

Creating a Biomedical Data Standardization Ecosystem: Ontologies, Metadata, and Applications for Effective Data Management

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Scientific data management aims to make data machine-actionable by ensuring that data is Findable, Accessible, Interoperable, and Reusable (FAIR principles). One major challenge is the lack of adequate resources and tools to facilitate ontology-linked metadata, which is crucial for data integration and sharing.

We initially leveraged the OntoPortal Alliance framework to tackle this challenge to establish MedPortal, an ontology resource platform (<http://medportal.bmicc.cn>). MedPortal integrates OBO Foundry ontologies along with Chinese versions of widely used clinical terminology resources. It provides services for semantic standardization, including term querying, annotation, recommendations, and mapping. Simultaneously, we created the Clinical Data Elements (CDE) registration, development, management, and reuse platform called CDE Portal (<http://cdeportal.bmicc.cn>). This platform adheres to the ISO/IEC 11179 international standard and supports ontologies at the conceptual level of data elements. With CDE Portal, we've stored nearly 80,000 data elements from NCI research projects, standardized common clinical CRF scales, and machine-readable formats for Chinese health information data elements. All these resources are accessible through APIs and can be easily reused in data management tasks using tools like CDE tools.

By establishing a cohesive and user-friendly biomedical data standard application environment, we aim to assist researchers in effectively utilizing data standards and enhancing the quality of data submissions, thereby boosting data-sharing practices.

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Dr. Yang's research focuses on the development and application of biomedical data standards, including ontology, data elements, data curation, and biomedical data management. She is also interested in utilizing knowledgebase and artificial intelligence to explore human disease

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