

# Ontology-based Biomedical Data Capture

Saturday July 21<sup>st</sup>, 8:30-17:30

Room B1

# Summary – the dark side

- In practice, serious coding problems occur
  - **Ontology** issues
  - **User interface** issues
  - **User** issues
- This is not restricted to clinical ontology
- There is no evidence how to realize ontology-based data capture

**Road Traffic Accident (RTA):**  
60% coded as  
**Renal Tubular Acidosis (RTA)**

# Summary – the brighter side

- Design Guidelines for Coding of Clinical Data were developed for Canada Health Infoway
  - 56 guidelines in 5 categories
- (Clinical) Context should be made explicit to prevent miscoding
  - Information model, terminology & user interface
- Modern (mobile) usability paradigms should drive entry and validation of data
  - Progressive matching (Google search)
- More emphasis on practical use in ICBO2013 ?!

# VDOSME 2012 Workshop

(Vaccine and Drug Ontology in the Study of Mechanism and Effect)

## Chairs:

- **Yongqun “Oliver” He**, University of Michigan, Ann Arbor, MI, USA
- **Luca Toldo**, Merck KGaA, Darmstadt, Germany
- **Gully Burns**, Information Sciences Institute, Marina del Rey, CA, USA
- **Cui Tao**, Mayo Clinic, Rochester, MN, USA
- **Darrell R. Abernethy**, U.S. FDA, Bethesda, MD, USA.

## PC Members

- **Olivier Bodenreider**, National Library of Medicine
- **Richard Boyce**, University of Pittsburgh
- **Lindsay Cowell**, University of TX Southwestern Medical Center
- **Dingcheng Li**, Mayo Clinic
- **Asiyah Yu Lin**, University of Michigan
- **Bjoen Peters**, La Jolla Institute for Allergy and Immunology
- **Sira Sarntivijai**, University of Michigan/US FDA
- **Nigam Shah**, Stanford University
- **Sunghwan Sohn**, Mayo Clinic
- **Larisa Soldatova**, Aberystwyth University
- **Stephen Wu**, Mayo Clinic
- **Yuji Zhang**, Mayo Clinic
- **Jim Zheng**, Medical University of South Carolina
- **Qian Zhu**, Mayo Clinic

<http://kr-med.org/icbofois2012/vdosme>

9:10 – 9:50 am

#### **Session 1: Ontology modeling and analysis**

Chair: Gully Burns

- Yu Lin and Yongqun He.  
Ontology representation and analysis of vaccine formulation and administration and their effects on vaccine immune responses (25 min)
- Drashti Dave and Gully Burns.  
A lightweight Ontology Design Pattern to curate and represent experimental variables from vaccine protection studies (15 min)

9:50 – 10:40 am

#### **Session 2: Ontology-based knowledge extraction from big data case reports or literature**

Chair: Luca Toldo

- Harsha Gurulingappa, Abdul-Mateen Rajput, Luca Toldo.  
Extraction of Adverse Drug Effects from Medical Case Reports (25 min)
- Junguk Hur, Arzucan Özgür, Zuoshuang Xiang and Yongqun He.  
Identification of fever and vaccine-associated gene interaction networks using ontology-based literature mining (25 min)

11:10 am – 12:00 noon

#### **Session 3: Ontology-based semantic web applications**

Chair: Oliver He

- Qian Zhu, Guoqian Jiang and Christopher Chute.  
Profiling structured product labeling using NDF-RT and RxNorm (25 min)
- Charalampos Doulaverakis, George Nikolaidis, Athanasios Kleontas and Yiannis Kompatsiaris.  
GalenOWL: Ontology based drug recommendations discovery (25 min)

1:30 – 2:05 pm

#### **Session 4: General Discussion #1**

Moderator: Luca Toldo

Topic: Relation between drug and vaccine ontology informatics (35 min)

- Similarities and differences between drug and vaccine informatics
- Collaborations between drug and vaccine ontology informatics fields
- Collaborations between academia and industry

2:05 – 2:30 pm

#### **Session 5: Teleconference Presentation by a presenter from USA**

Chair: Oliver He

- Cui Tao, Yongqun He, Gregory Poland and Christopher Chute.  
Time modeling of vaccine adverse events in VAERS for temporal analysis (25 min)

2:30 – 3:30 pm

#### **Session 6: General Discussion #2**

Moderators: Melanie Courtot and Oliver He

Topic: Updates on development of adverse event-related ontologies (60 min)

- Melanie: Updates on the development of the Adverse Event Reporting Ontology (AERO) and related ontologies (short talk: 10-15 min)
- Oliver: Updates on the development of the Ontology of Adverse Events (OAE) and its applications (short talk: 10-15 min)
- Further discussion

4:00 – 4:45 pm

#### **Session 7: General Discussion #3**

Moderator: Gully Burns

Topic: Challenges and opportunities (45 min)

- Current achievements and challenges
- International community collaborations
- Have another workshop next year?
- Other open issues for discussion

4:45 pm **Workshop ends**

# Summary and Discussion

- **Ontology representation of vaccine and drug effects and mechanisms**
  - Positive effects and **negative effects (= adverse events)**
  - Different ways to represent adverse events (AERO, OAE, TEO for time events)
- **Many ontology applications in vaccine and drug areas**
  - Semantic web applications using vaccine and drug ontologies
    - e.g., RxNorm/NDF-RT for drug labeling and integration, drug recommendation
  - Text mining approaches incorporating ontology elements
  - Use of both SWRL and DROOLS for building reasoning engines
  - Ontology Design Patterns and tools to assist OBI capture of experimental design
- **Challenges and Future Plan:**
  - Vaccines and Adverse Events provide an important active research area.
  - Need to develop killer use cases
  - Especially relevant to ‘pharmacovigilance’ community (Luca)
  - Need to arrange follow-up meetings, esp. to incorporate domain experts (domain scientists / governmental agencies, industry players).
    - Focus on specific collaborative projects and follow-up meeting next year.

ICBO Workshop:  
Towards an Ontology of  
Mental Functioning

Janna Hastings

Gwen Frishkoff

Barry Smith

~20 participants

Hearty discussion on all aspects of  
ontology for mental functioning

Integrating Neuroscience, Biomedicine  
and Psychiatry with Ontology



## Action points:

Bidirectional community interaction

Don't leave existing resources behind in

new developments

Infrastructural/technological

improvements

Keep discussing!