Health Information Standards

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Hospital Authority

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Healthcare Services

- Person-centred process provided
  - by multiple carers
  - at different times
  - at various locations
- Information driven
  - Longitudinal health record
    - Womb-to-tomb
  - Interoperable clinical information systems

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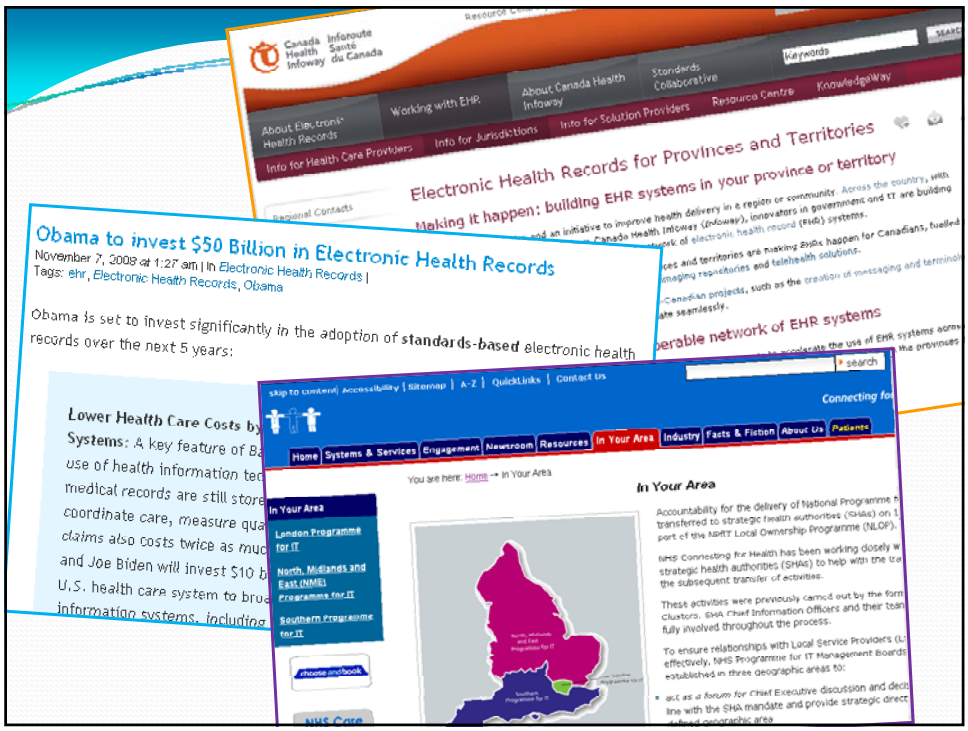

Consultation Document on Health Care Reform - HKSAR Government, March 2008

- Enhance primary care
- Public-private partnership in healthcare
- Electronic health record sharing
- Public healthcare safety net
- Financing model

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Steering Committee on eHealth Record Sharing

"…develop a territory-wide information infrastructure for the sharing of health records of individuals…"

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Standards

- Those morals, ethics, habits, etc., established by authority, custom, or an individual as acceptable

  Dictionary.com

- Document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context

  ISO

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Interoperability

To create an interoperable electronic health record for a safer, higher quality, more efficient continuous health service

Functional

Semantic

Interoperability

ability of ***two or more*** systems or components to exchange information and to use the information that has been exchanged

Source: IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries, IEEE, 1990]

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Value of Standards & Interoperable IT Systems in Healthcare

- improve decision-making through access to patient data across multiple care points
- reduce technical integration costs
- improve the effectiveness and quality of care
  - reduce duplicative diagnostic tests
  - reduce cost of processing administrative data
- timely detect, analyze, and respond to public health threats
- support clinical research → growth of scientific knowledge

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Value of Standards & Interoperable IT Systems in Healthcare

- improve decision-making through access to patient data across multiple care points

In the USA, a nationwide standardized electronic health records infrastructure would save US$77billion annually

Harvard Medical School, 19 Jan 2005

knowledge

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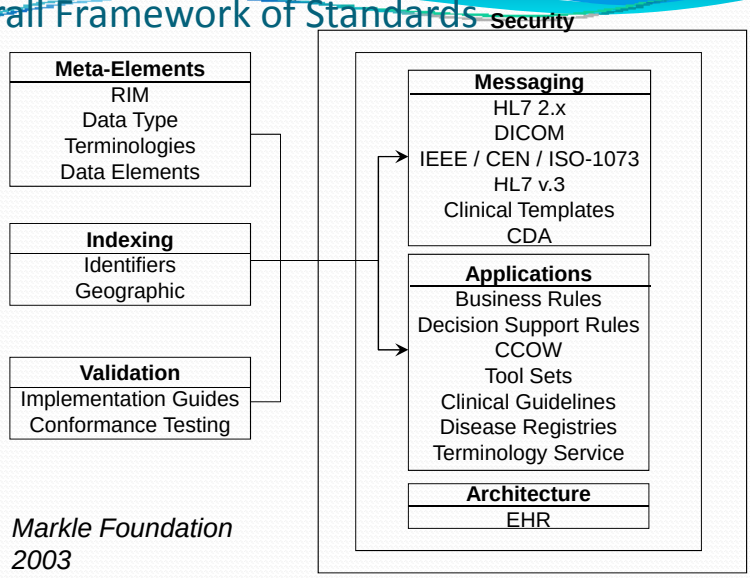
Overall Framework of Standards



Markle Foundation 2003

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Standards Governance

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Standards Governance at Overseas

- Canada
  - Canada Health Infoway
- Australia
  - National E-Health Transition Authority
- New Zealand
  - Health Information Standards Organization
- United Kingdom
  - Technology office of NHS Connecting of Health

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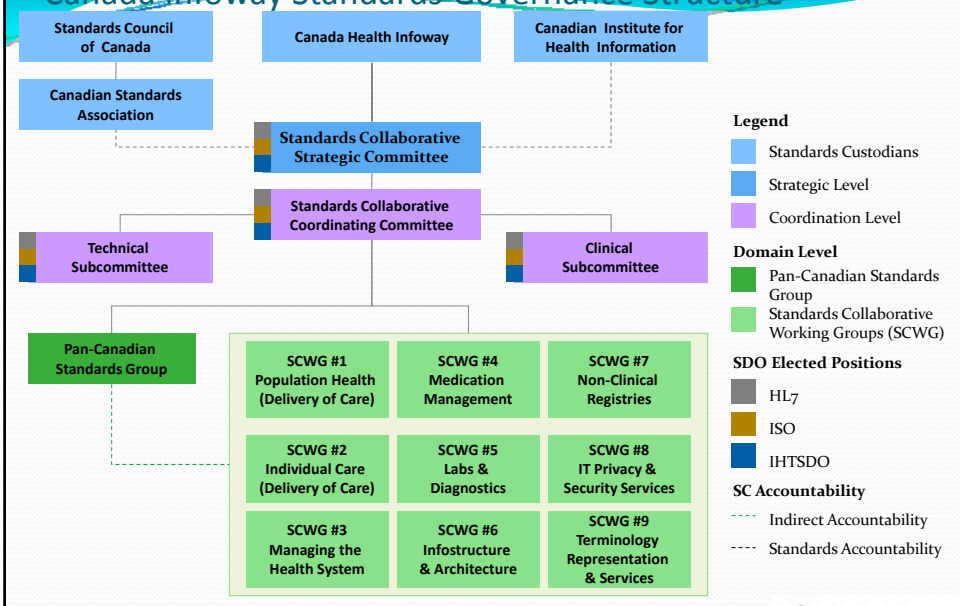
Canada Infoway Standards Governance Structure



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Canada Health Infoway Inforoute Santé du Canada

New Zealand

Health Information Strategy Action Committee

- Provide governance of, oversight of, and leadership for the implementation of the strategy to the health and disability sector
- 3 subcommittees
  - Infrastructure, e.g. privacy, authentication, security
  - Health Information Standards
    - Develop, agree, endorse, communicate, and promote health information standards
    - Monitor development progress & implementation
    - QA standards plans and activities, audit use of standards
  - National Collections
    - Implement standards, e.g. HPI, NHI
    - Specify data standards, e.g. business rules, definition, quality, access
    - .....

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Australia

nehta

- National E-Health Transition Authority (NEHTA)
- Dec 2008 : National E-Health Strategy
- National E-Health Entity
  - Strategy ...
  - Investment ...
  - Execution ...
  - Standards development
    - the definition, maintenance and enhancement of national E-Health standards and the implementation of a consistent process for undertaking this work
  - Solutions compliance ...

