Snow Owl MQ

A semantic platform for healthcare data processing
Snow Owl MQ
An overview

Snow Owl® Meaningful Query (MQ)
is a scalable Big Data software platform for
- Searching and browsing health records
- Grouping patients that share the same characteristics into cohorts
- Inspecting records to identify trends and correlations
- Statistical analysis of patient cohorts to test and verify clinical hypotheses

The platform covers the entire data processing workflow such as data import, real-time exploration, interactive querying, and production analysis including sophisticated machine learning algorithms – while providing access to the semantics captured in the healthcare data at every step of the process.

Clinical terminologies
Use terminology subsets and health outcomes of interest created and curated by dozens of governments and organizations. Easily build your own using clinician-friendly tools.

Patient cohort builder
Create patient cohorts by querying electronic health records for patients that meet particular criteria, including demographic traits, drug exposures, clinical findings, procedures, and observations.

Healthcare analytics
Query, analyze, and visualize healthcare data. Determine which patient cohorts are at risk for adverse events. Identify the most effective markets for new products. Find the population segment most affected by an outbreak. Perform casemix analysis. The sky’s the limit.
Suspendisse elementum rhoncus velit. Nulla turpis metus, faucibus nec, dignissim at, cursus in, tortor.

Unleash SNOMED CT
SNOMED CT is considered the most comprehensive, multilingual clinical healthcare terminology in the world. Its use is mandated for healthcare information exchange in over 20 national healthcare systems and recommended in dozens more. This has led to exponential growth of SNOMED CT encoded health records.

In contrast to other clinical terminologies, SNOMED CT is a formally defined ontology. This allows identifying concepts based on clinical meaning in addition to textual labels or pre-defined categorizations. Concepts may have multiple parents, allowing Viral pneumonia to be categorized as both a Lung disease and an Infectious disease. Mappings to other terminologies like ICD-9/10, LOINC, ATC, etc. permit even more categorization and grouping options.

Over 70 terminologies
Support for over 70 standard terminologies, including SNOMED CT, ICD-10, LOINC, ATC, RxNorm, dm+d, ICD-9, MedDRA, CPT, along with regional extensions such as ICD-10-CM.

Include your own terminologies, local code systems, mappings, and value sets. Create your own queries by specifying a set of rules and rest assured that new content from the above authorities automatically appears correctly in your subset. The friendly user interface requires no expertise knowledge but provides the power of an ontological foundation based on formal description logic.
**Patient cohort builder**

Snow Owl MQ supports evidence-based healthcare by selecting patient groups for longitudinal observation:

- Cohort based: comparing similar patient groups with the exception of an exposure
- Case-control: find patient groups with a problem (case) and without a problem (control) and see the frequency of a risk factor in each group to determine relationships between the risk and the problem

The cohort builder allows combining semantic queries with temporal criteria and demographic data to explore patient populations. Temporal criteria are expressed in relation to a baseline event such as a drug exposure or a condition. Baseline exposures and multiple inclusion and exclusion criteria can be defined and combined with logical operators. Matching results are displayed immediately as the cohort is created.

**Patient record visualization**

Visualize individual patient records as a sequence of events displayed on an interactive timeline. The observation period is automatically zoomed to a level that displays the baseline exposure along with all events relevant to the selected inclusion and exclusion criteria. The observation period can be increased or decreased to expand or reduce the timeframe. The view can be toggled between relevant events only or to include all record details.

Conditions, procedures, and drug exposures can be indicated, allowing hypotheses testing by selecting and browsing random sets of patients. The display of continuous condition and drug eras indicate changes in health or prescribed medications.

**One billion EHRs, or bring your own**

Use your own patient records with existing plug-ins and tooling that simplifies ETL.

Or analyze 1 billion existing patient records in the OMOP Common Data Model format from Clinical Practice Research Datalink (CPRD), Truven MarketScan Commercial Claims & Encounters (CCAE), Multi-State Medicaid (MDCD), Medicare Supplemental Beneficiaries (MDCR), Lab Supplemental (MSLR), GE Centricity Medical Quality Improvement Consortium, Premier, National Health and Nutrition Examination Survey (NHANES), OptumInsight ClinFormatics Data Mart, Healthcare Cost and Utilization Project (HCUP), Indiana Network for Patient Care, CMS Limited Data Sets, SAFTInet (Scalable Architecture for Federated Therapeutic Inquiries Network), and more.
Notebooks

Notebook-style development provides an exploratory approach to data analysis. Notebooks are composed of code blocks called cells, which contain statistical languages like R and Scala or rich-text documentation. The results of the code blocks are displayed on the notebook once the cells are executed either independently or together. This creates a discovery-based approach to analytics, where an analyst experiments in one cell, and then continues work in a subsequent cell based on results from the previous cell.

Organizing your data in rich-text notebooks lets you share your findings and visualizations with other users or export them in PDF and html. You can even collaborate with others in real time.

Hassle-free scalability

Analytics notebooks run everywhere without changes, whether on a local server, a private cluster, or in the cloud. They support both batch and real-time data stream processing and mining. Analytics notebooks can be executed immediately or scheduled to run as a job. This allows compute-intensive jobs to run on a lower budget on cloud services like Amazon EC2 Spot Instances.

Machine learning and visualization libraries in R, Scala, Python, SAS, Java, SQL

Analyze patient data with R, Scala, or Python; or export data for use in SAS and other systems. Combine R’s mature collection of machine learning libraries with distributed, massively parallel computing capabilities to process datasets beyond the ability of standalone R programs. We provide simple APIs for operating on large datasets, including over 100 data transformation operators. Standard libraries include support for over 70 healthcare terminologies, SQL queries, machine learning, and graph processing.

Easily include external analytics packages like OHDSI’s patient-level prediction and population-level estimation methods libraries. Visualize your results with any visualization package such as ggplot2, ggvis, rcharts, googleVis, matplotlib, and D3.js.
B2i Healthcare is a boutique software engineering firm specialized in SNOMED CT analytics and healthcare information standards and exchange.

Our Snow Owl® technology family is deployed in over 3,000 locations in 84+ countries worldwide.

Online demo: https://mq.b2i.sg

info@b2i.sg