



# ICD Revision Process: Building the infrastructure of ICD -11

*... building blocks of health information ...*

**Dr. T. Bedirhan Üstün**  
**Classifications, Terminologies, Standards**



# Aggregated Statistics 1665

**MEMENTO MORI**

**LONDON'S Dreadful Visitation:**  
Or, A COLLECTION of All the  
**Bills of Mortality**  
For this Present Year:  
Beginning the 27<sup>th</sup> of December 1664, and  
ending the 19<sup>th</sup> of December following:  
As also, The GENERAL or whole years BILL:  
According to the Report made to the  
KING'S Most Excellent Majesty,  
By the Company of Parish-Clerks of London. &c

LONDON:  
Printed and are to be sold by E. Cotes living in Aldersgate-street,  
Printer to the said Company 1665.

**A general Bill for this present year,**  
ending the 19 of December 1665, according to  
the Report made to the KING'S most Excellent Majesty.  
By the Company of Parish Clerks of London, &c.

Parish	Male	Female	Male	Female	Male	Female
St Ahas Woodstreet	100	113	St Clement Eastcheap	118	St Margaret Mole	104
St Allhallows Barking	114	111	St Dunns Roodchurch	78	St Margaret Newfish	114
St Allhallows Great	415	440	St Edmund Lombard	265	St Margaret Parson	49
St Allhallows Little	10	5	St Ethelburgh	195	St Mary Abchurch	92
St Allhallows Neaville	29	175	St Faith	104	St Mary Aldermanbury	52
St Allhallows Staining	185	112	St Giles	109	St Mary Abchurch	105
St Allhallows the Wall	100	110	St Gabriel Fenchurch	69	St Mary le Bow	64
St Andrew Holborn	71	115	St George Southwark	41	St Mary Hill	36
St Andrew Undershaft	124	169	St Giles	75	St Mary Moorfields	64
St Andrew Wardrobe	120	101	St James Duke place	163	St Mary Somerset	248
St Anne Aldgate	152	107	St James Garlickchurch	130	St Mary Spinning	47
St Anne Black Friars	113	107	St John Baptist	118	St Mary Woolchurch	61
St Andrew Parish	41	80	St John Zocharie	51	St Mary Woodchurch	118
St Bartholomew Exchange	73	71	St Katherine Creech	135	St Mary Woolchurch	118
St Bennet Fenchurch	47	41	St Lawrence Jewry	64	St Martin Ainslie	118
St Bennet Gracechurch	17	41	St Lawrence Poo wry	214	St Martin Ludgate	195
St Bennet Paul Wharf	155	79	St Leonard Eastcheap	37	St Martin Outwich	60
St Bennet Stree	31	50	St Margaret Parson	101	St Martin Vintry	417
St Bonifac Billingfleet	51	50	St Margaret Southwark	100	St Matthew Partryke	24
St Christopher	157	157	St Margaret Southwark	100	St Michael Oldgate	44
					St Michael Bassishaw	153

Buried in the 27 Parishes within the walls — 15107 Whereof of the Plague — 9857

St Giles Church 1457 1465 Katherine Tower 956 601 St Margarets 10421 10615 St Mary Woolchurch 4200 4855  
 St James Church 1803 1777 St Leonard Shoreditch 2669 1949 St Mary Abchurch 1675 1593 St Mary Parson 269 1110  
 Buried in the 150 Parishes in the Suburbs and Camp — 8154 Whereof of the Plague — 2140

St Clement Docks 1959 1139 St Mary Bury 01 128  
 St Paul Cross Garden 1408 1281 St Margaret Southwark 4710 5731  
 St Martin in the Fields 4504 2581 Where of the Plague — 156

Buried in the 6 Parishes in the City and Liberties of Wellhausen — 2393  
 Whereof of the Plague — 3493

**The Total of all the Christnings — 9997**  
**The Total of all the Burials this year — 97306**  
**Whereof of the Plague — 68596**

