

Draft White Paper
HIMSS Interoperability Showcase – 2011
Apixio Inc

Search Queries Across Multiple Sources of Clinical Data

It is widely believed that significant improvements in both the quality and the cost of healthcare can be achieved by making patient medical records readily available at the point of care. Patient records, which can include key clinical information such as medications, allergies, problems, labs, diagnostics, procedures and progress notes, are a critical component of assessing the patient's health and providing appropriate care. Unfortunately, most healthcare organizations in the U.S. are still reliant on phone and fax to share clinical information and coordinate patient care with other providers. However, the tide is shifting as the health industry continues to make steady progress towards the U.S. government's HITECH ACT initiative to "improve care coordination", by incentivizing care organizations to "exchange key clinical information" via standards based documents.

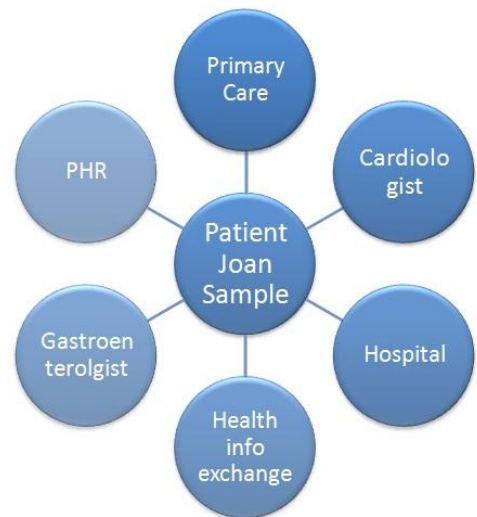
Even when the interoperability challenges of exchanging clinical information is overcome, sharing, aggregation, and viewing of key clinical information, via standards based documents such as Continuity of Care Documents (CCD), creates many information handling and workflow challenges for the industry. Given the high throughput in a typical medical practice, it is simply not possible for a provider to effectively review large volumes of Continuity of Care Documents for a typical elderly or sick patient who may have 100s of encounters. Today's technologies for review of Continuity of Care Documents are mostly limited to viewing of information one patient encounter at a time, thereby presenting significant time management challenges. A typical Continuity of Care Document for an encounter can include as much as thousands of discrete data points and hundreds of lines of ad-hoc textual data making it nearly impossible to review each and every document, given the short amount of time a provider has to make a clinical decision. Given the diversity of medical terminologies used at across various medical practices, it is very challenging for providers, payers, and health organizations to efficiently and reliably reconcile duplicate or inconsistent data, when looking at Continuity of Care Documents from multiple sources. Duplication of data can arise from the same set of medical information captured by different systems and subsequently reported on multiple Continuity of Care Documents. Inconsistency in the data can arise from several factors including, but not limited to, variations in medical vocabularies used by different providers, leading to challenges in identifying duplicate information, and also the same medical information reported at separate occasions, leading to challenges in identifying when and where the information originated.

Apixio has set out to develop and offer practical search and query solutions that would make it possible for all stakeholders in healthcare to deal with data volume and inconsistency issues. With this goal in mind, this white-paper describes how a provider can run specific clinical queries across multiple sources of information using IHE protocols.

Information search and retrieval at the point-of-care

General practitioner Dr. Smith has patient Joan Sample waiting for him in the exam room with a chief complaint of chest pain. The first thing Dr. Smith needs is a complete picture of Joan's chart as it relates to her current condition. Joan has recently been seen by both a cardiologist and a gastroenterologist and has visited the ER in the local hospital. To efficiently assemble the relevant information he needs, Dr. Smith uses Apixio Search.

Dr. Smith selects Joan Sample as the patient and then enters the clinical context "chest pain" in the Apixio search bar. He is immediately presented with relevant lab results, such as CKMB and Amylase, relevant diagnostic results, such as EKG and CT angiogram, and all progress notes and consult reports in which concepts relevant to chest pain, including "GERD" and "Holter monitor", are mentioned. New medications are automatically added to the Apixio medications display.



To retrieve medically *relevant* information, Apixio combines two distinct types of search:

Lexical search, in which text in the patient record is searched for occurrences of the search term and its variants, including synonyms.