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NHS - Connecting for Health

- Part of Technology Office
- Introduction, development & delivery of coding system products
  - Read Codes
  - SNOMED CT
  - Dictionary of Medicine & Devices
  - ICD 10
  - OPCS4
  - NHS Data Dictionary
- NHS Terminology Service – support & maintain
  - SNOMED CT
    Read Codes
  - Dictionary of Medicine & Devices
- Develop, maintain & support NHS Data Model & Dictionary Service

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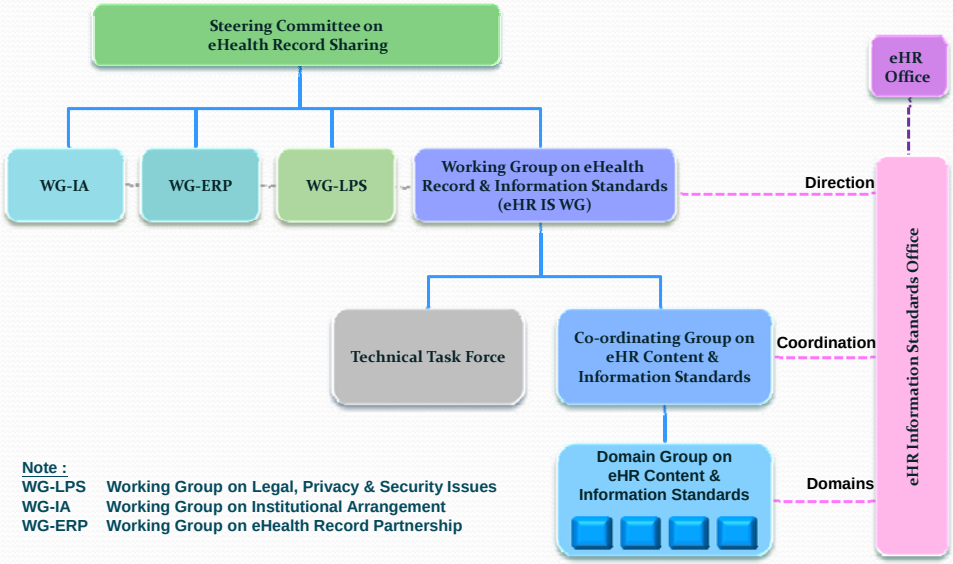
Organisation Structure for eHR Information Standards



Note :
WG-LPS Working Group on Legal, Privacy & Security Issues
WG-IA Working Group on Institutional Arrangement
WG-ERP Working Group on eHealth Record Partnership

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Challenges

- Too many standards
  - Conflicts, overlap, redundant
  - Mapping costs
  - Harmonization of standards
- Ever changing
  - Health science
  - Technology
  - Standards
- Politics
- Implementation
  - Cultural change
  - Impact to existing workflow / systems / data
  - Resources

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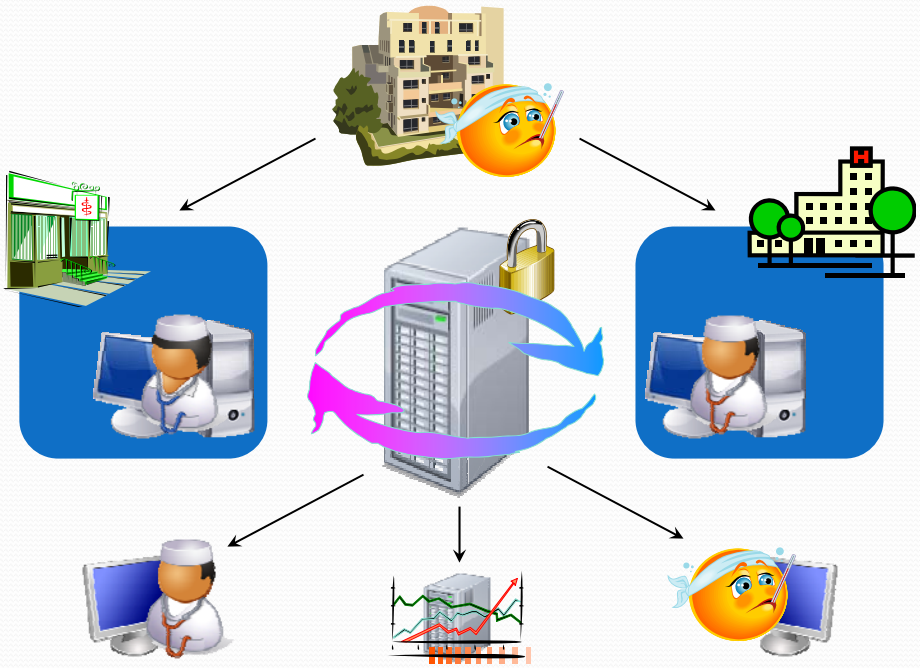

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Identification

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Basic Concepts

- Universal Healthcare Identifier (UHI)
  - Uniquely identify an individual person who seeks healthcare service
  - Link information of the same person across healthcare facilities
- Patient Master Index (PMI)
  - An index contains patient's identification and demographic data
  - A permanent listing of data of patients who have attended the healthcare facility
  - Building block for all patient based information systems

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Health Identifiers at IHTSDO Members

Country	National Identifier	With DOB / Sex	Remarks
Australia	Y		
Canada	Province based		
Cyprus			
Denmark	Y	Y	
Estonia	Y	Y	
Lithuania	Y	Y	
New Zealand	Y		
Netherland	Y		Issue to > age 12
Singapore	Y		
Slovak Republic	Y		Change number if new card is issued
Slovenia	Y	Y	
Spain	Y		
Sweden	Y	Y	
United Kingdom	Y		Issue to each newborn
United States	No		

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Identification Data

- Identifier
- Name
- Sex
- Date of birth
- Ethnicity
- Demographics
  - Address, phone,…
- Date of death

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Hong Kong

- Hong Kong Identity Card holders
  - For all Hong Kong residents > 11 yrs old
- Hong Kong Birth Certificate holders
  - < 11 yrs old + born in Hong Kong
  - From 1981, HKBC no. → HKID no.
- Others
  - Travelers
  - Illegal immigrants

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Case Study

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Issues with Patient Identification – Document related

Patient presents identity document

- HKID card / HKBC holders
  - Change of personal data
    - Name, e.g. baby
    - Sex
  - Incomplete personal data
    - Date of birth
    - Name
- Fake HKID card / HKBC holders
- Travelers
  - Change of identifiers
- Chinese characters

Patients do not present identity document

- Newborns
- Others, e.g. street sleepers, HKID/BC holders, prisoners

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Issues with Patient Identification – Behaviour related

- Change of identification data
  - Culture
  - Unpredictable patient behaviour
- Varied staff practice
- Typo error

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Challenges

- Repeatedly updating
- Loss of linkage
  - Multiple identifiers for same person
- Mixed up clinical data
  - Same identifier to multiple persons

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Impact

- Existing records
  - Paper
  - Electronic
    - Database design
- Patients involved
  - Active
  - Inactive
  - Deceased
- Users of patient record
  - Record offices
  - Clinicians

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Accurate Patient Identification

- Guidelines / Policies
  - Standard practice in registration / amendment of patient identification data
    - Valid identity document
    - Strictly based on identity document
    - Verify PMI data
  - Follow up problem cases
- Staff education
- Patient education
- Communication
- Monitoring
- Technology

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http://www.immd.gov.hk/ehtml/hkid_hkid.htm

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Healthcare Providers

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Healthcare Providers

- Standard identification of all healthcare providers
  - a person authorized by a competent authority or regulatory body to act in a capacity that provides health related goods or services

Health Data Standards Dictionary, HealthNet/BC, October, 1998

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Purposes

- Identify the healthcare providers accurately
- Facilitate communication between healthcare professionals
- Development of health information security and privacy guidelines
- Act as a basis for protected data sharing
- Enable cross-jurisdictional planning and evaluative analyses, such as human resource planning, strategies, and activities
- Support the integration of health information from different sources for research purposes

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New Zealand

- Ministry of Health
- National Health Practitioner Index (HPI)
- Authenticate the access to the HPI and health information systems
- Data source :
  - Registration body / council / employer
  - Determine the access right to the HPI
  - Identify which data can be updated by other parties, e.g. address
- Privacy impact assessment
- Allow healthcare organisation to access the HPI
  - Authentication
  - Control data access
- Information on disciplinary action / limitation on scope of practice
  - Available to public during the period
  - Will not be disclosed once the limitation is expired

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Canada

- Health InfoWay
- Provider Registry
- Information include :
  - identification, demographic data, and professional information
- Provider Registry Pre-Implementation Certification
  - Assess a provider registry application alone, or as an application-based service provider offering