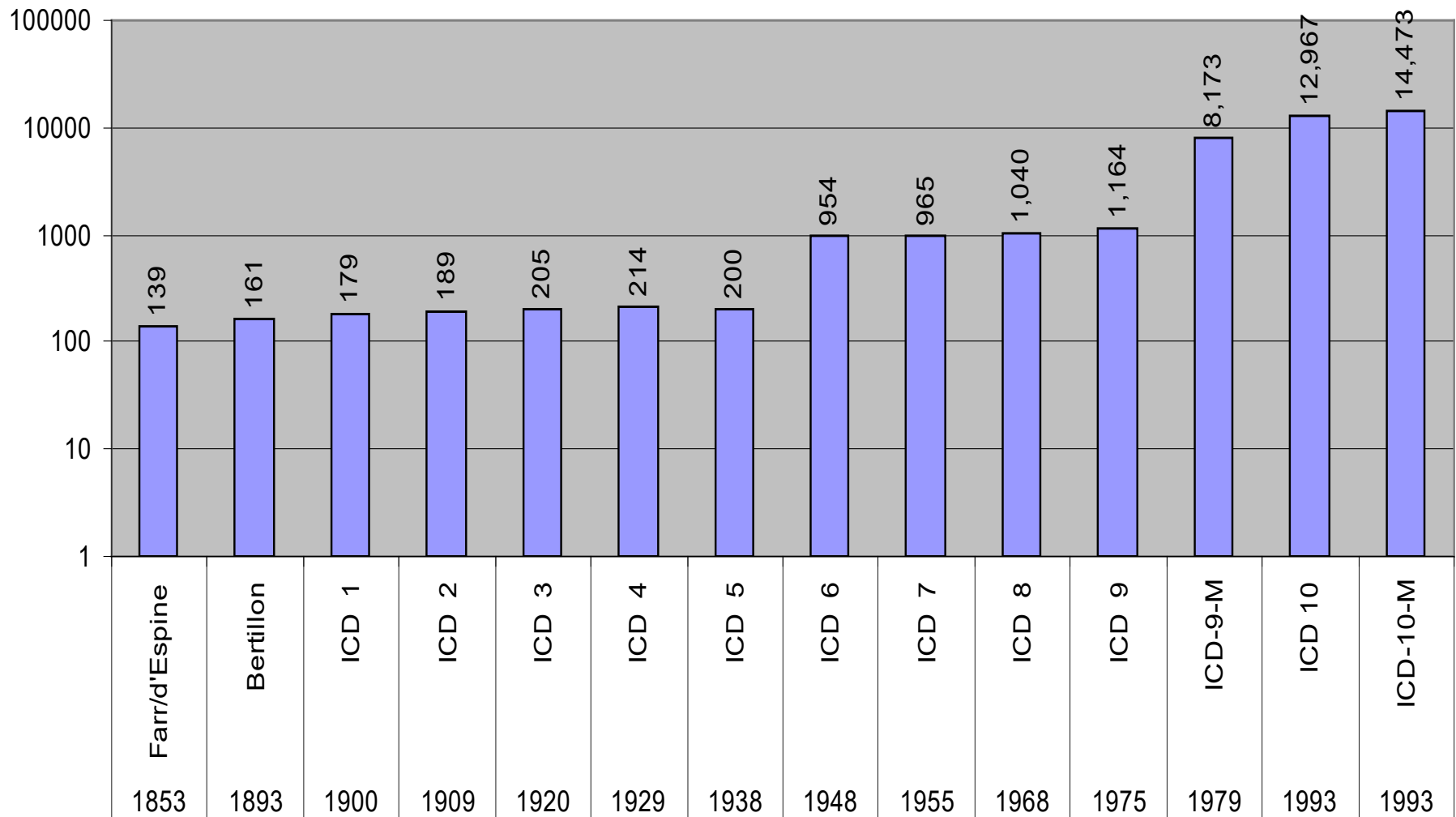
**The Diseases and Casualties this year.**

