

Terminology Servers, Interworking Clinical Systems, and CorbaLEX

Alan Rector

The GALEN Organisation Ltd

IT Laboratories, Oxford Road
Manchester M13 9PL, UK

Tel +44-161-275-6133, FAX +44-161-275-6932

www.galen-organisation.com



Why Terminology Servers?

- Evidence that clinical information systems work is growing
 - 20 years since Clem McDonald's *Protocol-based computer reminders, the quality of care and the non-perfectability of man*
 - Use still limited
- But widespread use needs common terminology
 - Terminology is the 'glue' for Healthcare Systems
 - Key *software* and *architecture* for healthcare

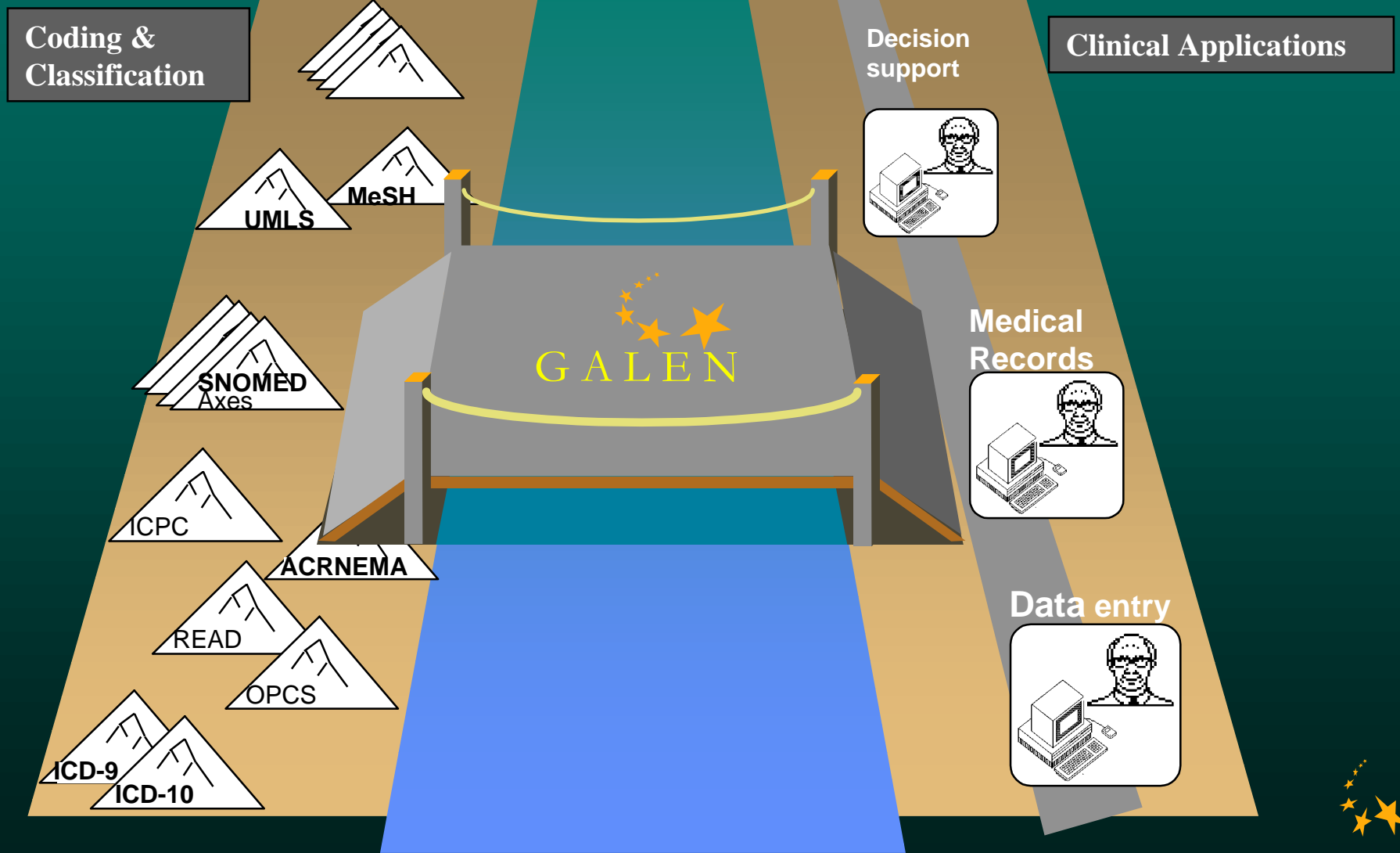


Why Terminology?

