Recording Associated Disorders
Using SNOMED CT

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What it has to do with the theme of the conference:

User Centered Networked Health Care
Patient Centered Health Care

- **Patient history**
  - Chronic condition: Type II diabetes mellitus
  - Complication: neuropathic arthropathy
Physician Centered Health Care
Physician Centered Health Care

- **Patient** history
  - Chronic condition: Type II diabetes mellitus
  - Complication: neuropathic arthropathy

- **Diabetologist**
  - Type II diabetes mellitus with neuropathic arthropathy

- **Neurologist**
  - diabetic neuropathic arthropathy

- **Rheumatologist**
  - arthropathy associated with a neurological disorder
4 views on one situation

- Not a problem per se
- But …

How to deal with this in “User Centered Networked Health Care”?
Consistency of Views

任何形式这些发现的组合都可以发生
P. Type II diabetes mellitus + neuropathic arthropathy
D. Type II diabetes mellitus with neuropathic arthropathy
N. Diabetic neuropathic arthropathy
R. Arthropathy associated with a neurological disorder
Inconsistency of inference

SNOMED CT enables inference

- Type II diabetes mellitus + neuropathic arthropathy
  = \textit{Diabetes mellitus type 2} + \textit{Arthropathy}

- Type II diabetes mellitus with neuropathic arthropathy
  = \textit{Diabetes mellitus type 2}

- Diabetic neuropathic arthropathy
  = \textit{Arthropathy} + \textit{Diabetic complication}

- Arthropathy associated with a neurological disorder
  = \textit{Arthropathy}
Diabetic neuropathic arthropathy
Problem

- 1 situation; 4 views
- 4 inferences
- None of these explicitly captures presence of “neurological disorder”
  - Only “neuropathic” or “associated with a neurological disorder”
Magnitude of the problem

Lexical

Disorder concepts described by means of ‘associated with’, ‘due to’ and/or ‘after’

Logical

Disorder concepts formally defined with associated with, due to, and/or after relations to disorders.

Some 27% overlap

2,804  780  2,981
What should be inferred

- The patient has **diabetes mellitus type II**
- The patient has **arthropathy**
- The patient has **disorder of nervous system**
Challenge: finding solutions

1. Leave it to reasoning process
   - E.g., if patient P has Disease $D_1$, and $D_1$ associated with Disease $D_2$, then P has $D_2$

2. Store concept references and their interrelations

3. Store instance references and their interrelations

- diabetes mellitus type II
- arthropathy
- disorder of nervous system
## Solutions

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<td><strong>Reasoner</strong></td>
<td>Simple modeling</td>
<td>Complex retrieval and inference</td>
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<tr>
<td><strong>Concepts</strong></td>
<td>Simpler retrieval and inference</td>
<td>Need to tackle terminology binding</td>
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<tr>
<td><strong>Instances</strong></td>
<td>Simplest retrieval and inference</td>
<td>Need to tackle terminology binding + referent tracking</td>
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Disorders which are associated to other disorders **cannot be consistently recorded** with different “views”

This poses a **problem** for retrieval/inference

It can be **solved** by **explicit recording of constituting concepts or instances**

This requires **terminology binding** (and **referent tracking**)

**Conclusion**