Abortive and Stillborn	617	Executed	21	Palfie	30
Aged	1545	Flox and Small Pox	655	Plague	68596
Ague and Fever	557	Found dead in Breets, fields, &c.	20	Planner	0
Appoplex and Suddenly	116	French Pox	86	Plurisie	15
Bedrid	10	Frighted	25	Poysoned	0
Blasph	16	Gout and Sciatica	37	Quintic	35
Bleeding	16	Grief	46	Rickets	0
Bloody Flux, Scouring & Flux	185	Gripping in the Guts	1288	Rifing of the Lighes	557
Burnt and Scalded	8	Hanged & made away themselves	7	Rupture	197
Calenture	3	Headmouldfallen & Mouldfallen	14	Scurvy	64
Cancer, Gangrene and Fistula	56	Jaundies	110	Shungies and J Swine pox	105
Canker, and Thruh	111	Impotume	227	Sores, Ulcers, broken and bruised	2
Childbed	625	Kild by severall accidents	46	Limbs	82
Chilfomes and Infants	125	Kungs Evil	86	Spleen	0
Cold and Cough	68	Leprosie	3	Spotted Fever and Purples	124
Collick and Winde	134	Lethargy	14	Stopping of the Stomack	32
Consumption and Tiffick	4808	Livergrown	20	Stone and Strangury	98
Convulsion and Mother	203	Mezgom and Headach	11	Suffic	132
Diffracted	5	Mearles	7	Teeth and Worms	2614
Dryptic and Timpany	1478	Murthered and Shoe	5	Vomiting	0
Drowned	50	Overlad & Straved	45	VVenn	0
		Males	5114	Males	4869
		Females	4853	Females	48737
		In all	9967	In all	97306

Increased in the Burials in the 190 Parishes and at the Pest-house this year — 79009  
 Increased of the Plague in the 150 Parishes and at the Pest-house this year — 68596



# ICD Revisions



# WHO Family of Classifications

## REFERENCE Classifications

**I**nternational  
**C**lassification of  
**D**iseases

**I**nternational  
**C**lassification of  
**F**unctioning,  
**D**isability & Health

**I**nternational  
**C**lassification of  
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**I**nterventions  
*(under development)*



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## 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,  
Third Edition  
(ICD-DA)

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

ICF, **Children & Youth  
Version** (ICF -CY)



# WHO Family of Classifications

## **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***

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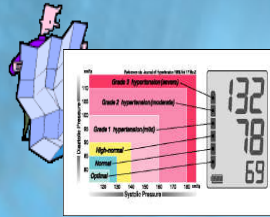
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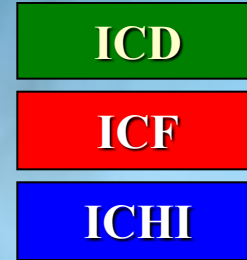
ICF, **Children & Youth Version**  
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# Placing WHO Classifications in HIS & IT



**KRs**  
Mappings



Classifications

e-Health Record  
Systems



Population Health

- Births
- Deaths
- Diseases
- Disability
- Risk factors



Clinical

- Decision Support
- Integration of care
- Outcome



Administration

- Scheduling
- Resources
- Billing



Reporting

- Cost
- Needs
- Outcome



# Problems with ICD

1. Driven by **mortality** and **billing** use cases
2. Used in **117 out of 193** countries for official statistics
3. No **standard of knowledge representation**
4. **No linkages** with health terminology and ontologies
5. **Does not interoperate** with eHR
6. **Limited web presence** – utility for masses





# Construction of ICD-10: Revision Process



- 8 Annual **Revision Conferences** (1982 - 89)
- **17 – 58 Countries** participated
  - 1- 5 person delegations
  - mainly **Health Statisticians**
- **Manual** curation
  - List exchange
  - Index was done later
- "Decibel" ? Method of discussion
- Output: **Paper Copy**
- Work in **English** only
- **Limited testing** in the field