Terminology => Medical Records => Decision Support => Clinical Care

Highways between applications

Bridges from applications to classifications



International Terminology: *“Coherence without Uniformity”*

- Multilingual
 - Because medical care and knowledge are international
- Flexible
 - Because needs differ

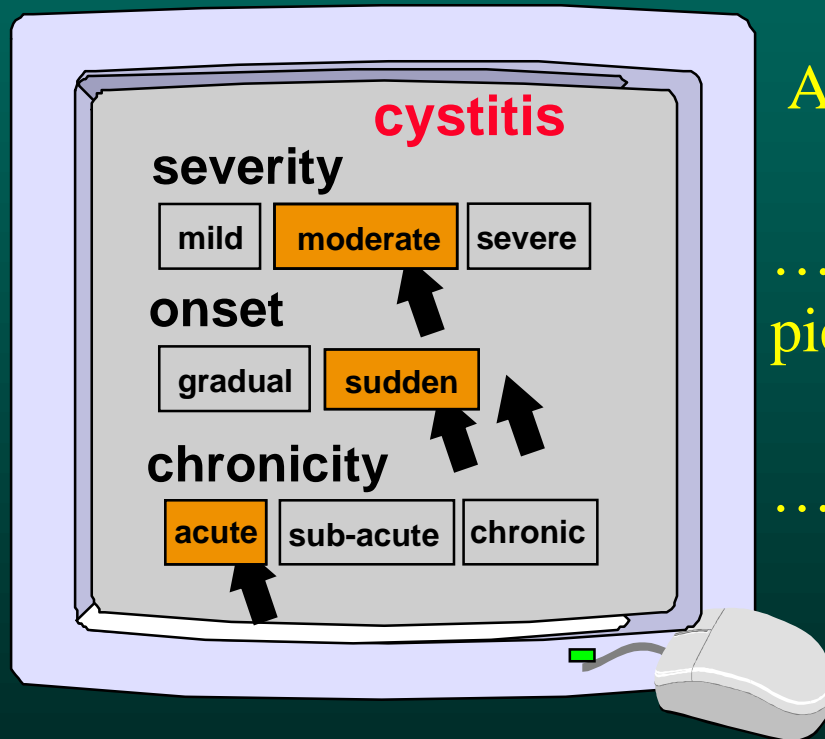


Uses of Terminology / Conceptual Models

- Re-use
- Integration
- User interface

- Authoring
- Indexing

From Selection to Description



Assemble a phrase...

...from a set of useful pieces...

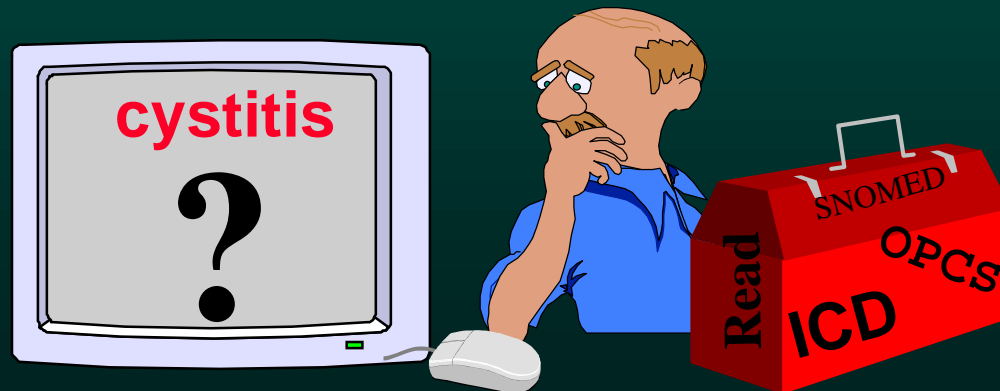
...displayed on the screen.

“moderately severe, acute cystitis of sudden onset”



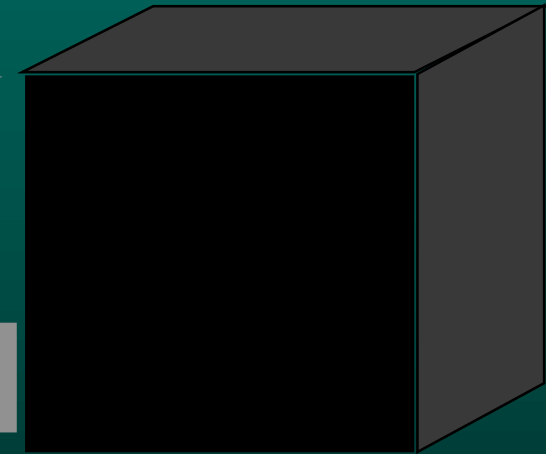
Only one problem:

- How can the computer know in advance what are the sensible pieces to display?
- Traditional coding schemes do not have the information required



A new kind of resource is required to answer new questions

What is it sensible to say
about cystitis?

