Drivers for the development of an *animal health surveillance ontology*

Crawford Revie

Fernanda Dórea
Ann Lindberg

Karl Hammar
Eva Blomqvist

Flavie Vial

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An ontology defines a common vocabulary for users who need to share information within a domain.

It includes machine-interpretable definitions of basic concepts in the domain and relations among them.

VeNom (Veterinary Nomeclature)

- Different dimensions of knowledge contained in the data

'Squamous cell carcinoma - clitoral'
'Squamous cell carcinoma - conjunctival'
'Squamous cell carcinoma - corneal'
'Squamous cell carcinoma - gastric (stomach)'
'Squamous cell carcinoma - penis/prepuce'
'Squamous cell carcinoma - oesophageal'
'Squamous cell carcinoma - nasal sinus'
'Squamous cell carcinoma - perineal'
'Squamous cell carcinoma - third eyelid/nictitating membrane'
'Squamous cell carcinoma - urethral'
'Squamous cell carcinoma - urinary bladder'

MeSH Terms

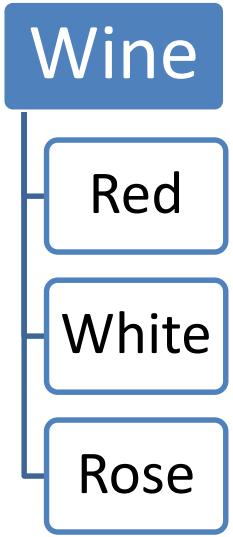
- Different dimensions of knowledge contained in the data

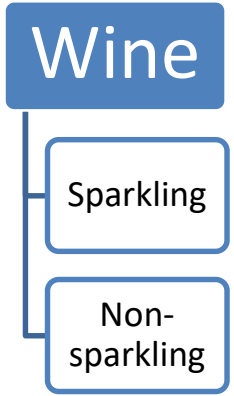
Wounds and Injuries [C26]
Fractures, Bone [C26.404]
Femoral Fractures [C26.404.061]
Hip Fractures [C26.404.061.425]
Femoral Neck Fractures [C26.404.061.425.500]

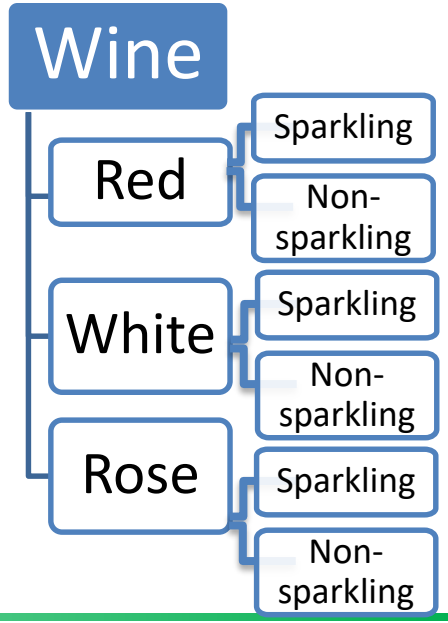
Wounds and Injuries [C26]
Hip Injuries [C26.531]
Hip Fractures [C26.531.750]
Femoral Neck Fractures [C26.531.750.500]

Wounds and Injuries [C26]
Leg Injuries [C26.558]
Femoral Fractures [C26.558.276]
Hip Fractures [C26.558.276.425]
Femoral Neck Fractures [C26.558.276.425.500]