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USA

- HIPAA
  - Secretary of Health and Human Services (or delegated individuals) to adopt standards for unique identifiers for all health care providers
- Administrator of the Centers for Medicare & Medicaid Services (CMS)
  - enforce the electronic transactions, code set, security, and identifier provisions (i.e., non-privacy administrative simplification provisions) of HIPAA
- National Provider System (NPS)
  - Store provider data
  - Generate National Provider Identifier (NPI)
    - Unique identification number
    - Universal identifier
    - All types of health care providers
    - 10-digit content free number
    - 23 May 2005 - effective
    - 23 May 2007 – HIPAA standard transactions
    - 23 May 2008 – small health plans

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Australia

- National E-Health Transition Authority (NEHTA)
- Healthcare Provider Identifier (HPI)
  - Assigned and maintained by Healthcare Identifiers Service
  - Healthcare professional & organisation
- Unique number for all healthcare providers who supports the delivery of healthcare
- From mid 2010 – by stages
- Stage 1 : professionals registered with the Australian Healthcare Practitioner Registration Authority

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Information

- Identifier
- Name
- Practising status
- Qualifications
- Scope of practice
- Conditions on practice

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Challenges

- Security & privacy
- Impact to current practice
- Not all professionals need registration in HK
- Maintenance (accuracy & currency)

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Terminology

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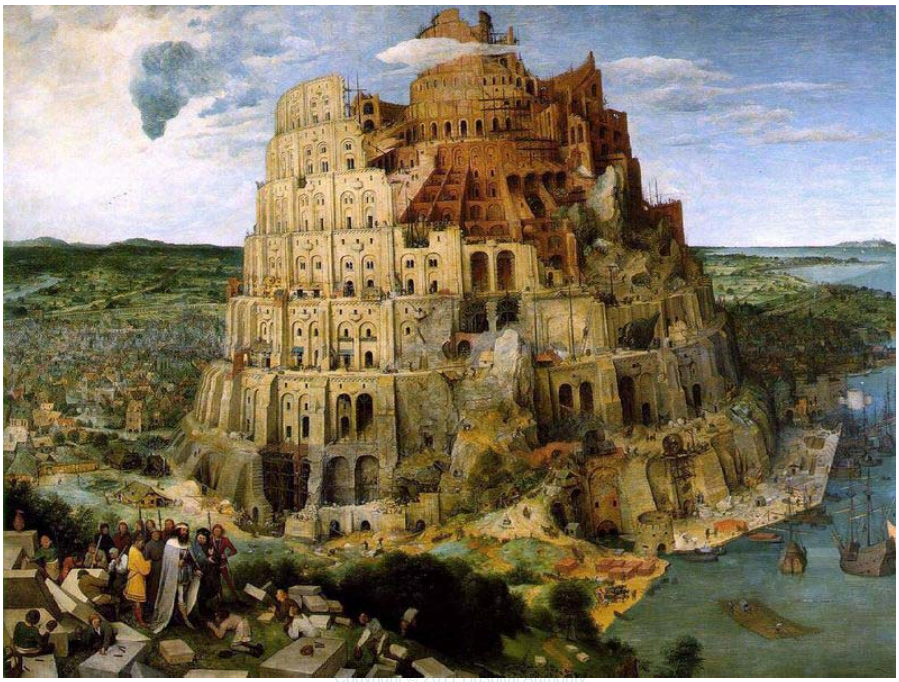

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Source: IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries, IEEE, 1990]

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Purposes of Terminology

- Record clinical information
- Facilitate the storage of clinical information
- Support sharing and reuse of clinical information
- Support efficient query formulation
- Create a natural language output from manual structured input
- Support the application of decision support algorithms

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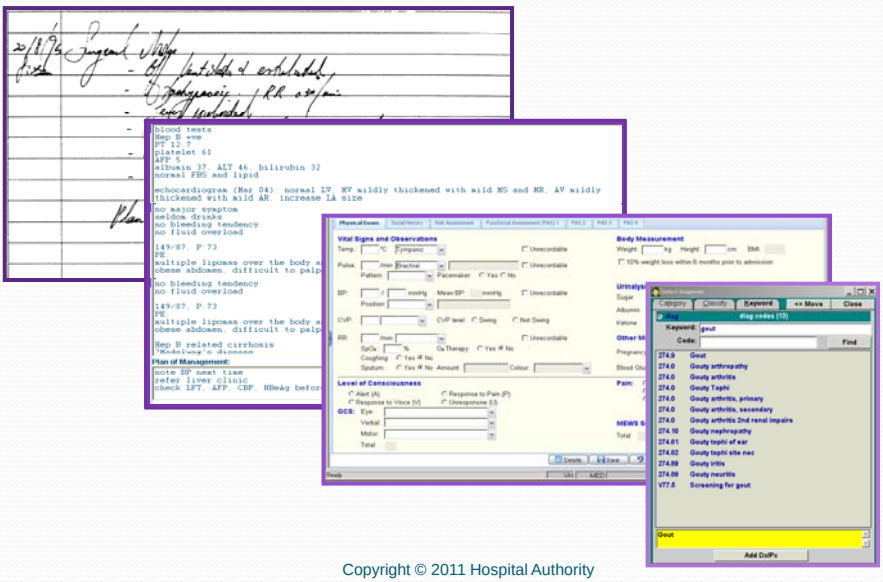
Clinical Documentation



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More on Medical Terminology

- Same meaning, different words e.g. bleeding, haemorrhage, hemorrhage
- Same word, different meanings e.g. PID, COLD, MI
- Meaning-modifying context e.g. family history, past history
- Probabilistic expressions and negation e.g. possible, no, absent, excluded, rule out

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Cimino's Desiderata of Controlled Medical Vocabulary

- Content
- Concept oriented
- Concept permanence
- Nonsemantic concept identifier
- Polyhierarchy
- Formal definitions
- Reject "not elsewhere classified"
- Multiple granularities
- Multiple consistent views
- Representing context
- Graceful evolution
- Recongize redundancy

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World Health Organization

ICD
Version 2006

List of Chapters

ICD-10 Homepage

Search ICD-10

Full

OK ?

Move to ICD code:

OK

Chapter List

Chapter	Blocks	Title
I	A00-B99	Certain infectious and parasitic diseases
II	C00-D48	Neoplasms
III	D50-D89	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
IV	E00-E90	Endocrine, nutritional and metabolic diseases
V	F00-F99	Mental and behavioural disorders
VI	G00-G99	Diseases of the nervous system
VII	H00-H59	Diseases of the eye and adnexa
VIII	H60-H95	Diseases of the ear and mastoid process
IX	I00-I99	Diseases of the circulatory system
X	J00-J99	Diseases of the respiratory system
XI	K00-K93	Diseases of the digestive system
XII	L00-L99	Diseases of the skin and subcutaneous tissue
XIII	M00-M99	Diseases of the musculoskeletal system and connective tissue
XIV	N00-N99	Diseases of the genitourinary system
XV	O00-O99	Pregnancy, childbirth and the puerperium
XVI	P00-P96	Certain conditions originating in the perinatal period
XVII	Q00-Q99	Congenital malformations, deformations and chromosomal abnormalities
XVIII	R00-R99	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
XIX	S00-T98	Injury, poisoning and certain other consequences of external causes
XX	V01-Y98	External causes of morbidity and mortality
XXI	Z00-Z99	Factors influencing health status and contact with health services
XXII	U00-U99	Codes for special purposes

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G04 **Encephalitis, myelitis and encephalomyelitis**

Includes: acute ascending myelitis
meningoencephalitis
meningomyelitis

Excludes: benign myalgic encephalomyelitis (G93.3)
encephalopathy:
· NOS (G93.4)
· alcoholic (G31.2)
· toxic (G92)
multiple sclerosis (G35)
myelitis:
· acute transverse (G37.3)
· subacute necrotizing (G37.4)

G04.0 **Acute disseminated encephalitis**
Encephalitis } postimmunization
Encephalomyelitis }
Use additional external cause code (Chapter XX), if desired, to identify vaccine.

