CODING & MODELS IN THE ‘REAL WORLD’

Dr Heather Leslie
Ocean Informatics/GeHCo
2009: “So I went into my patient portal, PatientSite, and clicked the button to do it <upload health data to Google Health>…

But WTF? An alarm: “! Requires immediate attention”

“Okay, yes, HCTz is my blood pressure medication. But low potassium? That was true when I was hospitalized two years ago, not now. What’s going on?”

Acidosis
Anxiety Disorder
Aortic Aneurysm
Arthroplasty - Hip, Total Replacement
Bone Disease
CANCER
Cancer Metastasis to Bone
Cardiac Impairment
CHEST MASS
Chronic Lung Disease
Depressed Mood
DEPRESSION
Diarrhea
Elevated Blood Pressure
Hair Follicle Inflammation w Abscess in Sweat Gland Areas
HEALTH MAINTENANCE
HYDRADENITIS
HYPERTENSION
Inflammation of the Large Intestine
Intestinal Parasitic Infection
Kidney Problems Causing a Decreased Amount of Urine to be Passed
Lightheaded
Low Amount of Calcium in the Blood
Low Amount of Potassium in the Blood
Malignant Neoplastic Disease
Migraine Headache
MIGRAINES
Nausea and Vomiting
Nephrosis
PSYCH
Rash
Spread of Cancer to Brain or Spinal Cord
Swollen Lymph Nodes

Date was four months after diagnosis

Correct date: triggered cancer diagnosis

No other line item had a date
ePDave’s Google Problem List

- Acidosis
- Anxiety Disorder
- Aortic Aneurysm
- Arthroplasty - Hip, Total Replacement
- Bone Disease
- CANCER
- Cancer Metastasis to Bone
- Cardiac Impairment
- CHEST MASS
- Chronic Lung Disease
- Depressed Mood
- DEPRESSION
- Diarrhea
- Elevated Blood Pressure
- Hair Follicle Inflammation w Abscess in Sweat Gland Areas
- HEALTH MAINTENANCE
- HYDRADENITIS
- HYPERTENSION

- ‘Diagnosis’ made while vomiting during chemotherapy
- ‘Optical migraine’. Never had headache

- Inflammation of the Large Intestine
- Intestinal Parasitic Infection
- Kidney Problems Causing a Decreased Amount of Urine to be Passed
- Lightheaded
- Low Amount of Calcium in the Blood
- Low Amount of Potassium in the Blood
- Malignant Neoplastic Disease
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- Spread of Cancer to Brain or Spinal Cord
- Swollen Lymph Nodes
- Vagel Duplication?
- What is this?

Temporary sign?

Vague

Duplication? Symptom/Diagnosis?

Temporary symptom?

Persisting diagnosis? Related to Vomiting?
“the system transmitted insurance billing codes to Google Health, not doctors’ diagnoses”

“basically if a doc needs to bill insurance for something and the list of billing codes doesn’t happen to include exactly what your condition is, they cram it into something else so the stupid system will accept it.

(And, btw, everyone in the business is apparently accustomed to the system being stupid, so it’s no surprise that nobody can tell whether things are making any sense: nobody counts on the data to be meaningful in the first place.)”
“We are analog beings trapped in a digital world… We are compliant, flexible, tolerant.

Yet we have constructed a world of machines that requires us to be rigid, fixed, intolerant.”

Donald Norman
Terminologies vs Information Models

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Archetypes

Reference Model
(RM)
Templates
Templates
Terminology requires context

- 44054006|Diabetes mellitus type 2
- But what does it really mean?

- Diagnosis of?
- Risk of?
- Family History of?
- No Past History of?
Diagnosis of Diabetes

44054006|Diabetes mellitus type

Problem/Diagnosis

Description

Severity

Date of Onset

| Problem/Diagnosis
| Identifier: index problem, issue or diagnosis.
| Description
| A narrative description of the issue, problem or diagnosis.
| Severity
| The assessed overall severity of the index problem.
| Date of Onset
| The date/time when the problem was first identified by the individual.
| Age at Onset
| The age of the individual when the problem was first identified by the individual.
| Body Site
| The body site affected.
| Body Site Details
| Details of the body site concerned.

Include:
openEHR-EHR-CLUSTER.anatomical_location.v1 and specialisations
Family History of Diabetes

44054006|Diabetes mellitus type

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No known History of Diabetes

44054006|Diabetes mellitus type
A universal code system for tests, measurements, and observations.

How do you say glucose?

More than 35,000 people in 163 countries use LOINC to make bridges across their islands of health data.

It's free, but invaluable.
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Procedure

“Left hip replacement” =
52734007|total replacement of hip|:
272741003|laterality|=7771000|left|
Detailed Procedure example

Reference model:
- ACTION class
- Subject of Record

"Left hip replacement" =
243796009|situation with explicit context|:
{363589002|associated procedure|=(397956004|prosthetic arthroplasty of the hip|:
363699004|direct device|=304120007|total hip replacement prosthesis|:
363704007|procedure site|=(24136001|hip joint structure|:
272741003|laterality|=7771000|left|),
260686004|method|=257867005|insertion - action|),
408730004|procedure context|={385658003|done|,}
408732007|subject relationship context|={410604004|subject of record|}
Quality clinical data requires:

Information models
(Archetypes/Templates)

+ Terminology
Clinical Modelling Tools

- Archetype Editor
- Template Designer

- CENTERMS CKM