

# Metadata management

Ontologies, measures,  
registries, and patient attribution



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## About Watson Health™ Informatics and Analytics

Informatics and Analytics are essential components of the Watson Health solution delivery process. An Informatics and Analytics team is dedicated to unlocking the potential of the data from Watson Health's partners' systems and deriving meaningful knowledge. The team maps data from the source systems into the Watson Health Data Model, performs data standardization, imputes and derives novel data points, and develops predictive and prescriptive analytics models. In addition, based on partners' needs, the team augments the IBM® Explorys Enterprise Performance Management (EPM) Application Suite's functionality through focused analytics and customized reports.

## Ontologies used by Watson Health

Watson Health maps each patient record in its system to a single set of ontologies, independent of the source data platform (electronic health record, billing or claims system, etc.). This enables terms to be searched upon for inclusion into cohort designations or measurement filters. Watson Health utilizes a number of established licensed and open-source ontology maps in addition to internally developing libraries where standards do not currently exist.

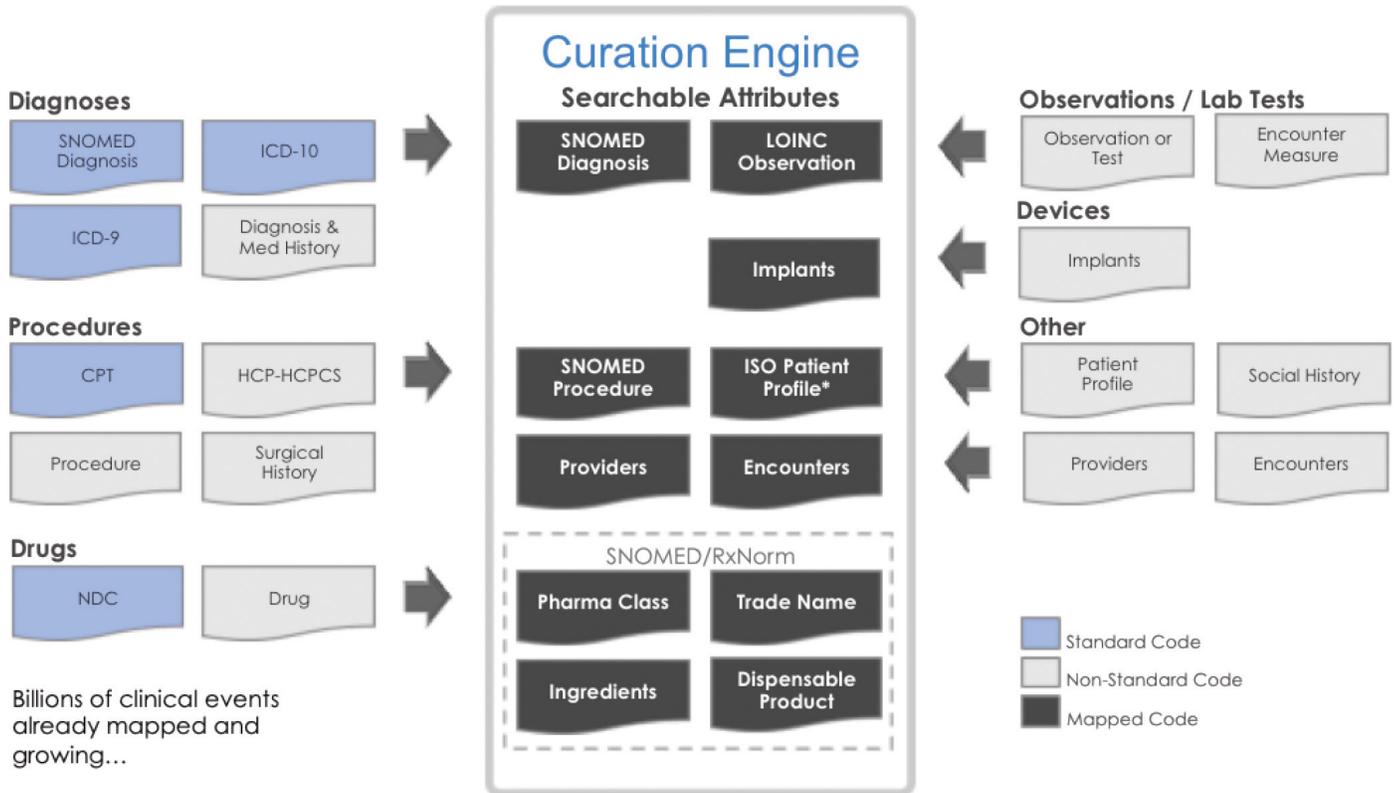


Figure 1: Representation of the data curation process. Each source system gets mapped into one standard set of ontologies selected by Watson Health

Watson Health maps patient demographics into a series of standard categories including age, language, religion, race, and insurance type, as well as geographic area. Watson Health's maps are built upon International Organization for Standardization (ISO) and designed for compliance with Health Insurance Portability standards and Accountability Act (HIPAA) and Health Information Technology for Economic and Clinical Health Act (HITECH).

