Introduction
HERON, The University of Kansas Medical Center’s (KUMC) i2b2 instance, was originally released in the fall of 2010. Over the past few years, HERON has continued to grow in terms of functionality and size, surpassing one billion facts. FY2013 sees HERON becoming more integrated within The University of Kansas Hospital (KUH), University of Kansas Physicians, Inc. (UKP), and KUMC with improved training, governance, and data fulfillment processes. System and data usage have increased as well as the need for additional types of data in HERON, such as REDCap project data, procedure orders, visit details, structured note concepts, and social, family, surgical, and medical histories. With these changes, HERON has become increasingly relevant to research and organizational improvement at KUMC.

Medication Modifiers

Last year we presented our medication hierarchy which we created based on VA Classes and RxNorm to map local drug terminologies to a national standard. Medications are organized based on VA Classes at the top-level. Ontology further sub-divided based on RxNorm Semantic Logical Dose Form (SLDF).

This year, we enhanced the hierarchy to include modifiers that provide more specific classification of medication-related facts.

- Types of dose modifiers:
  1. A code representing daily dose of a medication order
  2. A code classified as “given” according to the Medication Administration Record (MAR)

- Queries for either type of dose modifier prompts for a numeric dose value
- Other modifiers include dispensed, historical (home medication), inpatient order, outpatient order, PRN order, and MAR result type ("Given", "Wasted", "Refused", etc).

Death Date Discrepancies
HERON includes death information from several sources:

- Epic EMR
- Social Security Death Master File (SSDMF)
- North American Association of Central Cancer Registries (NAACCR)
- University HealthSystem Consortium (UHC)

It was discovered that death dates from various sources in HERON didn’t agree in many case. The medical informatics team has an ongoing collaboration with the KU hospital team to reconcile these discrepancies.

Data Requests
Data requests during the 2012-2013 academic year doubled over the previous two years. Requests submitted span 36 research topics and many included multiple searches per request. Upon the receipt of data, some users were surprised at the amount of data and expressed concern with analyzing the raw data.

In an effort to help users understand the data request process:

- Training sessions now have a portion devoted to data set discussions; e.g., what to expect and intended data uses
- Increased contact with users prior to providing data to review any search questions
- Data fulfillment in REDCap (in development)

Honest Broker approach to cross-institutional data requests
As collaborations grow within the Kansas City metropolitan area hospitals and within academic medical centers, so does the desire for federated searching across organizations. In conjunction with the CTSA KU C2R, we are developing a low-tech, human Honest Broker approach to federated searching.

Future Work for History includes mapping the surgical procedures in Surgical History and the diagnoses in Family History to a standard ontology.

Microbiology

Microbiology results with susceptibility is the latest enrichment to the HERON data pool. The Microbiology ontology combines culture site, organism, and antibiotic (in that order) to form the concept hierarchy, with a susceptibility modifier available at each level.

Timeline Hover Text Enhancements

- In addition to the concept code, the standard i2b2 timeline has been enhanced to show the full concept name, nval, tval, modifier string, and fact start; time
- Time resolution is now displayed to the minute rather than to the day

Quality Improvement

A variety of new types of data related to patient history have been added to HERON. It is now possible to query against a patient’s Medical, Family, Social, and Surgical history.

- Medical History (4.8M facts, 150K patients) – implemented as a modifier to the overall Diagnosis concept hierarchy
  - Diagnosis (4.8M facts, 398,477 patients)
  - Illness (4.8M facts, 398,477 patients)
  - Procedure (4.8M facts, 398,477 patients)
  - Dose (4.8M facts, 398,477 patients)

- Surgical History (3.3M facts, 160K patients) – a stand-alone member of the History ontology containing a patient’s past surgical procedures

- Social History (8.2M facts, 314K patients) – a stand-alone member of the History ontology supporting queries concerning a patient's sexual activity and tobacco usage with some numerically sensitive concepts (such as “pack per day”)

- Family History (4.8M facts, 150K patients) – a stand-alone member of the History ontology supporting queries about a patient’s family history (e.g. “cancer patients with a parent who had cancer?”)

Future Work for History includes mapping the surgical procedures in Surgical History and the diagnoses in Family History to a standard ontology.

Data Requests

- 149 students and staff sponsored (102 sponsorship requests reviewed)
- June 1, 2012-May 31, 2013 138 Non-Medical Informatics users ran 3110 queries
- Increased interest to use HERON for Quality Assurance measures.

Usage

January 2013-March 2013 had highest search numbers with 977 searches by 31 (includes Medical Informatics users) users in March 2013.

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Provision of CTSA and C2R Data


Please visit http://academic.kumc.edu/ users/wlwhs4/ for more information.