# Construction of ICD-11: Revision Process



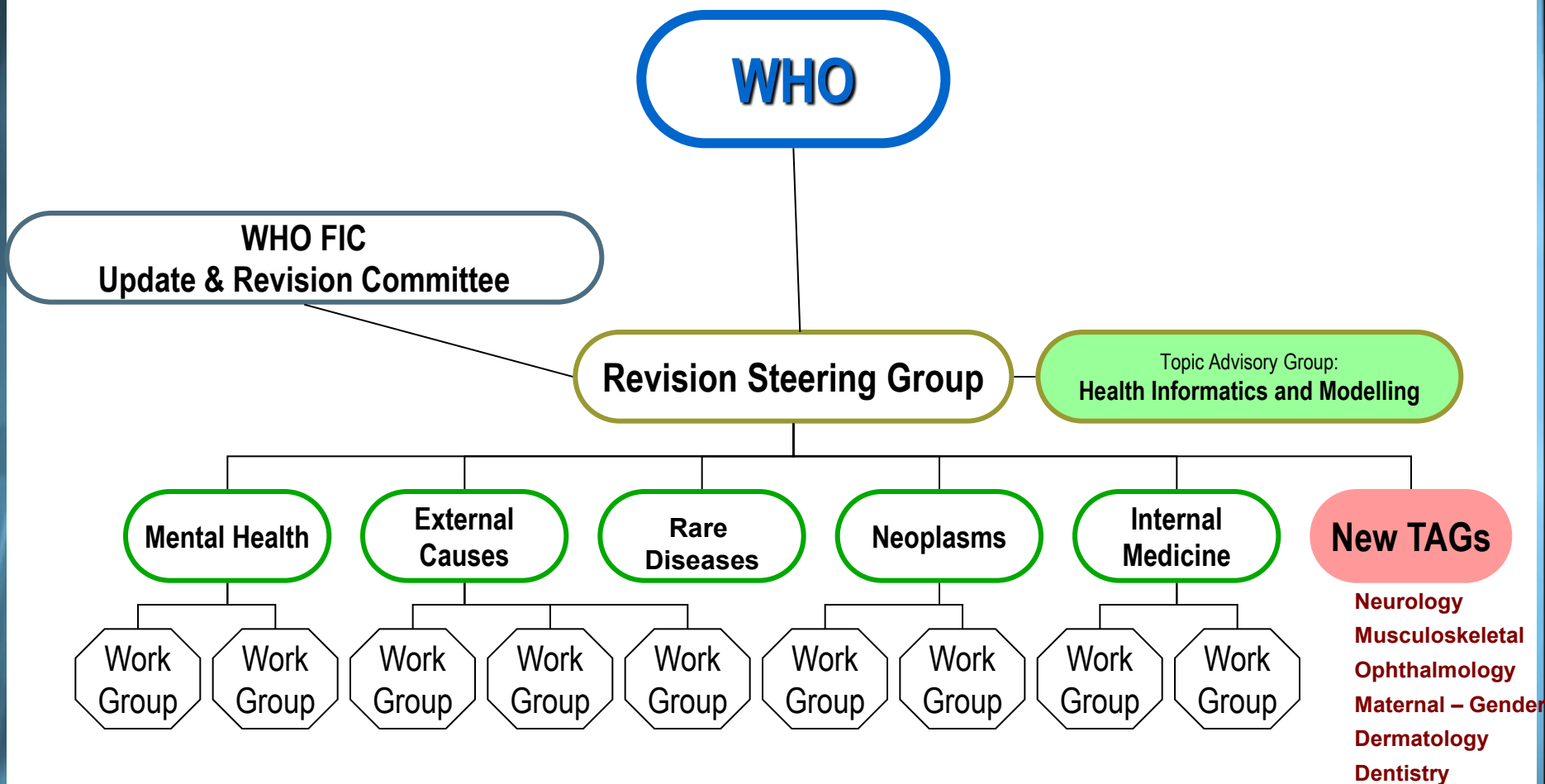
- **Internet-based permanent platform**
  - All year round
  - Open to all people in a structured way
  - Content experts focus
- **Digital curation**
  - Wiki enabled collaboration
  - Ontology based
- **Enhanced discussion & peer review**
  - TAGs serve as the editorial group
- **Electronic copy → print version**
- **Work in multiple languages**
- **Planned field tests**
  - Based on Use Cases

# ICD-11 Revision Goals

1. Evolve a **multi-purpose** and **coherent** classification
  - *Mortality, morbidity, primary care, clinical care, research, public health...*
  - *Consistency & interoperability across different uses*
2. Serve as an **international** and **multilingual** reference standard for **scientific comparability** and **communication** purposes
3. Ensure that ICD-11 will seamlessly function in an **electronic health records** environment.
  - *Link ICD logically to underpinning terminologies and ontologies (e.g. SNOMED, GO, ...)*
  - *ICD Categories “defined” by “logical operational rules” on their associations and details*



