII Codes for special purposes	U00-U85

Structure Of An ICD 10 Code



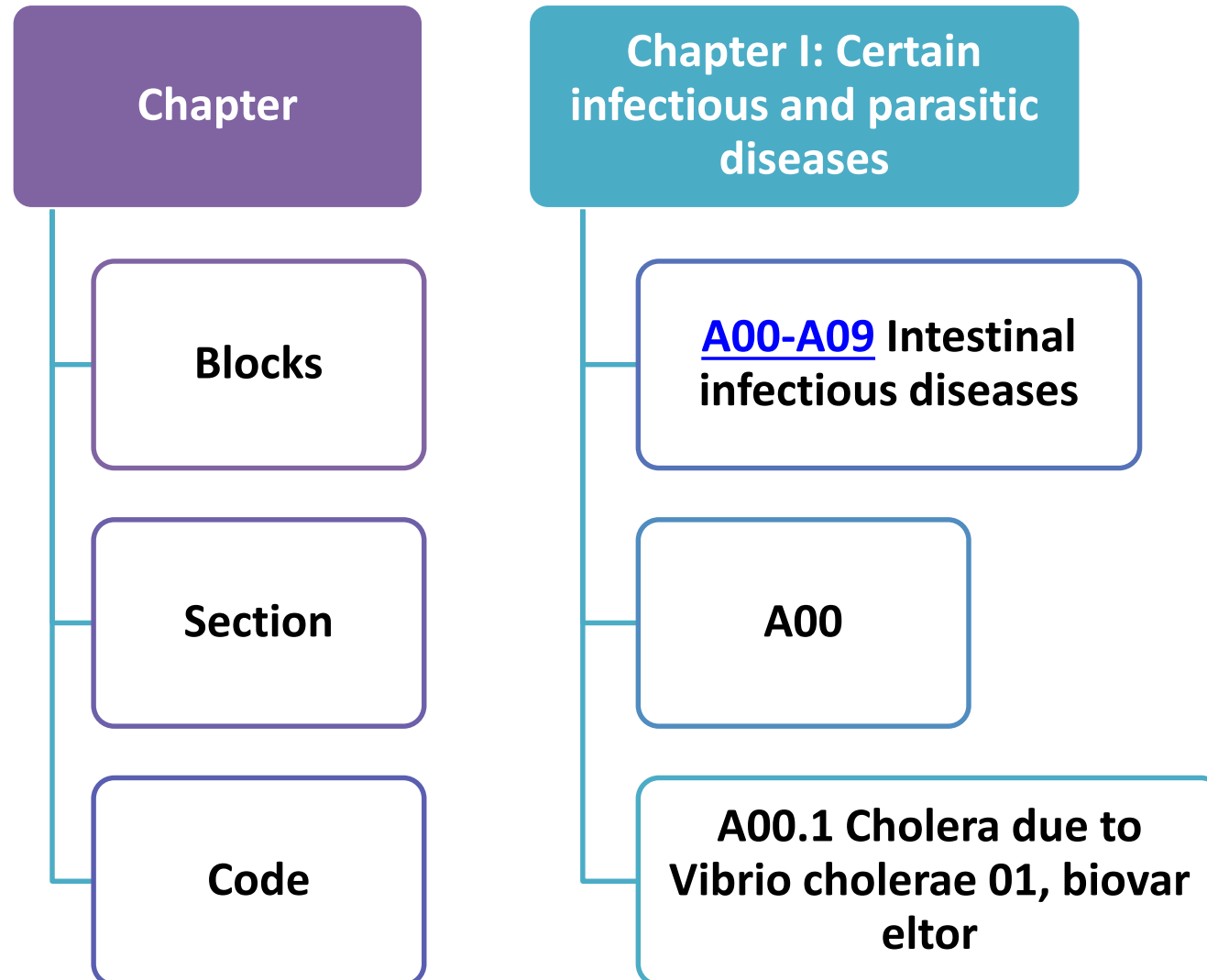
- F20.10 Hebephrenic schizophrenia continuous course
- F- Mental and Behavioral disorder
- 20 Schizophrenia
- .1 Hebephrenic type
- 0 Continuous course
- 5, 6th character – for specific purpose/research
- “U” codes – unused codes

ANATOMY OF AN ICD-10 CODE



ICD-10 code for torus fracture of lower right end of right radius, initial encounter for closed fracture