G04.1 **Tropical spastic paraplegia**

G04.2 **Bacterial meningoencephalitis and meningomyelitis, not elsewhere classified**

G04.8 **Other encephalitis, myelitis and encephalomyelitis**
Postinfectious encephalitis and encephalomyelitis NOS

G04.9 **Encephalitis, myelitis and encephalomyelitis, unspecified**
Ventriculitis (cerebral) NOS

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Issues with ICD

- For statistics
  - Not clinician language
- Content not sufficient for patient record purpose
  - Missing important data, e.g. severity, cancer staging
- Not otherwise classified
  - Change meaning when vocabulary updated
- And / Or
- Single hierarchy
- Limited code range
- Complicated data capturing rules

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International Classification of Primary Care

- Developed by WONCA (World Organization of Family Doctors)
- ICPC-2 is released in 1988
- Includes
  - primary care problems, symptoms
  - attendance reason
  - procedure
- Higher level grouping of concept
- HA : Family Medicine / GOPD

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U 28 Limited function / disability of urinary system

1st Axis	
General and unspecified	A
Blood/bloodforming organs, lymphatics	B
Digestive	D
Eye	F
Ear	H
Circulatory	K
Musculoskeletal	L
Neurological	N
Psychological	P
Respiratory	R
Skin	S
Endocrine, metabolic and nutritional	T
Urological	U
Pregnancy, child bearing, family planning	W
Female genital	X
Male genital	Y
Social problems	Z

2nd Axis	
1-29	Symptoms and complaints
30-49	Diagnostic and preventive procedures
50-59	Treatment procedures, medications
60-61	Test results
62	Administrative
63-69	Referral and other reasons for encounter
70-99	Diseases and diagnoses

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Challenges with LOINC

- The thing ordered is not always the thing measured
  → know the component being tested
  - Blood culture – living organism identified
  - VDRL – Treponema pallidum
- Know what is being measured

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Logical Observation Identifiers, Names and Codes

- Developed and maintained by the Regenstrief Institute in US since 1994
- Public domain
- Initially for coding laboratory tests
- Also extended to coding clinical observations, e.g.
  head circumference, blood pressure, body weight…
- A naming standard for 'data fields'
- Selected as the standard for reporting laboratory results amongst all federal health care agencies in US

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G6PD in LOINC

interval of time over which the observation or measurement was made

Short Common Name	Code	Component	Property	Time	System	Scale
G6PD Tiss Ql	18228-7	G6PD	ACNT	PT	TISS	ORD
		G6PD				RD
		G6P				QN
		G			R	ORD
G6PD Ser-cCnc					SER	QN
G6PD WBC-cC			CCNC			
G6PD RBC-cC			CCNT			
G6PD Bld.Dot Q			ACNC	PT	BLD.DOT	ORD

substance or entity that is measured, evaluated, or observed, e.g. urea, sodium

system (context) or specimen type upon which the observation was made, e.g. blood, urine

characteristics of what is measured measured, evaluated, or observed, e.g. mass, number, length, volume

scale of measure, e.g. quantitative, ordinal, narrative, qualitative

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Drug

- Medication Terminology Table
- Co-production
  - Pharmaceutical companies
  - Department of Health
  - Hospital Authority
- Hong Kong Drug Compendium as basis
  - Hong Kong Registration Number
- Mapped to SNOMED CT

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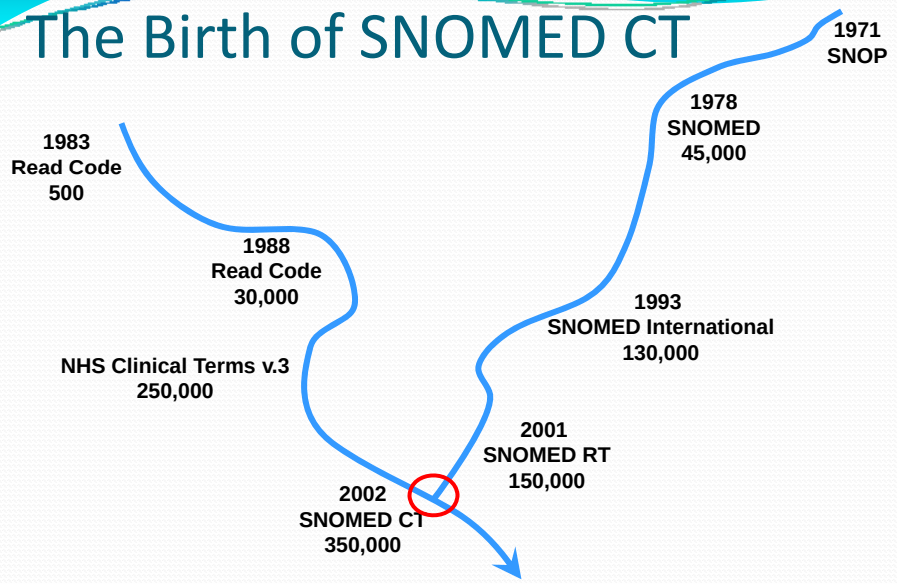
The Birth of SNOMED CT



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Standard Nomenclature of Medicine, Clinical Term

- Previously maintained by the College of American Pathologist
- Currently the largest single clinical terminology
- 19 hierarchies covering various aspects that would build an electronic health record
- One of the core terminologies to be used in US

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International Health Terminology Standards Development Organization

- May 2007
- 9 charter members
- CAP transferred the intellectual property of SNOMED CT to IHTSDO
- National Release Centers
  - Manage licensing and distribution of SNOMED CT
  - Manage and release local modifications, extensions and translations
  - Liaise with local stakeholders

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SNOMED CT Active Concepts – Jul 07

Subtype hierarchy		Count
clinical finding	35%	113618
procedure	17%	55199
body structure	10%	32725
organism	9%	30103
substance	8%	24578
pharmaceutical / biologic product	7%	22705
qualifier value		9279
event		8438
observable entity		7987

Subtype hierarchy	Count
social context	5234
situation with explicit context	4633
physical object	4558
staging and scales	1998
environment or geographical location	1746
linkage concept	1153
specimen	1086
special concept	490
record artifact	202
physical force	174

Total : 325,906

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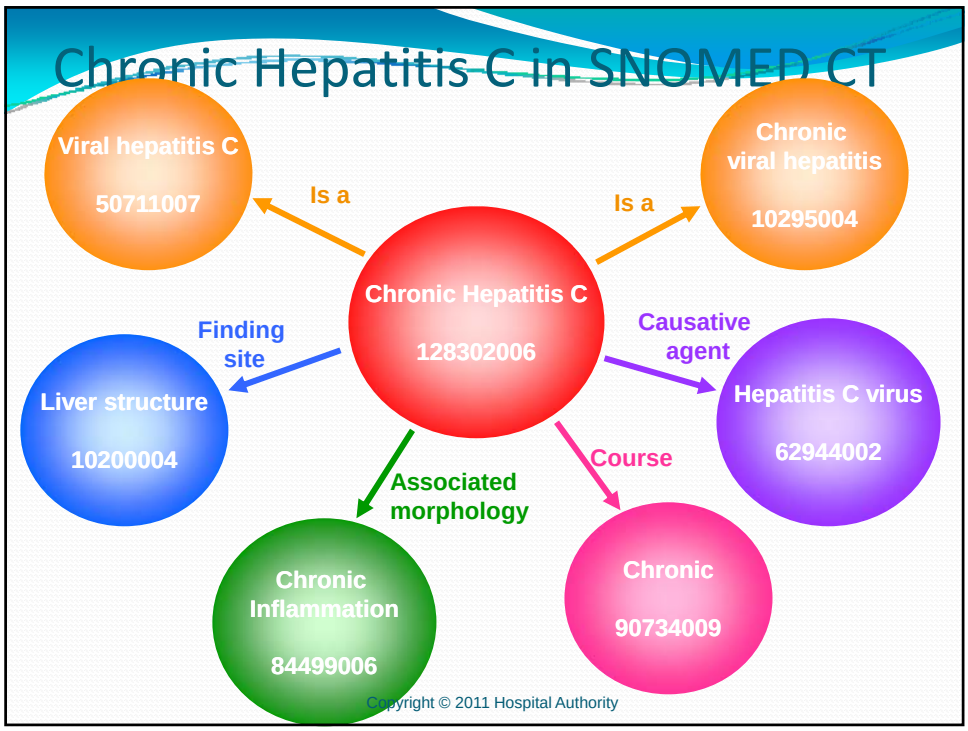
Chronic Hepatitis C in SNOMED CT
Viral hepatitis C
50711007
Is a
Chronic viral hepatitis
10295004
Is a
Chronic Hepatitis C
128302006
Finding site
Liver structure
10200004
Causative agent
Hepatitis C virus
62944002
Course
Chronic
90734009
Associated morphology
Chronic Inflammation
84499006
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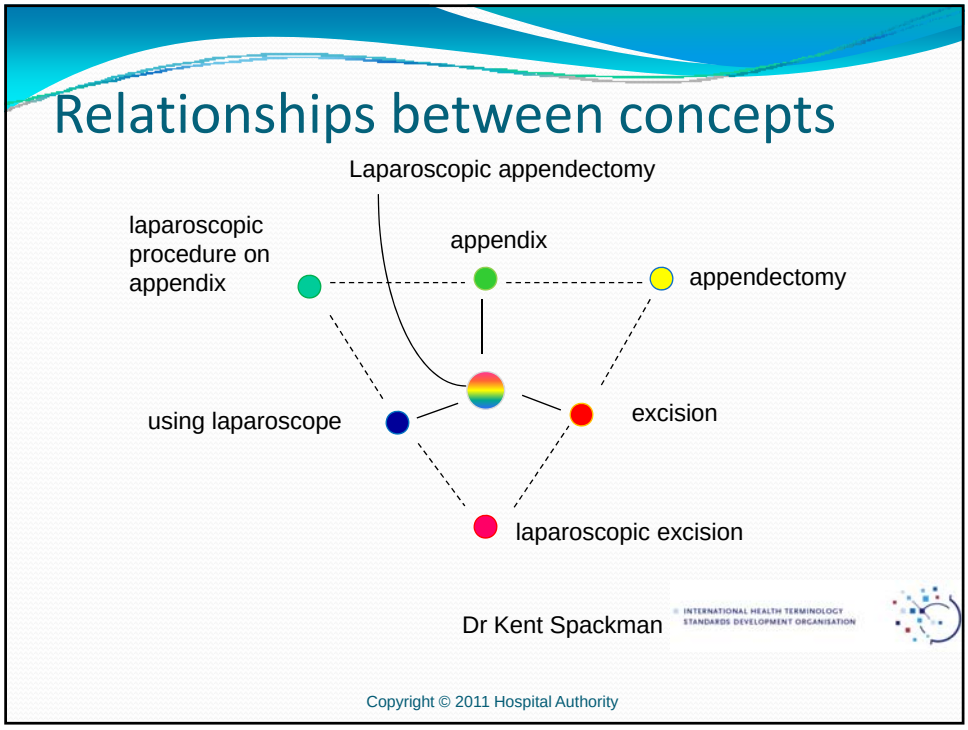
Relationships between concepts
Laparoscopic appendectomy
laparoscopic procedure on appendix
appendix
appendectomy
using laparoscope
excision
laparoscopic excision
Dr Kent Spackman
INTERNATIONAL HEALTH TERMINOLOGY STANDARDS DEVELOPMENT ORGANISATION
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Question and answer