# ICD-11 Revision Organization Structure



# Definition of Disease

a set of dysfunction(s) in any of the body systems including:

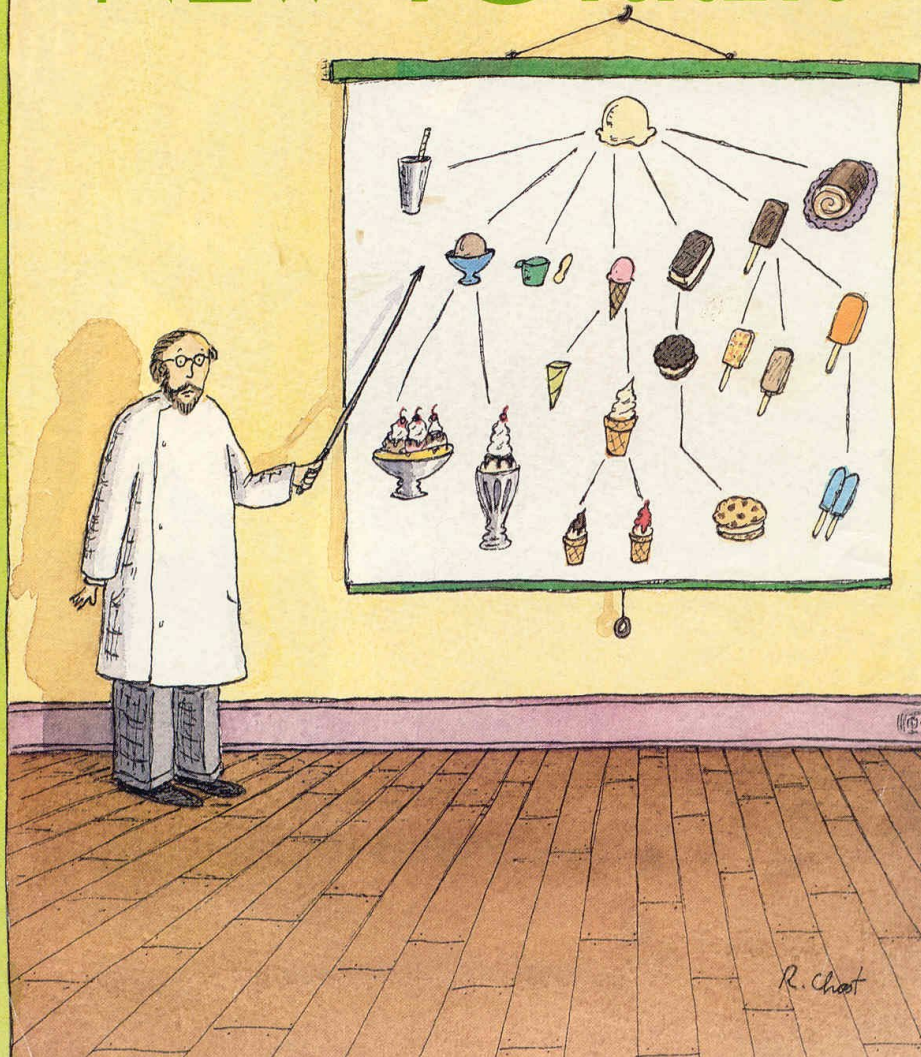
- with a known pattern of signs, symptoms & findings
  - » *symptomatology - manifestations*
- probably with an underlying explanatory mechanism
  - » *etiology*
- a distinct pattern of development over time
  - » *course and outcome*
- a known pattern of response to interventions
  - » *treatment response*
- with linkage to underlying genetic factors
  - » *genotypes, phenotypes and endophenotypes*
- with linkage to interacting environmental factors



