

Construction of a Pragmatic Ontology in Medicine: Application to Real World Clinical Practice and Drug Development, Michael N. Liebman, PhD, Managing Director, IPQ Analytics, LLC (USA); Sabrina Molinaro, PhD, Head, Epidemiology and Health Research, Institute for Clinical Physiology, National Research Council of Italy

We have developed a disease-agnostic ontology that focused on pragmatic questions in medicine and drug development rather than being fully atomistic in this domain. In addition, we have implemented this as a web-based platform that can analyze a heterogeneous corpus of documents and enable directed evaluation of diverse applications, e.g. discovery, clinical trials, disease diagnosis and stratification.

An ontology is a set of concepts and categories in a subject area or domain that shows their properties and the relations between them. To address activities in clinical practice and research, our ontology focuses on the concepts of “disease”, “drug/treatment” and “target”. Examples of relationships include: “a clinical trial links a drug/treatment to a specific disease”; “what animal models were used to evaluate the potential target and drug”, “what is the mechanism of action of the drug on the clinical target”. Thus data is mapped, i.e. curated, in a one-to-many relationship that provides a functional mapping and the ability to ask questions of (or evaluate a given resource) involving complex concepts, e.g. what comprises a clinical trial.

This ontology and its application as a data model have been incorporated into a web-based platform that supports continued evolution of the underlying ontology as new studies are performed. It further supports querying at a more conversational language level to enable multi-disciplinary teams to utilize and interact with the data and resulting analysis. Further gap analysis is performed to analyze the quality and quantity of data represented in a specific document and enable evaluation of the potential impact of such gaps.