LOINC	SNOMED CT
Question	**Answer**
Urine culture test	E. Coli
Breast Histology	Adenocarcinoma
Serum Sodium	137 milliequivalents / liter

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3 Common Terminologies

	ICPC2	ICD 10	SNOMED CT
Owner	WONCA	WHO	IHTSDO
Last version	1998	1992	Jan 2010
Update		Yearly	Half-yearly
Domains	Diagnosis, procedure	Diagnosis	19 (diagnosis, procedures, organism, drug, body structure, specimen…)
No. of level	1	3	Unlimited
Current terms	~ 1,400	~13,000	~ 311,000 Diagnosis (~80,000)
Expandability	2,600	260,000	unlimited
Remarks	• Single hierarchy • Terms with multiple concepts, e.g. U71 cystitis / other urinary infection	• Single hierarchy • Terms with multiple concepts • 'And' means 'and/or' • NEC	• Relationship based • Poly-hierarchy • Build new concepts from current ones

Viral Hepatitis in ICPC2

D63	Follow-up encounter unspecified
D64	Encounter/problem initiated by provider
D65	Encounter/problem initiated by other than patient/provider
D66	Referral to other provider/nurse/therapist/social worker
D67	Referral to physician/specialist/clinic/hospital
D68	Other referral NEC
D69	Other reason for encounter NEC
D70	GASTROINTESTINAL INFECTION
D71	MUMPS
D72	VIRAL HEPATITIS
D73	GASTROENTERITIS PRESUMED INFECTION
D74	MALIGNANT NEOPLASM STOMACH
D75	MALIGNANT NEOPLASM COLON/RECTUM
D76	MALIGNANT NEOPLASM PANCREAS
D77	MALIGNANT DIGESTIVE NEOPLASM OTHER/NOS
D78	NEOPLASM DIGESTIVE SYSTEM BENIGN/UNSPECIFIED

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Viral Hepatitis in ICD 10

World Health Organization

ICD
Version 2007

List of Chapters
Chapter Introduction
List of Blocks
Previous Block
Next Block

Search ICD-10
hepatitis viral
Full search
OK Help

Move to ICD code:
OK

B15-B19	Viral hepatitis
B15.0	Hepatitis A with hepatic coma
B15.9	Hepatitis A without hepatic coma
B16.0	Acute hepatitis B with delta-agent (coinfection) with hepatic coma
B16.1	Acute hepatitis B with delta-agent (coinfection) without hepatic coma
B16.2	Acute hepatitis B without delta-agent with hepatic coma
B16.9	Acute hepatitis B without delta-agent and without hepatic coma
B17	Other acute viral hepatitis
B17.1	Acute hepatitis C
B17.2	Acute hepatitis E
B17.8	Other specified acute viral hepatitis
B18	Chronic viral hepatitis
B18.0	Chronic viral hepatitis B with delta-agent
B18.1	Chronic viral hepatitis B without delta-agent
B18.2	Chronic viral hepatitis C
B18.8	Other chronic viral hepatitis
B18.9	Chronic viral hepatitis, unspecified
B19	Unspecified viral hepatitis
B19.0	Unspecified viral hepatitis hepatic with coma
B19.9	Unspecified viral hepatitis without hepatic coma

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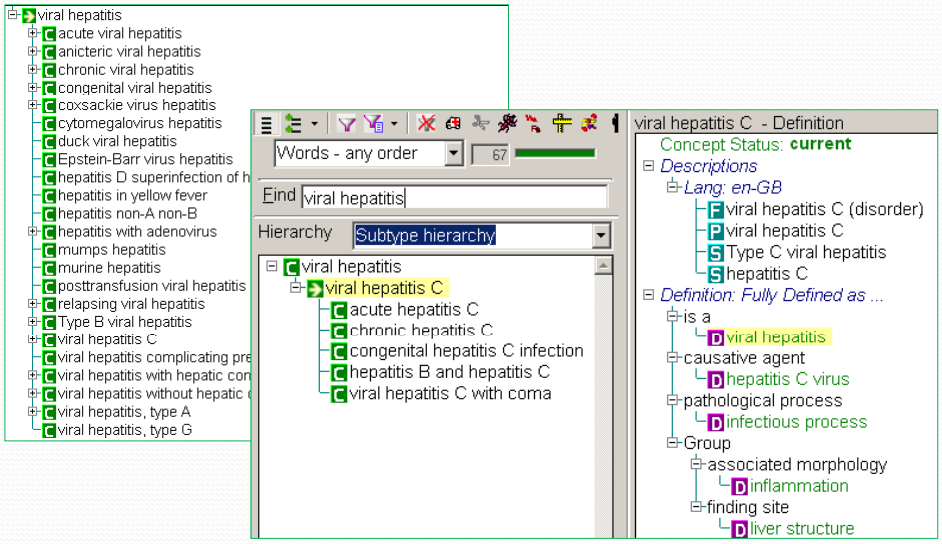
Viral Hepatitis in SNOMED CT



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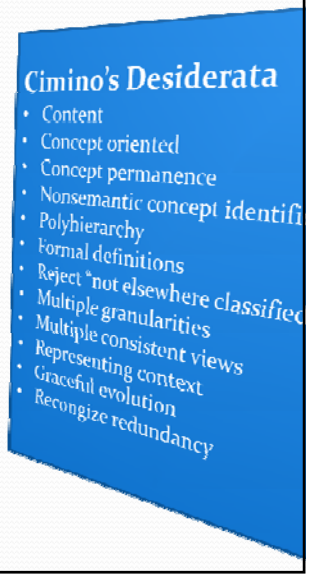
Making a Terminology to be Useful

- Terminology profession
- Cimino's desiderata
- Definition is important
- Editorial rules
- Maintain the terminology
  - Responsive
  - Terminology tool
- Reference terminology
  - License
  - Submission to standards body for formal inclusion in subsequent release



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Terminology in Applications

- Same application ≠ same terminology set
- Search
  - Wild card
  - Synonym
  - Subset
- Guidelines for concept display – user oriented
  - Exact match
  - Synonym
  - Classification list
  - Alphabetical order may not work
  - Most popular list
  - Some hints
  - What you see, what you get
- Mapping
  - Must be validated
  - Know the rules of reference terminology being mapped
- Administrative data can always be derived from clinical details

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Archetype

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OpenEHR

- 1999
- University College London and the Australian company Ocean Informatics
- Based on Good Electronic Health Record (GEHR)
- openEHR EHR Reference Model : EHR structure and content
- Archetype
  - formal models of clinically relevant EHR elements defining their data structure and terminological basis in a
  - form suitable for verifying
- Template
  - aggregations of archetypes for a particular situation
  - may be used to specify forms, documents or messages