ICD-10 code Arrangement



- 1st character – letter, each for a chapter except-
- D- both in chapter II - neoplasms & Chap III - diseases of blood & blood forming organs & certain disorders involving the immune mechanism
- H- both in chapter VII - Diseases of the eye & adnexa & chapter VIII - Diseases of the ear and mastoid process
- Four chapter Use more than one letter – I, II, XIX, XX
- I- XVII relate to disease & other morbid conditions
- XVIII – symptoms, signs, abnormal clinical & laboratory Findings, not elsewhere classified
- XIX – injuries, poisoning & certain other consequences of external causes

Addition of signs/symbols/words



Sr NO	Signs/Symbols/Words	Application
1	† Dagger	Describe a condition in terms of its underlying cause or etiology
2	* Asterisk	its current manifestation
3	() Parentheses	Enclose supplementary words, code referring exclusion
4	[] Square brackets	Enclose synonyms, alternative words For referring to previous notes
5	.-	When insertion of modifying words is required in diagnosis
6	: Colon	To list inclusion and exclusion terms
7	NOS	Not otherwise specified or unspecified/ unqualified
8	NEC	Not Elsewhere Classified
9	“And”	In titles is always and /or

- Tuberculosis (A15-A19)
 - Includes : Infections due to Mycobacterium tuberculosis and Mycobacterium bovis
 - Excludes :
 - Congenital tuberculosis (P37.0)
 - Pneumoconiosis associated with tuberculosis (J65)
 - Sequelae of tuberculosis (B90.-)
 - Silicotuberculosis (J65)

Use of Dagger & Asterisk



- Elsie's documentation states that she has a cataract which is the result of insulin dependent diabetes.
- This means that the full code is E10.3 †. In the inclusion terms we see Diabetic, cataract listed with the appropriate asterisk category H28.0*.
- Therefore the two codes needed to capture the diagnosis in a patient like Elsie are:

E10.3† H28.0*

Q. Which of these codes would you use for the –

a. underlying cause of death?

Ans. E10.3†

b. Current Manifestations

Ans. H28.0*

Diabetes mellitus (E10-E14)

Use additional external cause code (Chapter XX), if desired, to identify drug, if drug-induced.

The following fourth-character subdivisions are for use with categories E10-E14:

.0 With coma

Diabetic:

- coma with or without ketoacidosis
- hyperosmolar coma
- hypoglycaemic coma

Hyperglycaemic coma NOS

.1 With ketoacidosis

Diabetic:

- acidosis
- ketoacidosis

without mention of coma

.2† With renal complications

Diabetic nephropathy (N08.3*)

Intracapillary glomerulonephrosis (N08.3*)

Kimmelstiel-Wilson syndrome (N08.3*)

.3† With ophthalmic complications

Diabetic:

- cataract (H28.0*)
- retinopathy (H36.0*)

Conventions used in Tabular list



- Parentheses () used in :
- Enclose supplementary words, NOT affecting code
 - e.g. I10 Hypertension (arterial) (essential) (malignant) (primary) (systemic)
 - Indicates Hypertension alone or qualified by any or combination
- Enclose code referring exclusion
 - e.g. H01.0 Blepharitis, excludes blepharoconjunctivitis (H10.5)
- Block titles, to enclose three character codes of categories
- To enclose the dagger code in an asterisk category or the asterisk code following a dagger term

Conventions used in Tabular list



- Square brackets [] used to :
 - Enclose synonyms, alternative words
 - e.g. A30 Leprosy [Hansen's disease]
 - For referring to previous notes
 - e.g. C00.8 overlapping lesion of lip [see note 5 on p.182]
 - For referring to previously stated set of character subdivisions common to a no. of categories
 - e.g. K27 Peptic ulcer, site unspecified [See page 566 for subdivisions]

Conventions used in Tabular list



- Colon :
- To list inclusion and exclusion terms
 - e.g. K26 Duodenal ulcer
- Includes : erosion (acute) of duodenum
- Excludes : peptic ulcer NOS (K27.-)
- .0 Acute with haemorrhage
- .1 Acute with perforation
- When insertion of modifying words is required in diagnosis
 - e.g. K36 Other appendicitis
 - Appendicitis :
 - . Chronic
 - . recurrent

Conventions used in Tabular list



- Brace }
- Used in listing inclusion & exclusion terms, to indicate that neither words preceding nor after it are complete terms. e.g.
 - O71.6 Obstetric damage to pelvic joints & ligaments
 - Avulsion of inner symphyseal cartilage
 - Damage to coccyx
 - Traumatic separation of symphysis (pubis)
- NOS – Not otherwise specified or unspecified/ unqualified