- Different dimensions of knowledge contained in the data



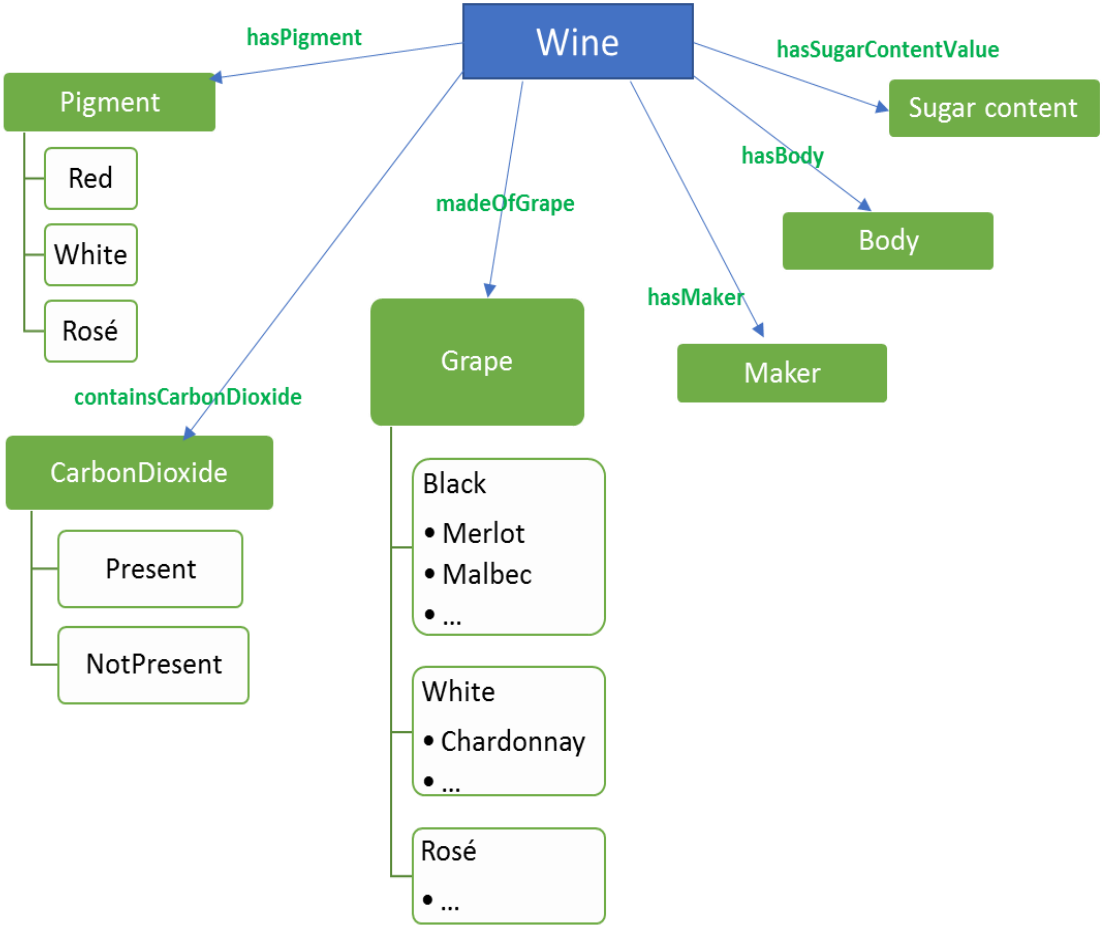




Ontologies

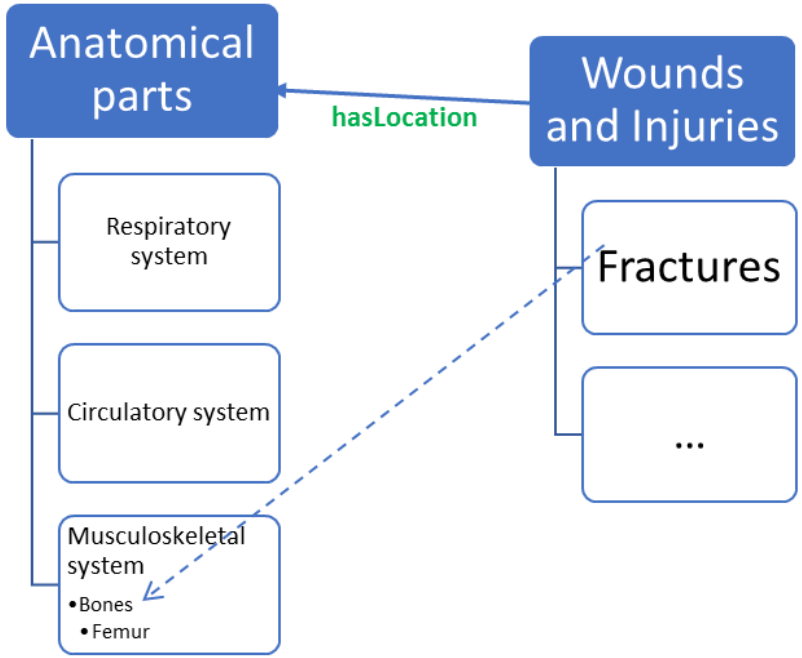
- Data model

- Classes
- Properties
- Instances



Why use ontologies?