Aug. 4, 1986

# THE NEW YORKER

Price \$1.50



# What is Ontology?

- **Ontology (philosophy)**
  - the Organization of Reality ☺ !!!
- **Ontology (computer science)**
  - the explicit – operational description of the conceptualization of a domain:
    - Concepts: **entity** and **quality**  
(*properties and attributes*)
- An ontology defines:
  - a **common vocabulary** → a shared understanding/exchange:
    - among people
    - among software agents
    - between people and software
      - to reuse data - information
      - to introduce standards to allow interoperability



# THE CONTENT MODEL

*Any Category in ICD is represented by:*

**TITLE of ENTITY: Name of disease, disorder, or syndrome...**

- 1. Textual definition**
- 2. Synonyms - Inclusion – Exclusion - Index terms**

## **Descriptive characteristics**

- 1. Type**  
Disease, disorder, syndrome, injury, sign/symptom, external cause, reason for encounter;
- 2. Body System(s)** (*pathophysiology*)
- 3. Body Part(s)** (*anatomical site*)
- 4. Manifestation Attributes**
  - a. Signs & Symptoms**
  - b. Diagnostic Findings**
- 5. Etiology**
  - a. Causal Mechanisms /Agents**
  - b. Genomic characteristics**
- 6. Temporal Properties**
- 7. Severity and/or Extent**
- 8. Functional Impact**
- 9. Treatment**

## **Maintenance attributes**

- A. Unique identifier**
- B. Subset, adaptation, and special view flag**
  1. Primary Care
  2. Clinical Care
  3. Research
  4. Special indices (e.g. Public Health Indices or Resource Groupings)
- C. Hierarchical relationships**  
parents and children in ICD structure
- D. Mapping relationships**  
Linkages to other systems like SNOMED etc.
- E. Other rules**

## ICD-10 Plus

## ICD-11 draft

## ICD Terminology

**Application**

**ICD-10 +  
WEB Application**

**Hi-Ki**  
Joint-authoring Tool  
WIKI like application

**Protégé/OWL  
LEXGRID**

**Key Tasks**

- Clinical Modification Owners enter their **CM** version Codes
- **TAG** and **Workgroups** enter proposals

- **TAG Experts** for ICD-11
- **WHO editors**
  - Taxonomic rules
  - Definitions
  - Diagnostic criteria

- **Information Model**
- **Linkages between ICD and:**
  - SNOMED-CT
  - Other ontology & terminologies
- **Clinical interface algorithms**

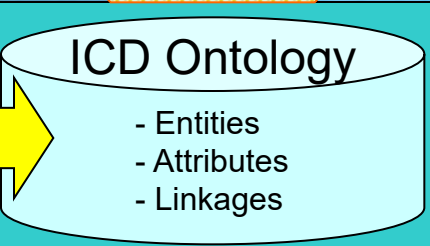
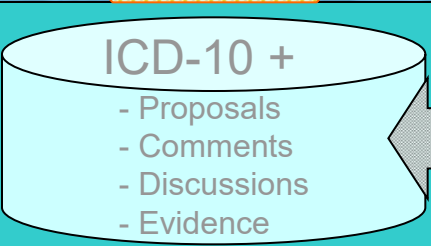
**Access**

- **ANY USER** can **POST** proposals or comments.
- **ANY USER** can **REVIEW** other proposals and discuss.

- **ALL USERS** can see drafts and comment.