Diagnoses, findings, and procedures are mapped into the Systematized Nomenclature of Medicine-Clinical Terms (SNOMED-CT) hierarchy. The Observational Medical Outcomes Partnership (OMOP) provides a set of vocabularies to map ICD-9 diagnosis codes and CPT procedure codes to SNOMED.<sup>1</sup>

Although healthcare providers and electronic health record systems vary in their adoption of standards for coding laboratory test observations, Watson Health has developed a robust open map for translation into the Logical Observation Identifiers Names and Codes (LOINC) hierarchy established by the Regenstrief Institute.<sup>2</sup> The model continues to be expanded to utilize additional mapping and natural language processing techniques. Additionally, observational values are normalized into standard units of measurement as a basis for these curation algorithms. In cases where no logical target exists within the LOINC structure for a particular observation, Watson Health has developed an additional "Observations Auxiliary Map" (OAM) that is used for indexing and searching observations not yet included in the LOINC structure.

The IBM® Explorys Platform performs mapping of pharmacy claims, medication orders, and drug administration records within the partner system into pharmaceutical classifications, ingredients, trade names, and dispensable product categorizations. The map for these elements is based upon a combination of SNOMED and RxNorm that provides both standardization and drug class hierarchy. RxNorm provides normalized names for clinical drugs and links its names to many of the drug vocabularies commonly used in pharmacy management and drug interaction systems. By providing links between these vocabularies, RxNorm can mediate messages between systems not using the same software and vocabulary.

RxNorm also includes the National Drug File - Reference Terminology (NDF-RT) from the Veterans Health Administration. NDF-RT is a terminology used to code clinical drug properties, including mechanism of action, physiologic effect, and therapeutic category. Through the use of RxNorm, Watson Health provides mapping of drugs into a SNOMED standard from a number of originating values including National Drug Code (NDC) and text processed by natural language processing techniques.

### Quality measures metadata

The Measure Definition Language (MDL) is an XML-based programming language used to define a metric. Measures are defined using a numerator, denominator, and exclusion groups. The denominator is the base population being evaluated (e.g., diabetic patients). The numerator is the fraction of the denominator that is compliant for a given quality metric (e.g., most recent A1C < 8 percent). The exclusion group is the fraction of the overall population that is removed from consideration when evaluating the numerator and denominator (e.g., an active diagnosis of gestational diabetes).

Measures are designed to match the original steward's specification as closely as possible. Some alterations may have to be made to capture the workflows of a particular healthcare system, which are transparently available to the partner. The MDL provides the flexibility to specify which coding standards, data locations, and visit types are in use when scoping specific criteria. The IBM® Explorys Calculation Engine utilizes the MDL to generate results daily or at whichever frequency is needed.

Measure definitions are continuously updated by various groups. Watson Health performs measure updates within one year of a new published specification. Watson Health monitors the Centers for Medicare and Medicaid Services (CMS), National Quality Forum (NQF), United States Health Information Knowledgebase (USHIK), Agency on Healthcare Research and Quality (AHRQ), National Council on Quality Assurance (NCQA), and others to identify updated definition releases and corrections that are periodically made.

### Clinical registry metadata

Watson Health clinical care registries support various care coordination activities by utilizing a flexible, fast and future-proof method of defining their contents. The Watson Health clinical care registries are defined using the Registry Definition Language (RDL), an XML-based schema that allows one to define the target patient population as well as the specific columns of clinical data of interest. RDL column definitions can contain virtually any combination of clinical, financial, or operational data elements. In addition, registry column definitions can include risk scores (like Hierarchical Condition Categories (HCC) weights or risk of heart failure readmission), calculations (average patient claim charge, largest A1c value in the last year), and visualizations required in the clinical registry presentation, such as spark-lines. The IBM® Explorys Registry Engine uses RDL to generate and update clinical care registries daily.

### Attribution model metadata

Watson Health offers a versatile methodology for attributing a patient to a provider. The Patient Attribution Definition Language (PADL) is an XML-based method of determining the rules that are followed by the IBM® Explorys Attribution Engine when attempting to attribute a specific patient to one or more providers. Provider title, role, specialty, and plurality of visits can be used to make sure the patient is being assigned to the correct provider. Standard methods, like using the patient's primary care provider (PCP) on record or the CMS four-cut method are supported as pre-configured templates. PADL also supports cascading attribution schemes, where a series of rules are evaluated in a particular order. For example, you might first check if the patient is assigned to a provider in a value-based contract. If not, you can see if the patient has a PCP on record. If not, you can identify the provider with a primary care specialty that saw the patient most frequently during the last 18 months. Watson Health works closely with healthcare partners to identify the attribution methodology that makes the most sense for their organization.

## Metadata change management

Measure, clinical care registry and attribution updates affecting specific customers are facilitated through a robust change management process resulting in communication to partners. The relevant stakeholders have the opportunity to review changes prior to the updated content being put into place for their organization.

## About IBM Watson Health

In April 2015, IBM launched IBM Watson Health and the Watson Health Cloud platform. The new unit will work with doctors, researchers and insurers to help them innovate by surfacing insights from the massive amount of personal health data being created and shared daily. The Watson Health Cloud can mask patient identities and allow for information to be shared and combined with a dynamic and constantly growing aggregated view of clinical, research and social health data.

For more information on IBM Watson Health, visit: [ibm.com/watsonhealth](http://ibm.com/watsonhealth).

Footnotes

1. Observational Medical Outcomes Partnership (OMOP), Vocabularies, 4-11-2014, <http://omop.org/Vocabularies>.

2. Regenstrief Institute, Inc.; LOINC; <http://www.loinc.org>.

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