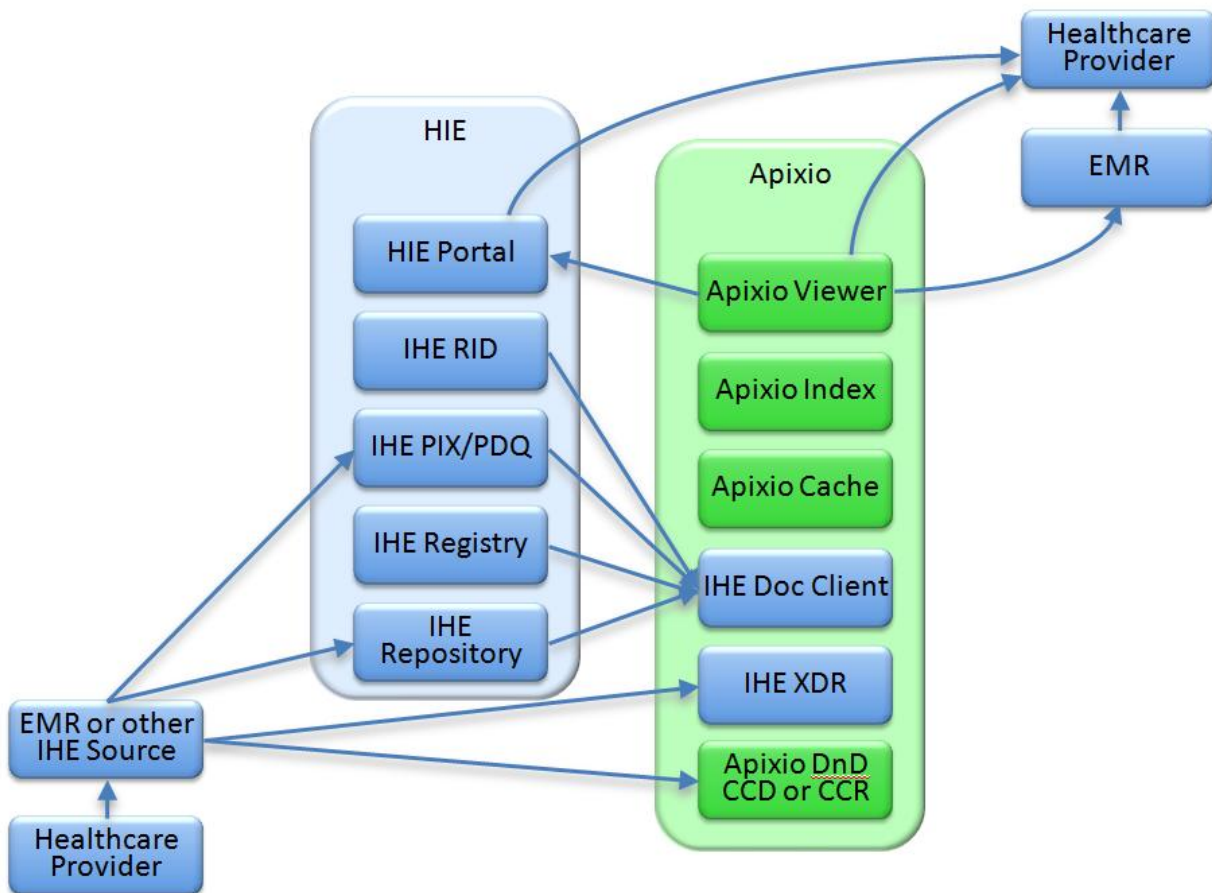
Apixio Medical Concept Search, in which data that is medically related to the search term is retrieved. Medical concept search finds relevant structured data with standardized codes, such as lab results, along with textual results for terms that are medically related to the search term. A search for "chest pain" will return a progress note that contains the term "EKG".

Apixio Lexical and Medical Concept Search solve the data volume problem for Dr. Smith by returning the information from the chart that is most relevant to Joan Sample's chest pain situation. Since the information is coming from multiple sources, where each item is coded and described differently, access to her information is not enough. Every incoming element must be reconciled and de-duplicated to create a single view of Joan's history that can be quickly and easily understood by the provider.

For example, Joan Sample's cardiologist has prescribed 20 mg of Simvastatin to lower her cholesterol. In the hospital, this medication was recorded as 20 mg of *Zocor*, a brand name for Simvastatin. Apixio's Display Merge presents these two items as a single entry in the medications list and flags the entry to alert Dr. Smith to the fact that "Simvastatin 20 mg" actually contains two records that were not exactly the same. This process is carried out for all information types displayed, including medications, allergies, problems, labs, and office notes.

How does Apixio's solution work with IHE protocols?

IHE protocols are being used to securely communicate patient medical records. The diagram below provides an example of how IHE protocols can be used to get clinical information from a source healthcare provider to a consuming healthcare provider (e.g. a specialist's report back to the primary care physician). In this example we assume that both the source and the consuming healthcare providers have an EHR that adheres to meaningful use communication protocols and that optionally, a regional HIE (health information exchange) is present.



The source healthcare provider generates a source document in his local EMR (Electronic Medical Record) system. This document can be sent to the regional HIE's repository automatically via a "provide and register document set" transaction. From there, Apixio can query the document via various IHE protocols such as PIX/PDQ, XDS, and RID. Alternatively, if the regional HIE is not available or not yet operational, the documents can be sent directly to Apixio via two other options: (1) XDR (Cross-Enterprise Document Reliable Interchange) protocol, or (2) The document source can generate a CCD (continuity of care document) or CCR (continuity of care record) and can just drag-and-drop this file into the Apixio viewer.

Once the document is received by Apixio, Apixio strips out the PHI (Protected Health Information) and encrypts and stores the PHI in a PHI-specific storage area. The rest of the document is parsed, indexed, and cached to enable rapid searches and data de-duplication.

The consuming healthcare providers can access the Apixio viewer through one of several methods. They can log on directly via the Web to the Apixio viewer portal. Alternatively, they can see the results from an Apixio Search embedded in their local EMR. Finally, they can see the results from an Apixio Search embedded in their regional HIE.

Apixio Inc.

www.apixio.com

Tel: 877.427.4946

1825 S. Grant Street, Suite 210

San Mateo CA 94402

Contact:

Nooshin Tehrani

ntehrani@apixio.com