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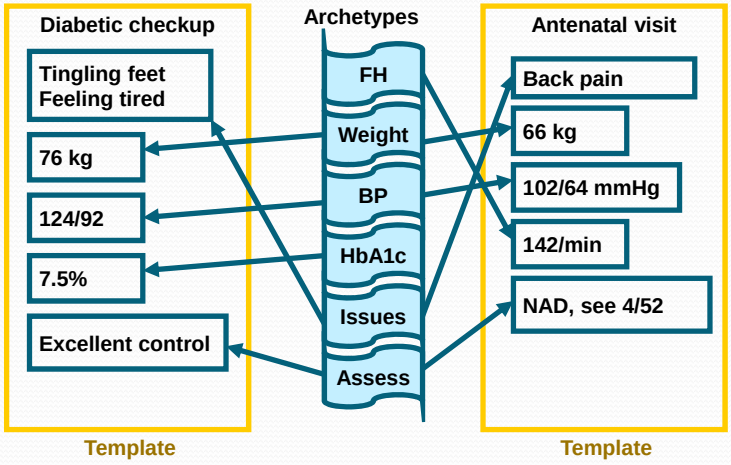
Archetypes and Templates



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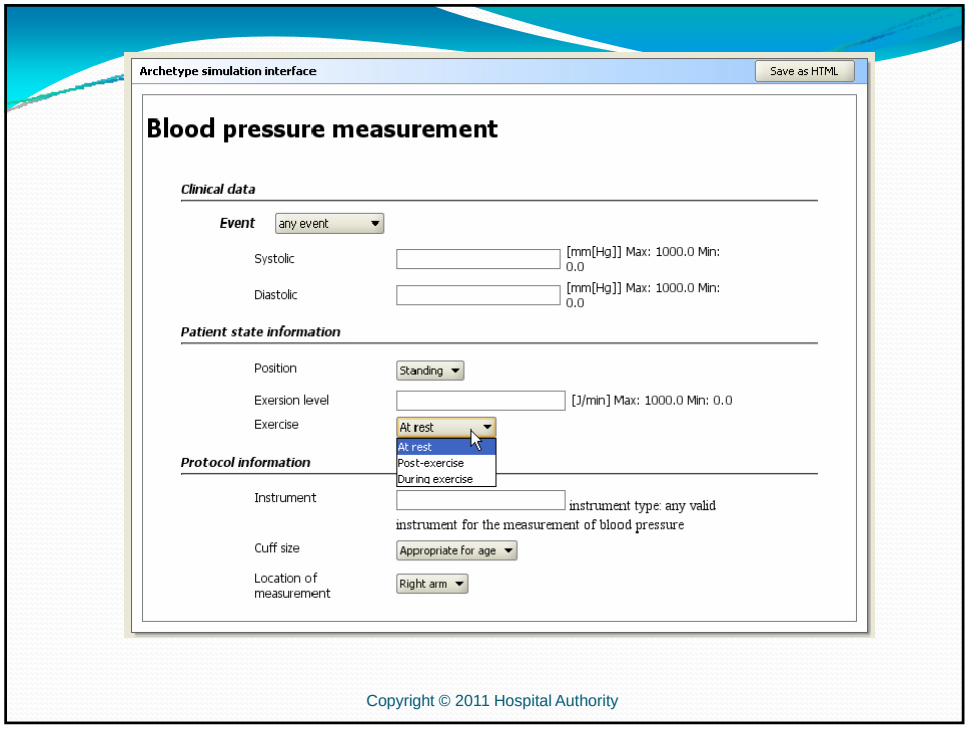
Archetype simulation interface
Save as HTML
Blood pressure measurement
Clinical data
Event
any event
Systolic
[mm[Hg]] Max: 1000.0 Min: 0.0
Diastolic
[mm[Hg]] Max: 1000.0 Min: 0.0
Patient state information
Position
Standing
Exersion level
[J/min] Max: 1000.0 Min: 0.0
Exercise
At rest
At rest
Post-exercise
During exercise
Protocol information
Instrument
instrument type: any valid instrument for the measurement of blood pressure
Cuff size
Appropriate for age
Location of measurement
Right arm
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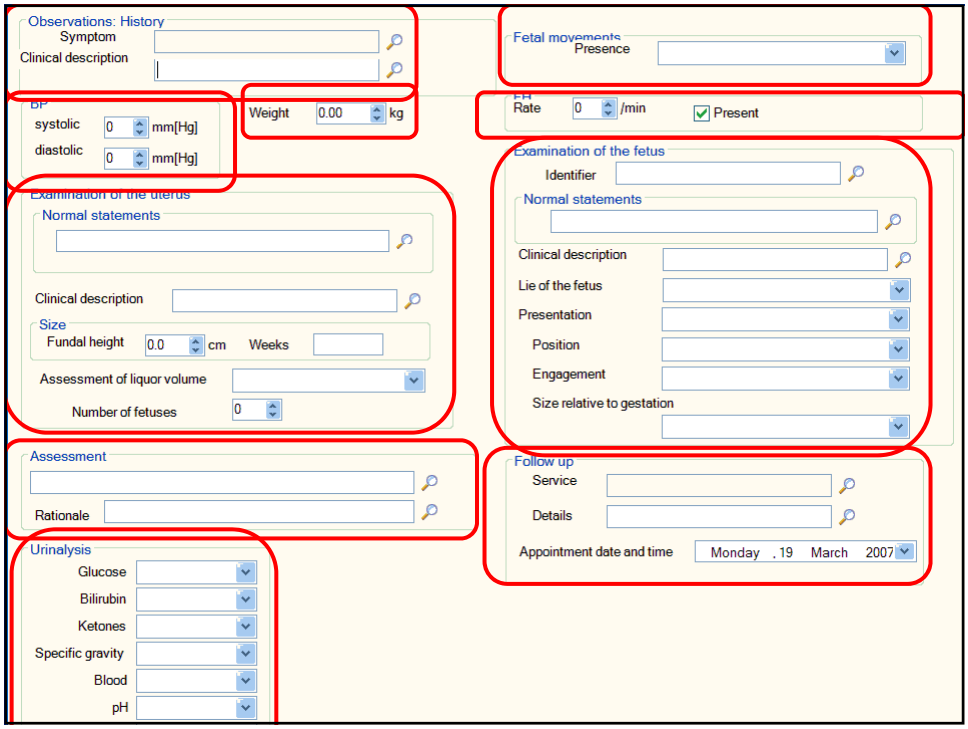
Observations: History
Symptom
Clinical description
BP
systolic
0
mm[Hg]
diastolic
0
mm[Hg]
Weight
0.00
kg
Examination of the uterus
Normal statements
Clinical description
Size
Fundal height
0.0
cm
Weeks
Assessment of liquor volume
Number of fetuses
0
Assessment
Rationale
Urinalysis
Glucose
Bilirubin
Ketones
Specific gravity
Blood
pH
Fetal movements
Presence
FH
Rate
0
/min
Present
Examination of the fetus
Identifier
Normal statements
Clinical description
Lie of the fetus
Presentation
Position
Engagement
Size relative to gestation
Follow up
Service
Details
Appointment date and time
Monday
19
March
2007

Continuity of Care Record

American Society for Testing & Materials

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Intended for

Need for

- Transportability
- Personal Health Record
- Cost containment

Transfer of core patient data

- To/from EHR to/from another EHR
- To/from an EHR to/from a PHR
- To/from EHR to/from hospital information system / departmental system

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History

- CCR Workgroup
- Origin : Massachusetts Department of Public Health
  - NCR Patient Care Referral Form
- Developed jointly by
  - ASTM International
  - Massachusetts Medical Society (MMS)
  - Health Information Management and Systems Society (HIMSS)
  - American Academy of Family Physician s (AAFP)
  - American Academy of Pedeatriccs Patient Care Referral Form
- Transfer of patients from inpatient setting to nursing / longterm care facilities
  - Minimum dataset
  - Basic patient information consisting of the most relevant and timely facts about a patient's condition
- Convert to XML