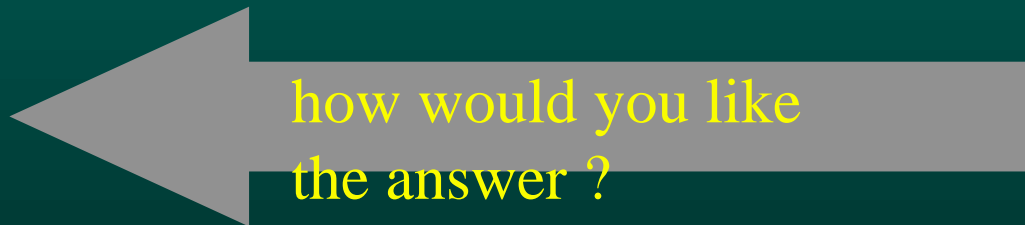
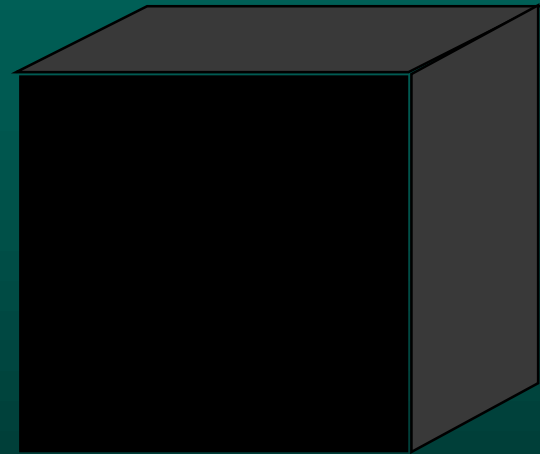


its severity can be described
(either mild, moderate or
severe)...

Questions which support clinical user interfaces ...

A new resource

What is cystitis combined
with 'acute and mild?



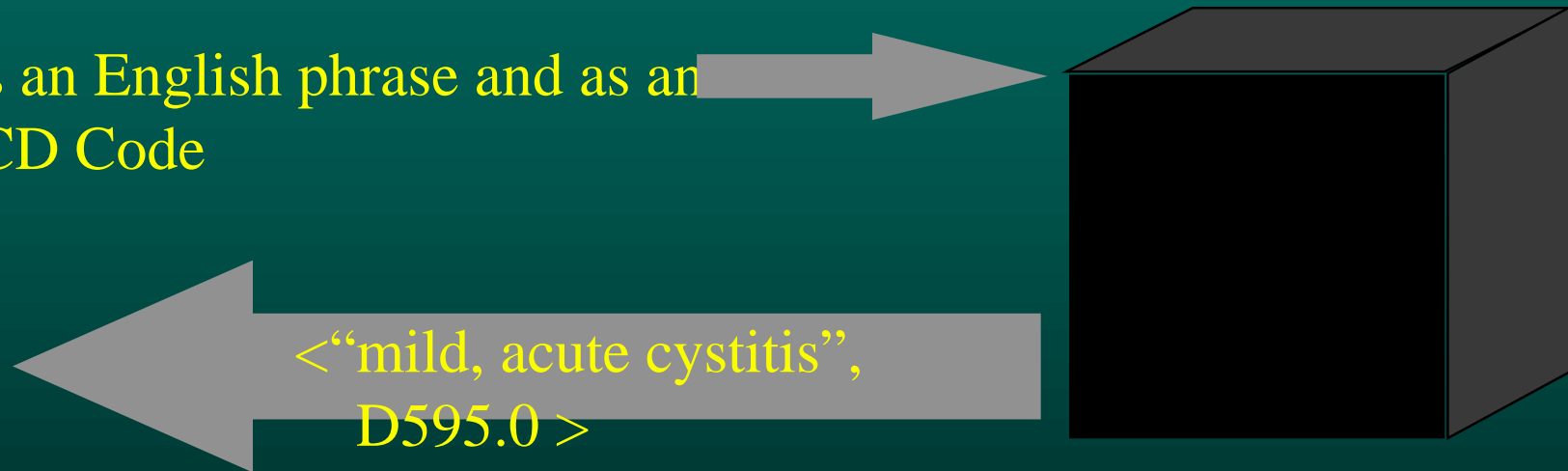
how would you like
the answer ?