To share common understanding of the structure of information among people or software agents

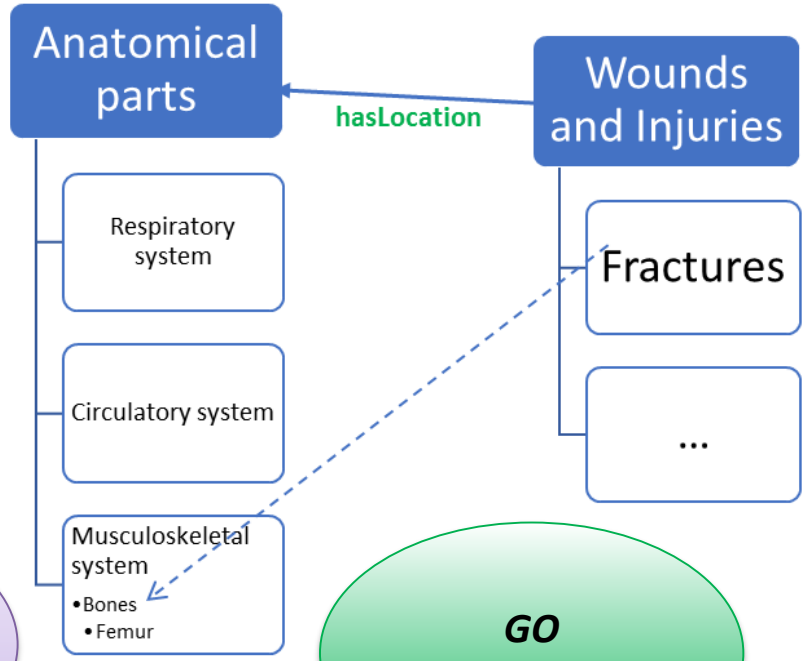


To enable reuse of domain knowledge

Uberon multi-species anatomy ontology

Anatomical Entity Ontology

Foundational Model of Anatomy



GO Gene Ontology

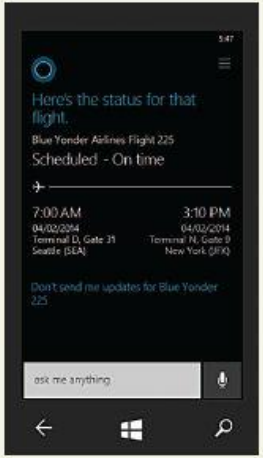
Ontology for General Medical Science

Symptom Ontology

Clinical Measurement Ontology

Animal Health Surveillance Ontology

To re-use domain independent knowledge