} Obstetric

- Not Elsewhere Classified (NEC)
- Serves a warning that certain variants are listed somewhere. e.g.
 - J16 Pneumonia due to other infectious organisms, not elsewhere classified
 - Includes J16.0 Chlamydial pneumonia,
 - J16.8 Pneumonia due to other specified infectious organisms
- “And” in titles is always and /or
 - A18.0, Tuberculosis of bone and joints are to be classified cases of “Tuberculosis of bone”;

- Sections :
- I – list of all terms classifiable to Chapters I-XIX, and XXI, EXCEPT drugs and other chemicals
- II – index of external causes of morbidity and mortality, all terms classifiable to Chapter XX, EXCEPT drugs and other chemicals
- III – table of drugs & chemicals, list for each substance the codes for poisonings & adverse effects of drugs classifiable to Chapter XIX, & Chapter XX codes that indicates mode : accidental, deliberate (self-harm), undetermined, or adverse effect of a correct substance

- Lead terms or key words (extreme left)
- Indentations (in right after dash)
 - Erythroblastosis (fetalis) (newborn) P55.9
 - - due to
 - -- ABO (antibodies) (incompatibility) (isoimmunization) P55.1
 - -- Rh (antibodies) (incompatibility) (isoimmunization) P55.0
- LEAD TERMS : name of disease/pathological condition
- Indented : the modifiers – variety, site, etc.
- Tuberculosis of hip – search under “t”
- Stomach ulcer – search under ? “S/U”
- Adjectival disease conditions : puerperal, puerperium/tuberculosis, tubercular, tuberculous – in noun form or both

- Step I. Look for diagnosis (Lead term/key words) in the record
 - Asthma, uremia, encephalopathy (noun for diseases, injuries)
- Step II. Refer volume 3 (alphabetical index)
- Step III. Refer the tabular list (Vol.1), verify the suitability of the code selected
- Volume 2 contains a detailed Instruction Manual

- ICD-10 classification codes are provided in ClaML (XML based file format) with other related materials
- Available from WHO website download area
- You will need to register and accept the license before downloading
- [get here](#)
- More information could be found at NRCeS website