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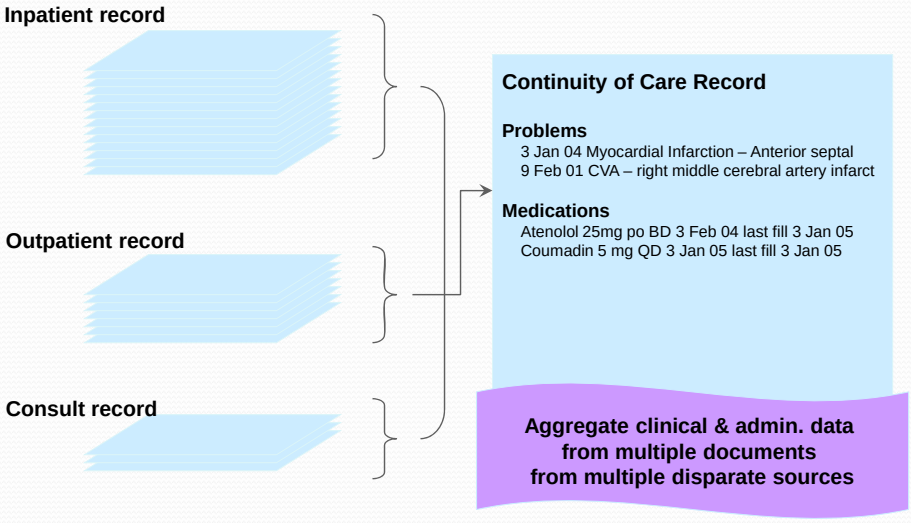
Concept of CCR



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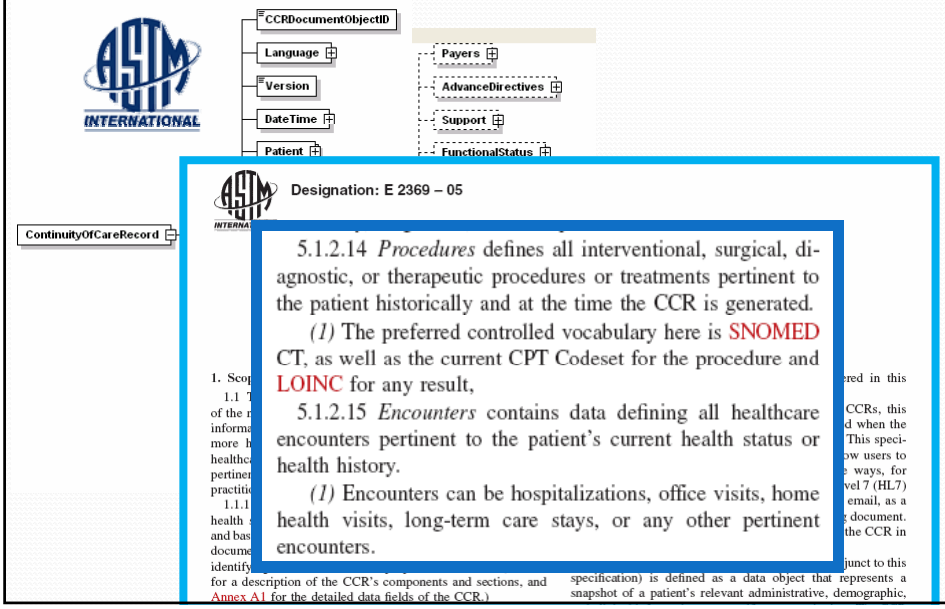
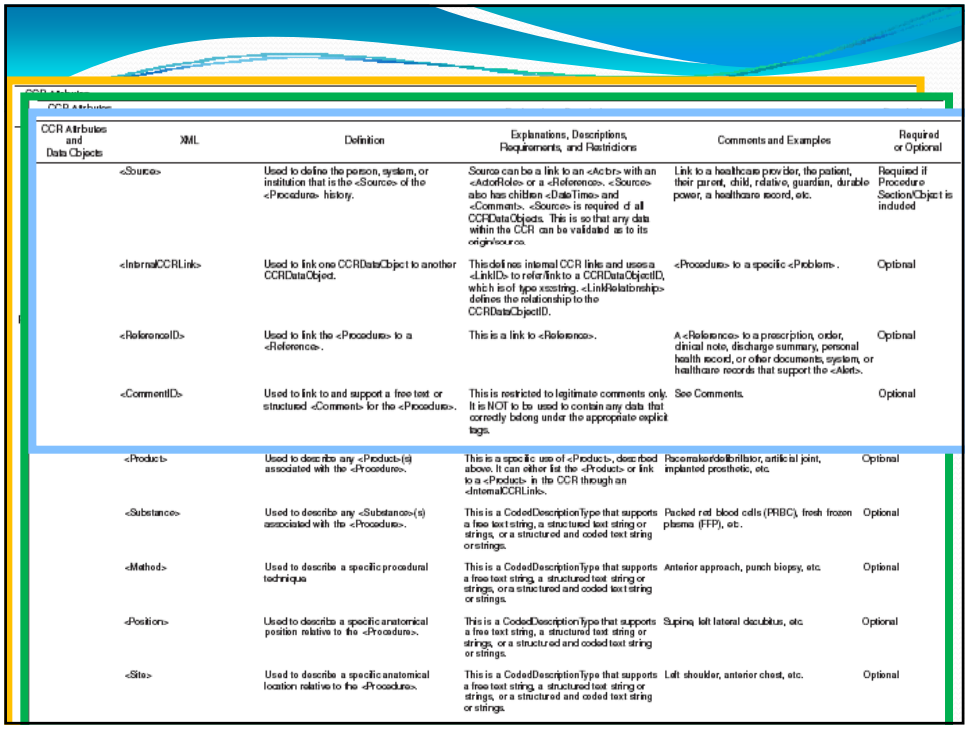
ASTM's CCR





CCR Attributes and Data Objects	XML	Definition	Explanations, Descriptions, Requirements, and Restrictions	Comments and Examples	Required or Optional
	<Source>	Used to define the person, system, or institution that is the <Source> of the <Procedure> history.	Source can be a link to an <Actor> with an <ActorRole> or a <Reference>. <Source> also has children <DateTime> and <Comment>. <Source> is required d all CCRDataObjects. This is so that any data within the CCR can be validated as to its origin/source.	Link to a healthcare provider, the patient, their parent, child, relative, guardian, durable power, a healthcare record, etc.	Required if Procedure Section/Object is included
	<InternalCCRLink>	Used to link one CCRDataObject to another CCRDataObject.	This defines internal CCR links and uses a <LinkID> to refer/link to a CCRDataObjectID, which is of type xsd:string. <LinkRelationship> defines the relationship to the CCRDataObjectID.	<Procedure> to a specific <Problem>.	Optional
	<ReferenceID>	Used to link the <Procedure> to a <Reference>.	This is a link to <Reference>.	A <Reference> to a prescription, order, clinical note, discharge summary, personal health record, or other documents, system, or healthcare records that support the <Alert>.	Optional
	<CommentID>	Used to link to and support a free text or structured <Comment> for the <Procedure>.	This is restricted to legitimate comments only. It is NOT to be used to contain any data that correctly belong under the appropriate explicit tags.	See Comments.	Optional
	<Product>	Used to describe any <Product>(s) associated with the <Procedure>.	This is a specific use of <Product>, described above. It can either list the <Product> or link to a <Product> in the CCR through an <InternalCCRLink>.	Pacemaker/defibrillator, artificial joint, implanted prosthetic, etc.	Optional
	<Substance>	Used to describe any <Substance>(s) associated with the <Procedure>.	This is a CodedDescriptionType that supports a free text string, a structured text string or strings, or a structured and coded text string or strings.	Packed red blood cells (PRBC), fresh frozen plasma (FFP), etc.	Optional
	<Method>	Used to describe a specific procedural technique.	This is a CodedDescriptionType that supports a free text string, a structured text string or strings, or a structured and coded text string or strings.	Anterior approach, punch biopsy, etc.	Optional
	<Position>	Used to describe a specific anatomical position relative to the <Procedure>.	This is a CodedDescriptionType that supports a free text string, a structured text string or strings, or a structured and coded text string or strings.	Supine, left lateral decubitus, etc.	Optional
	<Site>	Used to describe a specific anatomical location relative to the <Procedure>.	This is a CodedDescriptionType that supports a free text string, a structured text string or strings, or a structured and coded text string or strings.	Left shoulder, anterior chest, etc.	Optional

Data Interchange

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Message Standards

Define

- when a message is sent
- what the message contains
- the syntax of the message
- standardized data elements
  - with defined data types
- terminologies used, and
- acknowledgement rules

Markle Foundation, 2005

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HL7 HK

- Adoption
  - PAS data : HL7 v.2
  - Clinical data : CDA
- Localisation of HL7
- Training