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    "name": "Estella Gallagher"
  },
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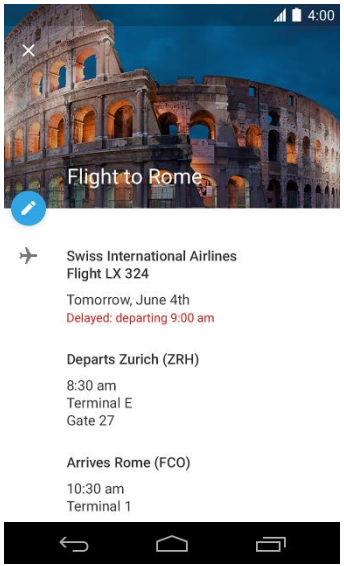
  }
}
```

Person
Organization
Place
CreativeWork
Intangible
Action
MedicalEntity
Event



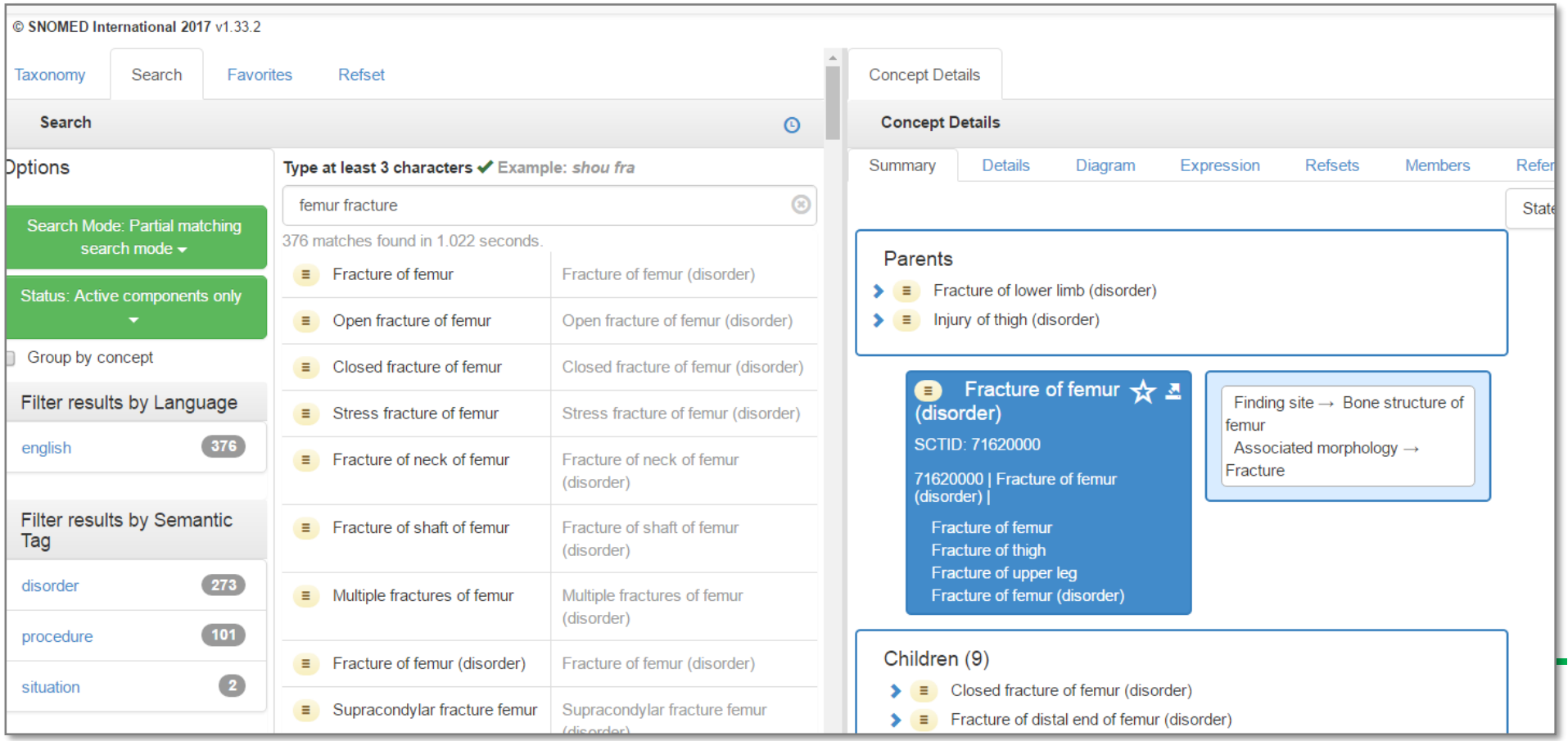
Geonames ('GIS') Ontology

FOAF ('people') Ontology

SKOS ('Thesuaral' structure) Ontology

Animal Health Surveillance Ontology

To make domain assumptions explicit



