

Developing an ontology centred on the PICO model to support the linkage of Cochrane evidence to promote its usability and discoverability

Cochrane has vastly rich content and data store locked away in data silos and static presentation formats.

No existing ontology matched our requirements therefore the decision was made to construct a custom ontology, specifically designed for the Cochrane domain, to support the open production, publication, dissemination and usability of Cochrane data and content.

The Cochrane Linked Data Project focused on the adoption of linked data technologies to support the creation, dissemination and retrieval of Cochrane content. Opening up the content and data. An ontology is one such technology.

Methodology:

- Existing vocabularies used as the basis for the initial import of terms to support standardisation and interoperability.
- Initial terms were merged and extended by the addition of Cochrane specific terms.
- Preference of terms weighted towards the language of Cochrane.
- Hierarchies created between the terms within the PICO framework.

An ontology defines a common vocabulary within a domain, a formal description of concepts, their properties and the relations among them. This provides a shared common understanding of a domain.

The PICO (Population, Intervention, Comparison, Outcome) Model was chosen as the conceptual structure for the Cochrane Ontology owing to the intrinsic nature of the content.

Outcome categories: Collaboration between Cochrane and Care Outcomes Measures in Effectiveness Trials (COMET) to produce the Core Outcomes Set.

Source vocabularies:

- SNOMED CT
- RxNorm
- MeSH
- MedDRA
- WHO ATC

Implementation

First phase:

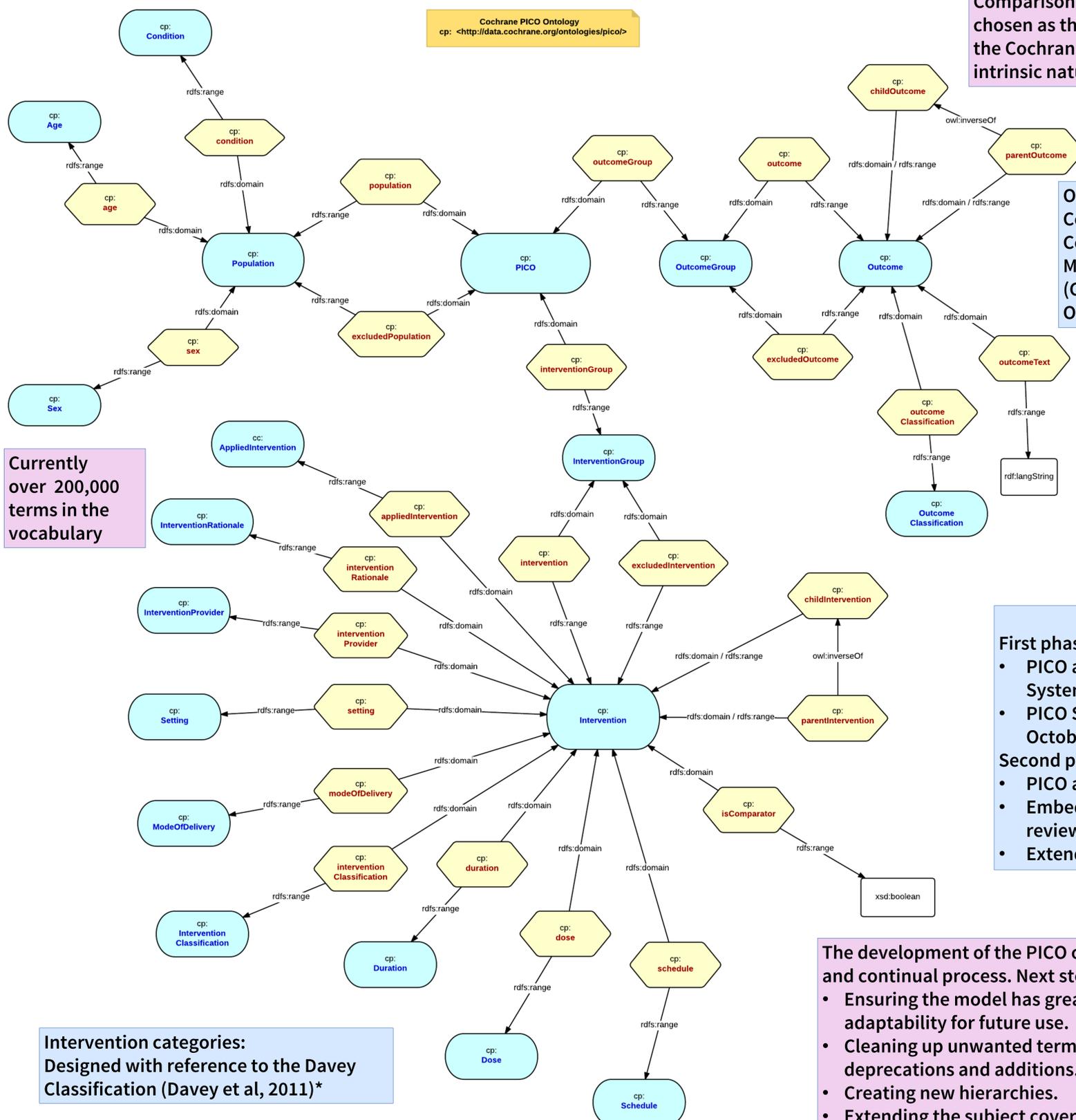
- PICO annotation of Cochrane Systematic Reviews
- PICO Search (BETA release in October 2019)

Second phase:

- PICO annotation of studies
- Embed within the Cochrane review authoring process
- Extend to other content types

The development of the PICO ontology is an iterative and continual process. Next steps include:

- Ensuring the model has greater flexibility and adaptability for future use.
- Cleaning up unwanted terms through merges, deprecations and additions.
- Creating new hierarchies.
- Extending the subject coverage for new domains e.g. Public Health



Currently over 200,000 terms in the vocabulary

Intervention categories: Designed with reference to the Davey Classification (Davey et al, 2011)*

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*Davey J, Turner RM, Clarke MJ and Higgins JPT Characteristics of meta-analyses and their component studies in the Cochrane Database of Systematic Reviews: a cross-sectional, descriptive analysis *BMC Medical Research Methodology* 2011;11:160 <https://doi.org/10.1186/1471-2288-11-160>