INFECTIOUS DISEASE ONTOLOGY

OBO Foundry Session, July 28, 2011
International Conference on Biomedical Ontology
Buffalo, New York
IDO SCOPE

• Cover the entire infectious disease domain

  • entities in the chain of infection (host, pathogen, vector, reservoir)

  • biological scale (molecule, cell, organism, population)

  • example terms: fomite, focal infection, long-term non-progressor, herd immunity, antiseptic
IDO AND OBO FOUNDRY ONTOLOGIES

IDO-Core

IDO-Asp
IDO-Sa
IDO-Bac
IDO-TB
IDO-Sch
IDO-Par
IDO-Flav
IDO-Cry
IDO-Virus
IDO-Flu
IDO-Mal

CL
GO BP
OGMS
OBI

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OPEN

• “open and available to be used by all without any constraint”

• http://infectiousdiseaseontology.org/page/Main_Page

• http://code.google.com/p/infectious-disease-ontology/

• NCBO BioPortal

• OBO Foundry
FORMAT

- “common formal language in an accepted concrete format”
- IDO is available in OBO format and OWL2-RDF/XML
URIs

• “Each class and relation (property) in the ontology must have a unique URI identifier.”

• URI from source ontology for imported terms and relations

•IDO terms:
  • base URI: http://purl.obolibrary.org/obo
  • unique prefix: ‘IDO’
  • local unique identifier
VERSIONING

• “procedures for identifying distinct successive versions”

• dated PURLs
  • http://purl.obolibrary.org/obo/ido/2010-12-02/ido.owl
DELINEATED CONTENT

- “a clearly specified and clearly delineated content”
- infectious disease domain
  - example terms: fomite, focal infection, long-term nonprogresor, herd immunity, antiseptic
- import terms from OBO Foundry ontologies
  - GO, OBI, OGMS
TEXTUAL DEFINITIONS

• “textual definitions [...] for a substantial and representative fraction [of terms], plus equivalent formal definitions (for at least a substantial number of terms)”

• All IDO terms have a textual definition
• 36% of IDO terms have necessary and sufficient conditions
• 28% of IDO terms have necessary conditions
• 36% of IDO terms have neither
RELATIONS

- is_a
- has_part
- has_disposition
- has_role
- capable_of
- has_material_basis_in
- has_output
- inheres_in
- located_in
- location_of

- part_of
- participates_in
- realized_by
- realizes
- negatively_regulates
- positively_regulates
- results_in
- results_in_formation_of
- unfolds_in


USERS

- Staphylococcus aureus
  - Vance Fowler - Duke University Medical Center
- Brucellosis
  - Oliver He - University of Michigan
- Salmonella
  - Ina Hulsegge - Animal Breeding and Genomics Centre
- Influenza
  - Richard Scheuermann, Burke Squires - UT Southwestern Medical Center
  - Melanie Courtot - BC Cancer Research Center
  - Lynn Schriml - University of Maryland
  - Joanne Luciano - Rensselaer Polytechnic Institute
- HIV
  - Stanley Schwartz, Alex Diehl - University at Buffalo
- Vector-borne diseases (Malaria)
  - Kitsos Louis, Pantelis Topalis - IMBB
- Eukaryotic pathogens
  - Chris Stoeckert - University of Pennsylvania
- Sepsis Use Case in Vital Signs Ontology
  - Albert Goldfain - Blue Highway
- APOLLO SV
  - Bill Hogan - University of Arkansas

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COLLABORATION

• IDO 2007 - Cold Spring Harbor Laboratory, New York
  • Burroughs Wellcome Fund

• IDO 2008 - University at Buffalo, New York
  • Burroughs Wellcome Fund

• IDO 2010 - Baltimore, Maryland
  • NCBO Dissemination Event

• IDO 2012 - TBD
LOCUS OF AUTHORITY

• issue tracker:
  • http://code.google.com/p/infectious-disease-ontology/

• discussion list:
  • http://groups.google.com/group/ido-discuss?pli=1
NAMING CONVENTION

• Formal name

• Editor preferred name

• “use explicit and concise names”, univocity, singular nominal form, avoid conjunctions
MAINTENANCE

• “maintenance in light of scientific advance”
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SCOPE OF IDO-CORE

- pathogenicity
- virulence
- resistance
- antimicrobial
- sterilizing immunity
- antiseptic
- fomite
- vector
- reservoir
- chain of infection
- infectious organism
- treatment and prevention
- infectious disease
- population with infected hosts
- epidemic
- endemic
- zoonotic
- chronic
- focal
- infected host
- infection
- incidence
- seroprevalence
- herd immunity
- carrier
- long-term nonprogressor
- symptomatic
- sterilizing immunity
- antimicrobial
- antiseptic
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IDO CORE-EXTENSION APPROACH

IDO-Asp  IDO-Sa
IDO-Fun  IDO-Bac
IDO-Cry  IDO-Mtb
IDO-Flav  IDO-Sch
IDO-Virus  IDO-Par
IDO-Flu  IDO-Mal

IDO-Core

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PURPOSE OF IDO-CORE

• Provide terms relevant to infectious diseases generally (e.g. infection, host, pathogen, vector)

• Ensure interoperability between IDO extensions
  • terminological consistency (term names and meanings)
  • definition templates
  • consistent approach to classification
  • consistent approach to asserting relations

• Allows parallel development by domain experts
  • prevent common mistakes
  • ensure utility for computational applications