To support research and knowledge discovery from data

Fracture of the femur

Osteochondroma of femur

All injuries of the femur?

All injuries of the LEG?

Ontologies applied to *data-driven surveillance*

Desired functions

- Convert health data into information in real-time
- Use medical knowledge to infer surveillance relevant information from data collected for other purposes
- Provide a *permenant* source of term mappings that are open and can be shared/expanded by community (***IRI***)

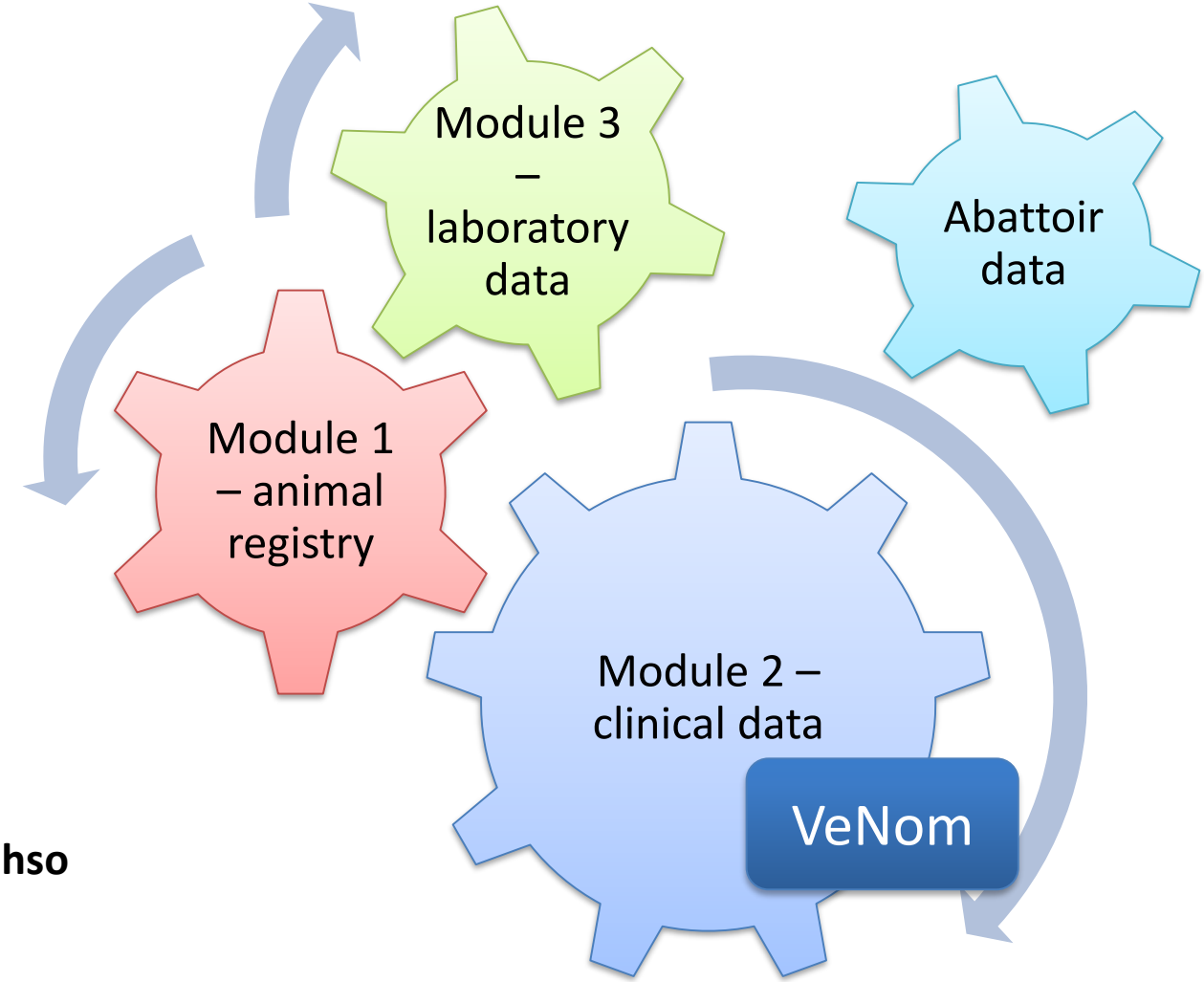
Inherent challenges to overcome

- Distributed data (not likely to be shared)
- Data non-coded or coded using different standards
- Solutions must work prospectively and retrospectively

Sustainability of solutions

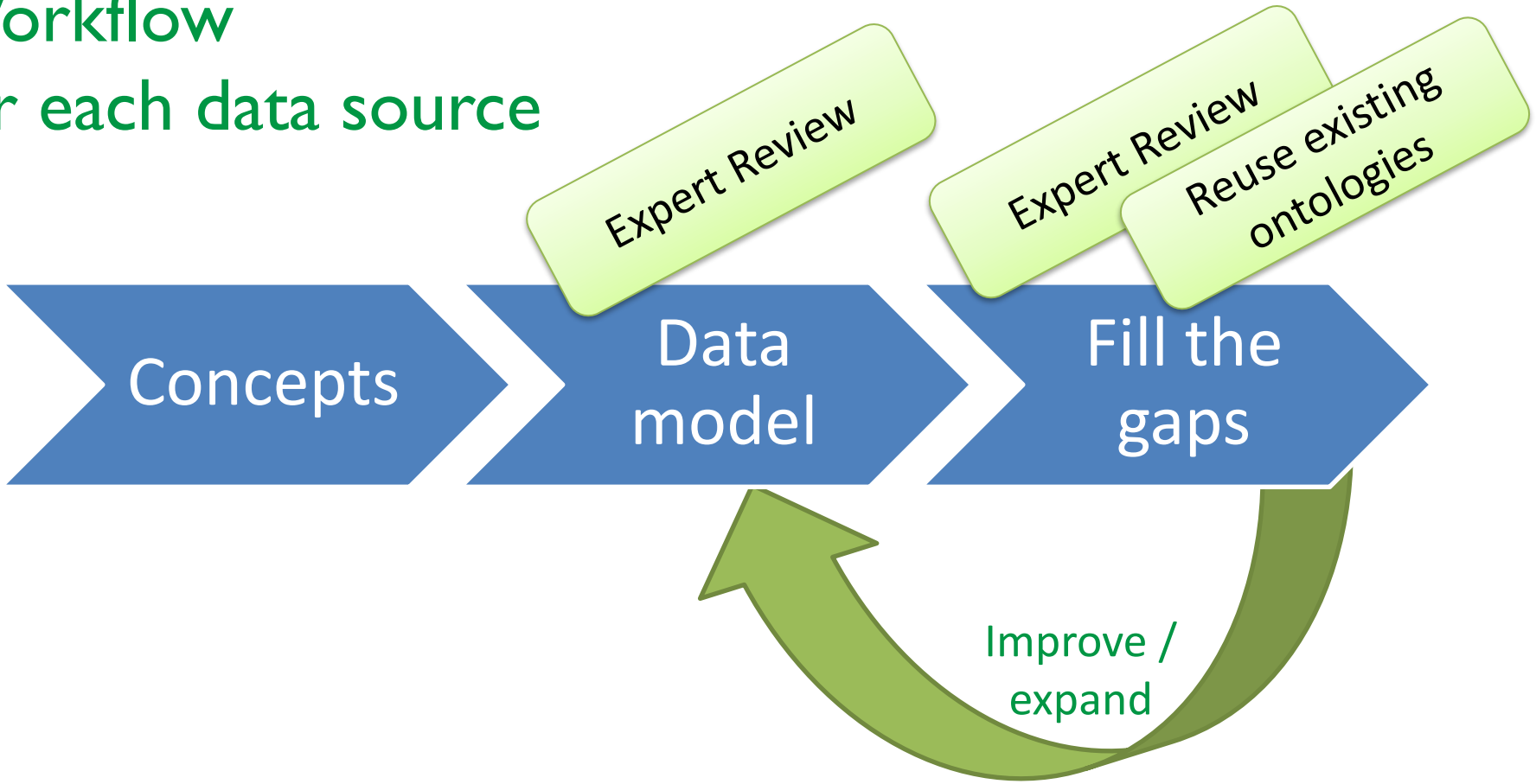
- Maintenance
- Reviews and updates
- Scalability
- Transparency
- Interoperability

Animal Health Surveillance Ontology



https://w3id.org/ahso

Workflow
for each data source



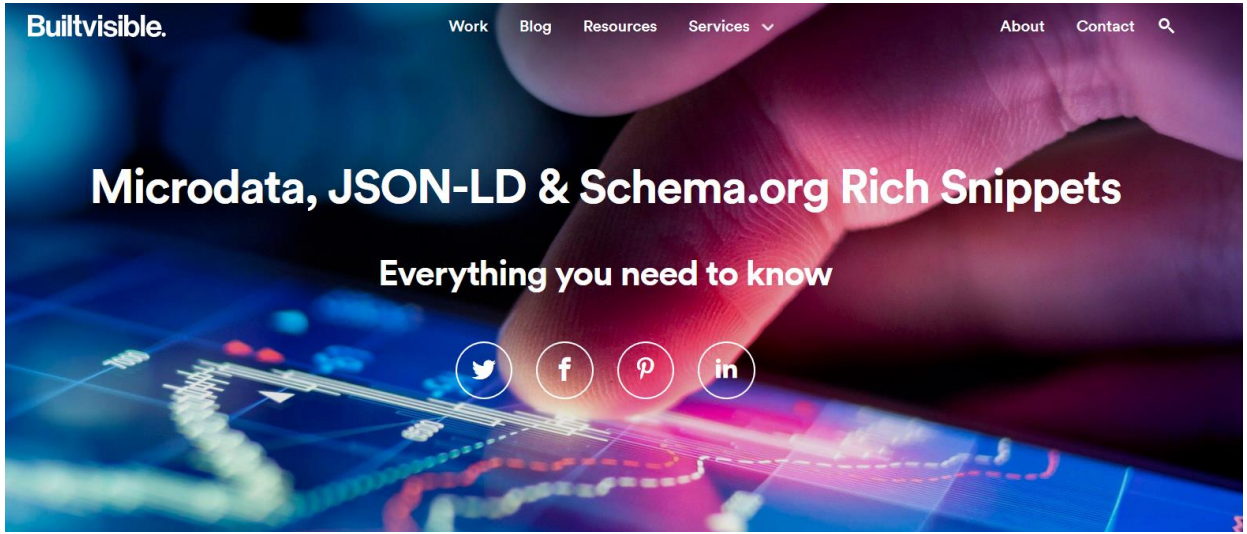