**... a resource that can cope with arbitrarily complex
clinical concepts ...**

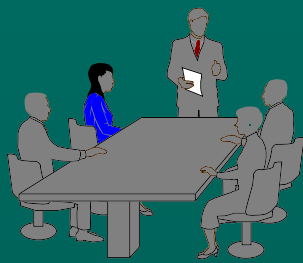


A new resource

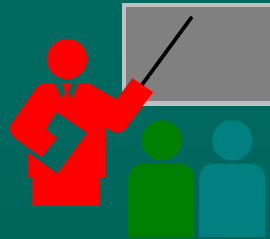
as an English phrase and as an
ICD Code



... and cope with different natural languages and coding schemes.



managers



educators



systems developers



specialist
clinicians



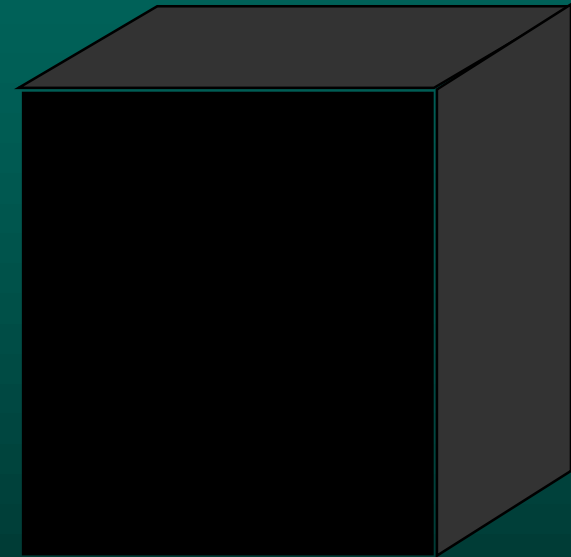
general
practitioners



Nurses,
health visitors...



researchers



**A re-usable resource for many applications
and users ...**



Terminologies are Changing

Rossi Mori

- First generation
 - Simple hierarchies
 - ICD, Read 1...
- Second generation
 - Enumerated compositional systems
 - Read 3.1, (Dicom/Snomed, new HL7, SNOMED...)
- Third Generation
 - Formal compositional systems
 - GALEN, Convergent Terms Project/SNOMED-RT

GALEN's 3rd Generation Approach

Compositional Systems as Conceptual Leggo

“Pathological fracture of the neck of the right femur caused by osteoporosis”

Fracture which

*<hasLocation-(AnatomicalNeck which
isDivisionOf-(Femur which
hasLaterality-right))*

hasCause-Osteoporosis>

Simplicity for Users from internal complexity

FRACTURE

Location **Femur** Tibia Humerus Wrist ...

Shaft **Neck** Gt Troch ...

left **right**

Cause trauma **Osteoporosis** ...

Challenges for CorbaLex

- To do enough ...
 - Cope with GALEN, SNOMED-RT, Read 3.1, ...
 - Support systems with sound logical foundations
- ...but not too much
 - Cope with existing systems
 - Don't demand logical consistency
 - Key Targets
 - HL7, SNOMED-Dicom-Microglossary, ICD9/10, CPT4, Read 2

Challenges for CorbaLEX

- Cope with the culture clash - vocabulary & semantics
 - O-O analysis, data-bases and programming
 - data-base semantics - implementation oriented
 - Concept analysis/description logics
 - set theoretic/model theoretic semantics - domain oriented
 - Traditional terminologists
 - linguistically oriented theories
- Avoid ill-explored territory

A clash of Vocabulary

Object Oriented Systems	Formal Terminological Systems
Relation	Role
Relationship	Role Instance
Concept	Concept or Type
Attribute	-
Single-valued relationship	Attribute
Role	-

A Clash of Semantics

Object Oriented Systems	Terminological Systems
Coarse grained	Fine grained
Subtyping by behaviour Aggregation Dependency	Subtyping by meaning Conceptual composition
Subtyping a relation	Subtyping an inference
Schema static	'Schema' dynamic

Terminological semantics related to

- Description logics
- Conceptual graphs
- Ontolingua/The Generic Frame Protocol

Or no semantics plus idiosyncracies

- ICD
- CPT
- SNOMED
- ...

Where is the CorbaLEX proposal?

- Enough to test
- Sample questions outstanding
 - Are 'value domains' handled sensibly
 - Are text strings sufficient for attribute values

Criteria for success short term

- Encapsulate a sensible test-portion of
 - First generation,
 - e.g. ICD,
 - Second generation,
 - e.g. SNOMED-Dicom, Read 3.1
 - Third generation,
 - e.g. GALEN, SNOMED-RT
- Demonstrate client applications

Criteria for success Long Term

- Re-use
 - A recognised growing library of common clinical information modules
 - *Stop starting from scratch!*
- Integration
 - 2+ independently developed DSSs *integrated with* 2+ independently developed EPRS *without* exponentially increasing effort.
- User interfaces
 - Real systems in real use with real patients by real clinicians

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