About SHRINE

Background

SHRINE was launched in May 2009 to help clinical researchers solve the problem of identifying sufficient numbers of patients to include in their studies. Without adequate sample sizes, it is difficult for researchers to reach a level of confidence in the results of their research. Through the use of a federated network protocol, SHRINE allows investigators to see limited data about patients meeting their study criteria without compromising patient privacy.

SHRINE was initially developed to aggregate patient cohorts across four Harvard affiliated academic medical centers in the Boston area. In addition to this initial deployment, SHRINE nodes have been implemented at Beth Israel Deaconess Medical Center, Boston Children's Hospital, Partners Healthcare (Brigham and Women's Hospital and Massachusetts General Hospital), Dana Farber Cancer Institute, and many other locations outside of the Harvard Medical School network. We are currently piloting a national deployment.

Motivation

Obtaining sufficient patient samples remains one of the primary challenges in informatics studies. Even when a single hospital has enough cases to reach statistical significance, biases in the available cohort may produce results that "overfit" the circumstances for which the data were collected.

In order to obtain the maximum number of cases representing the study population, it is useful to aggregate patient facts across as many sites as possible. Cutting across institutional boundaries necessitates that each hospital IRB remain in control, and that their local authority is recognized for each and every request for patient data. The independence, ownership, and legal responsibilities of hospitals predetermines a decentralized technical approach, such as a federated query over locally controlled databases.

Approach

Secondary use of Clinical Encounter Data for Research Purposes

Building on the I2B2 platform, SHRINE enables federated queries across many independently operated patient databases.
With over 60 sites participating in the I2B2 National Center for Biomedical Computing, there is now a rare opportunity to conduct regional and national health studies.

Mapping Heterogeneous Medical Coding Systems "on the fly"

Mapping medical terminologies, such as medication and diagnoses codes, is no small task.
Towards this goal, we have developed software which maps medical dictionaries to national standards such as ICD9 (Diagnoses), RxNorm (Medications), and Demographics (HITSP). This software is aptly named "SHRIMP", because it performs the minimal amount of mappings necessary to enable queries in a non-disease specific manner manner.

Federated Query and Aggregation of Independently Operated Clinical Databases

Building on the success of the SPIN federated query system [Paper], SHRINE provides a scalable query and aggregation mechanism.
See our article in JAMIA for details on the federated credentialing system, scalable peer-to-peer architecture, and secure logging and auditing.