Clarification on usage and purpose

DIFFERENCE BETWEEN ICD AND SNOMED CT

Difference between ICD and SNOMED CT



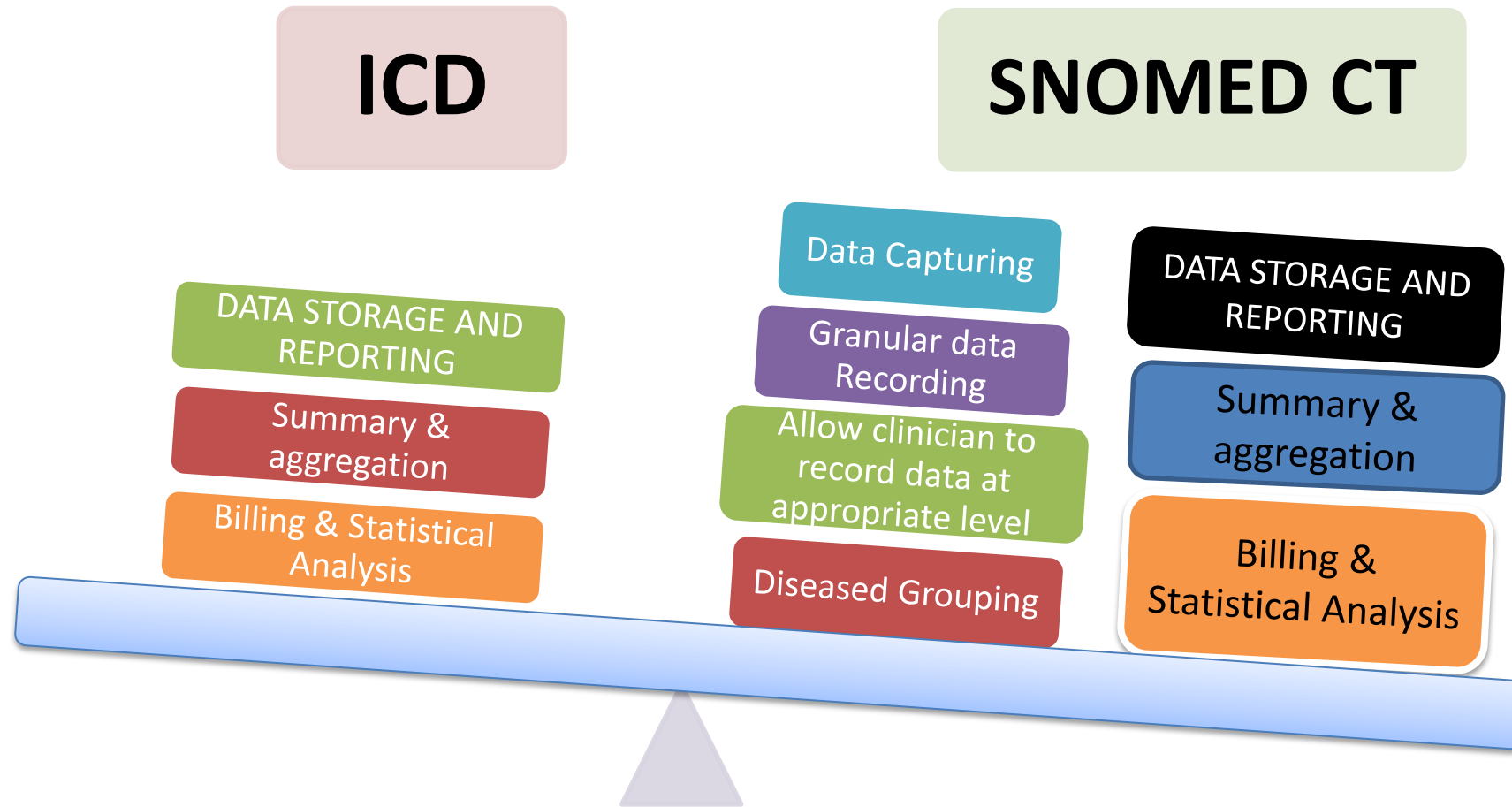
Criteria	ICD	SNOMED CT
Scope	<p>Limited</p> <ul style="list-style-type: none"> •Diseases •Related health problems •Procedures 	<p>Broad</p> <ul style="list-style-type: none"> •Diseases •Signs / Symptoms / Other clinical findings •Procedures •Observables •Body structures •Organisms •Substances •Pharmaceutical products •Physical objects •Physical forces •Specimens
Granularity	<ul style="list-style-type: none"> •Summarizes and aggregates data into broad categories 	<ul style="list-style-type: none"> •Each distinct meaning has a different concept identifier •Records data at a granular level •Allows clinicians to record data at appropriate level of detail
Statistical Classification Terminology vs.	<p>Mono-hierarchy</p> <p>Each code is grouped into a single grouping</p> <p>E.g. 'viral pneumonia' classified as 'respiratory disease' but not a 'viral disease' or 'infection'</p>	<p>Poly-hierarchy</p> <p>Codes can belong to different groupings based on meaning</p> <p>E.g. 'viral pneumonia' classified as both a 'respiratory disease' and a 'viral disease' (which is a 'infectious disease')</p>

Difference between ICD and SNOMED CT



Criteria	ICD	SNOMED CT
Purpose and use	<p>Classifications are essential to the big picture view of healthcare</p> <ul style="list-style-type: none">•Used to summarize and aggregate data•Adds statistical value to data•Important for use cases where each code must be grouped only once – e.g. billing & statistics	<ul style="list-style-type: none">•Allows data to be recorded at a granular level for clinical purposes•Allows data to be grouped and aggregated in different ways•Allows data to be queried using relationships between concepts
Purpose and use	<p>Limited value in an individual patient EHR</p> <ul style="list-style-type: none">•Represents one dimension of meaning•No links to body sites, causes etc•Groups multiple clinical meanings together using a single code•Does not always represent sufficient detail for clinical purposes	
Other	Not sufficient for clinical queries	Supports meaningful health records

Application of ICD-10 and SNOMED CT



Mapping SNOMED CT to ICD-10



- SNOMED CT is to be used as primary terminology in healthcare application
- SNOMED CT to ICD-10 maps developed by SNOMED International and WHO
- Maps can be used for classification and reporting as required for regulatory purposes
- C-DAC's Toolkit for SNOMED CT (CSNOtk) provides an API for SNOMED CT to ICD-10 mapping which can be consumed directly to get classification
- Few input parameters provides more appropriate mapping (age, gender, etc.)

Resources and References



- <http://www.who.int/classifications/icd/en/>
- <http://apps.who.int/classifications/icd10/browse/2016/en>
- http://apps.who.int/classifications/icd10/browse/Content/statichtml/ICD10Volume2_en_2016.pdf?ua=1&ua=1
- https://en.wikipedia.org/wiki/International_Statistical_Classification_of_Diseases_and_Related_Health_Problems
- <https://www.nrces.in/standards/whofic/icd>

Thank You

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