Community involvement

- Workgroups for each module/data type
- Review outputs and submit issues

- Google forum
- Github
- Home page
- Open edit book

datadrivensurveillance.org/ahso

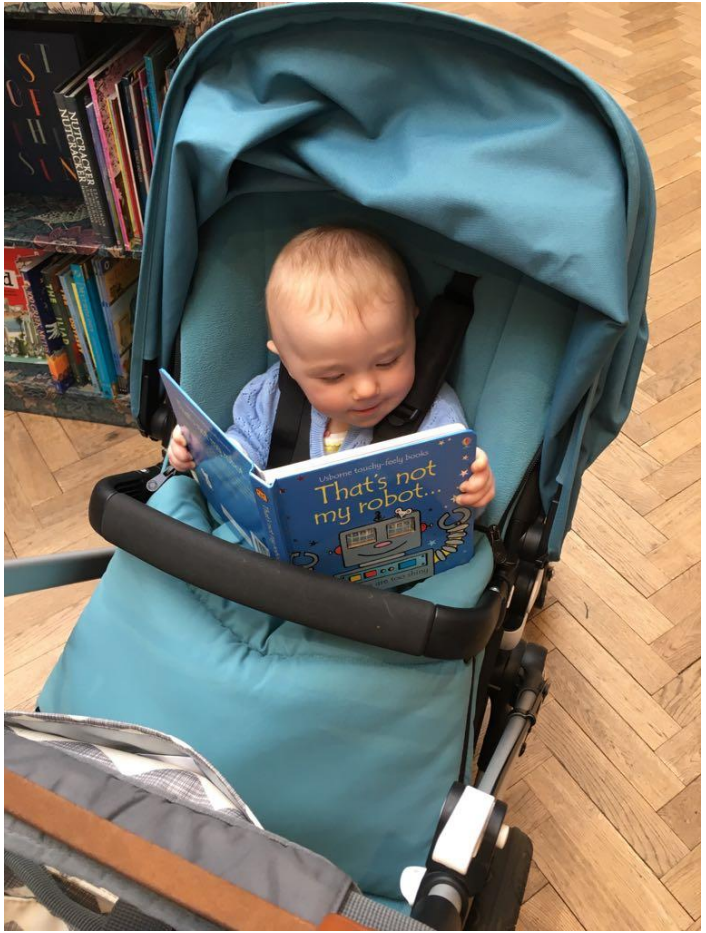
Challenge to ‘big data’ epi teams



- microdata
- JSON-LD

- schema.org

- RDF
- OWL



Just when you thought it was safe to be a quantitative epidemologist

Animal Health Surveillance Ontology

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