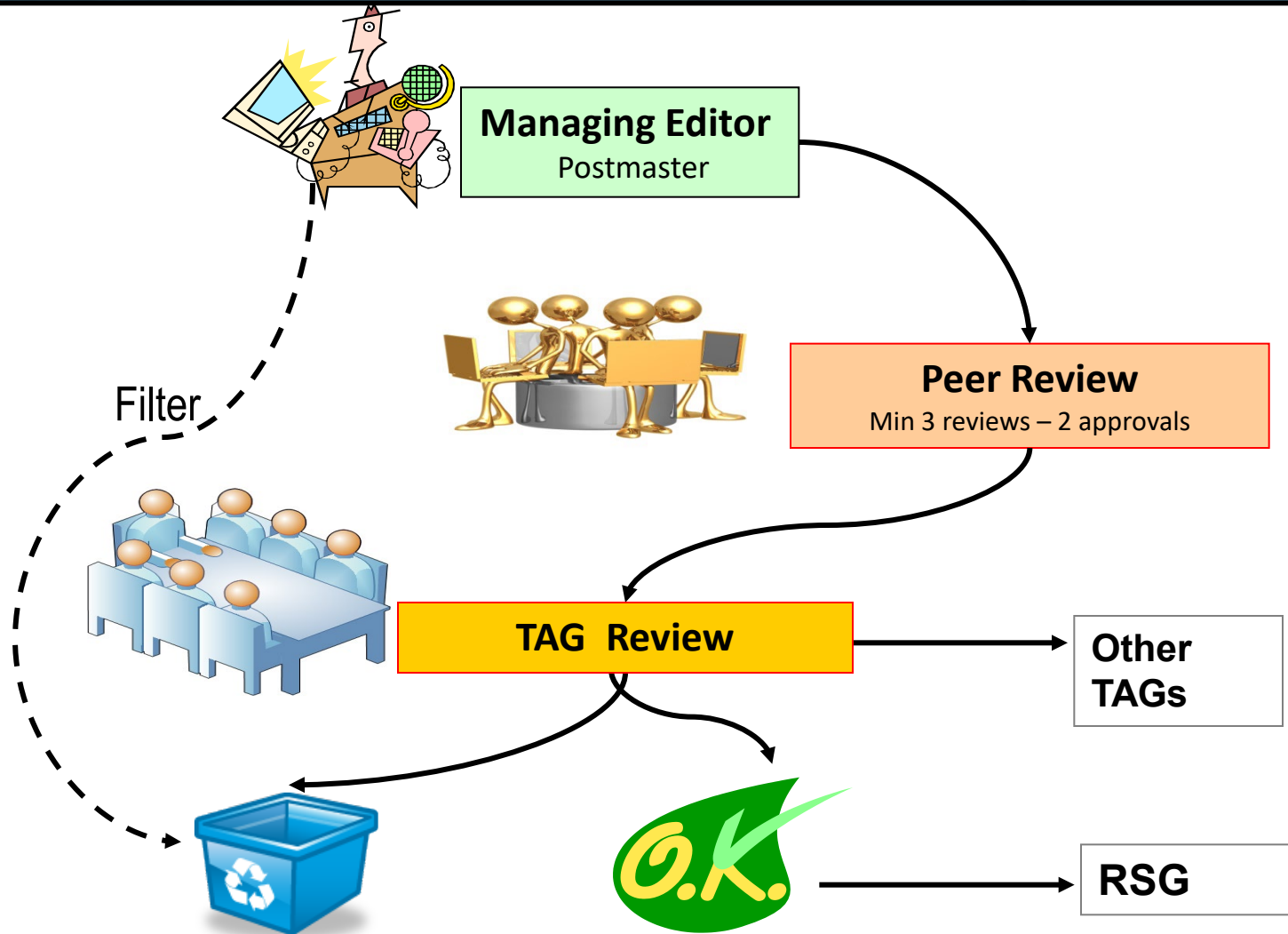
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**Technical Layer**





# Proposed TAG Editorial Function Workflow Management



# What does WHO want ?

- **Meaningful exchange** of health information
  - Enable **aggregation of health information** from different sources
- **One stop-shop** for different users / developers
  - In multiple languages
- **Crystallization spiral for knowledge representation**
  - *formalization* → **conceptualization** → *formalization*
    - *Linkages* between different domains of health information
    - *Translational research tool* + *semantic zooming*



# WHO Commitment

- **Collaborative development**
  - Content expertise
  - Social computing
- **Open Public Good**
  - Free access / Free of charge for public use
- **Evidence based classification**
  - Links with Public Evidence Sources ( PubMed ,...)
- **Ontology supported linkages**
  - Linkages with GO, SNOMED CT...
- **Continuous Quality Improvement**
  - Evaluation
  - Update and maintenance



# Tentative Timeline

- **2010** : **Alpha version** ( ICD 11 alpha draft)
  - +1 YR : **Commentaries and consultations**
- **2011** : **Beta version & Field Trials Version**
  - +2 YR : **Field trials**
- **2013** : **Final version** for public viewing
  - **2014** : **WHA Approval**
- **2015+** **implementation**