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HL7 Messages Sample

```
MSH|^~\&|OBIS|CMC|EPR|HAHO|20021029133345||ORU^R01|5355|P|2.3.1|||ER|ER|HKG|ASCII|ENG

PID|||HKID:A1234563~PKey:111222||Chan^Tai Man||20021029|M|||1517, 15, A, ABC
   Centre^TM||^^^^^^99811234~^^^^^^91882345|||S

PV1|1|I|A10^ICU^12|||||||||||||||| HN02000006A|||||||||||||||||||||||||20021029132425

OBR|1|X89-1501^OE|78912^RD|9274-2^NEONATAL APGAR 5M POST
   BIRTH^LN|R|2002010291330|19873290800|||CS1A|N

OBX|1|ST|32411-1^NEONATAL APGAR.COLOR 5M POST BIRTH^LN||2||||F
OBX|2|ST|32412-9^NEONATAL APGAR.HEART RATE 5M POST BIRTH^LN||2||||F
OBX|3|ST|32413-7^NEONATAL APGAR.MUSCLE TONE 5M POST BIRTH^LN||2||||F
OBX|4|ST|32414-5^NEONATAL APGAR.REFLEX IRRITABILITY 5M POST BIRTH^LN||2||||F
OBX|5|ST|32415-2^NEONATAL APGAR.RESPIRATORY EFFORT 5M POST BIRTH^LN||2||||F
```

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Standardisation for HK eHR

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Standards Documents

http://www.ehealth.gov.hk/

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eHR Content Standards Guidebook

1. Background
2. Purposes of the Paper
3. Definition of Electronic Health Record
4. Framework in Building eHR
5. Structured Data & Free Text
6. Data Type
7. eHR Content
8. Level of Compliance
9. Implementation
10. References

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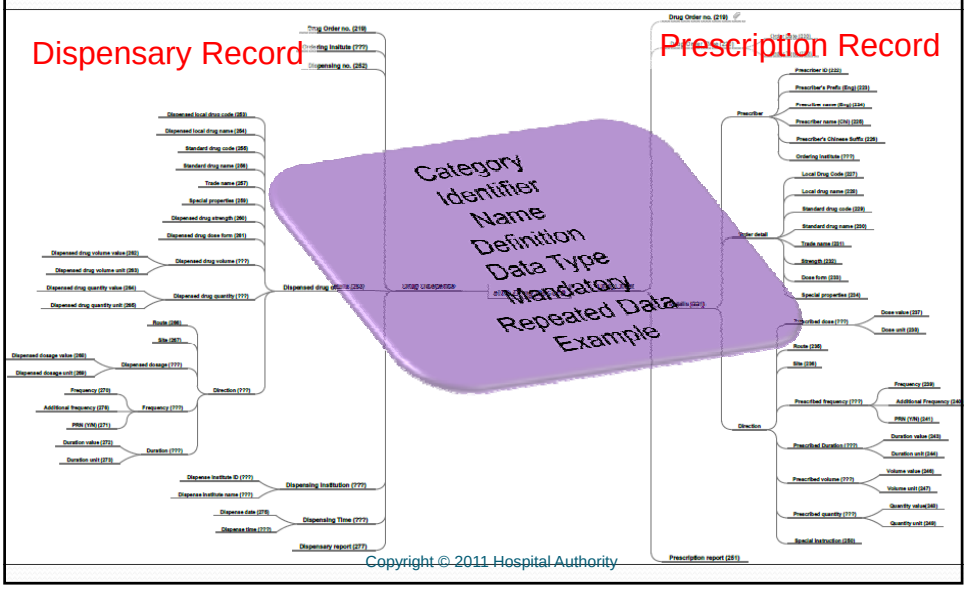
Content – Drug Record



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Appendix ii - eHR Codex

Appendix II Index:

1. Address code — Under Construction
2. Active Inactive
3. Admission / referral source
4. Alert certainty
5. Alert type
6. Allergy reaction
7. Antibiotic
8. Attendance indicator
9. Attendance type
10. Birth place
11. Body system
12. Diagnosis rank
13. Diagnosis status
14. Discharge type
15. Dispensing status — Under Construction

Alert Certainty

Purpose: to define the certainty of the alert

Souce: e-HR

Value	Description
S	Suspected
C	Certain

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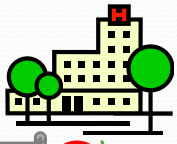
Diabetes Mellitus



Automated paper

1 Problem : diab. mellitus

3 Diagnosis

3983	Diabetes Mellitus

Fully Interoperable eHR

2 Diagnosis

DM

Data Integration

醫健通 ehealth

eHR Content Standards Guidebook

HKCTT (Diagnosis)	
3983	Diabetes Mellitus
3985	Type II Diabetes Mellitus
3987	Type I Diabetes Mellitus

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Recognised Terminologies for HK eHR

	Drug	Laboratory	Diagnosis	Other health data
Compendium of Registered Pharmaceutical Products (HK Drug Compendium)	Y			
Hong Kong Clinical Terminology Table (HKCTT)	Y	Y	Y	Y
International Classification of Diseases, 10th Revision (ICD 10)			Y	
International Classification for Primary Care (ICPC)			Y	
Logical Observations, Identifiers Names and Codes (LOINC)		Y		
Systematized Nomenclature of Medicine, Clinical Terms (SNOMED CT)	Y	Y	Y	Y

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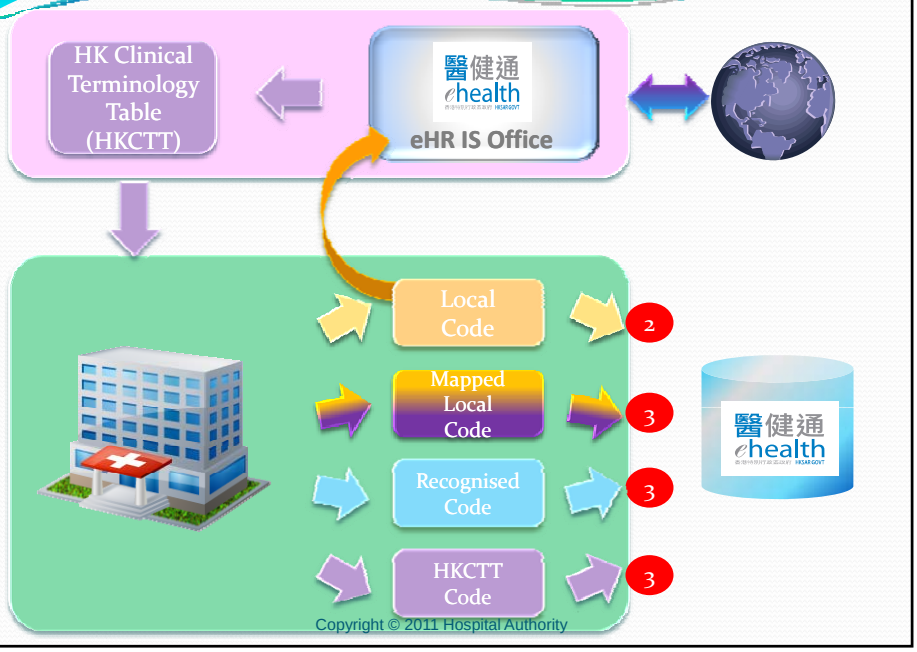
Adoption of Health Information Standard



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Type 1 Diabetes Mellitus in eHR

Date	Provider	Description	Code	System
3 Jan 2004	Hospital A	Insulin-dependent diabetes mellitus without complications	E10.9	ICD10
4 Feb 2001	Dr Chan	Diabetes mellitus type 1	46635009	SCT
3 Mar 1999	Hospital B	Type 1 diabetes mellitus	3987	HKCTT
5 May 2003	Hospital C	Pneumonia	8471	HKCTT
6 Dec 2002	Dr Wong	Pneumonia, unspecified	J18.8	ICD 10
9 Sep 2002	Dr Ho	Insulin-dependent diabetes mellitus	DM1	Ho's List

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Suggested Readings

- Cheung NT, Fung V, Kong JH. The Hong Kong Hospital Authority's information architecture. Medinfo. 2004; 11(Pt 2):1183-6
- Detmer D, 2006. Public Policy institute. Learning from Abroad: Lessons and Questions on Personal Health Records for National Policy.
- Markle Foundation. (2003). Connecting for Health : A Public-Private Collaborative The Data Standards Working Group Report
- Cimino JJ (1998). Desiderata for controlled medical vocabularies in the twenty-first century. Methods of Information in Medicine, 37(4-5):394-403.
- Cimino JJ, Clayton P, Hripcsak G, Johnson S. (1994). Knowledge-based approaches to the maintenance of a large controlled medical terminology. Journal of the American Medical Informatics Association, 1994;1:35-50.
- Dolin RH, Mattison JE, Cohn S, et al (2004). Kaiser Permanente's convergent medical terminology. Proceedings of MedInfo 2004, 346-350.
- Rector, AL (1999). Clinical terminology : why is it so hard? Methods of Information Medicine 1999; 38:239-52.

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