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This is the home of the Related Project - Incorporating Number Of Studies Query capability in i2b2 space.

Introduction

The data and application models of i2b2 revolve around its fundamental functionality of patient cohort discovery. All current queries in i2b2 are returning either patient counts or patient lists.

We have implemented another type of search in i2b2 which returns number of studies. It allows the adoption of the i2b2 platform in primary HIT settings whose goal is to create administrative portals and executive dashboards, or in dual-purpose environments supporting the traditional patient cohort discovery mode, together with operations and utilization management research studies.

The i2b2 enterprise research platform (equipped with the Number of Studies query) was utilized for storing, aggregating and analyzing the data streams generated by Medical Imaging Demonstration (MID) Project across the four sites the Center for Evidence Based Imaging convenes for (Geisinger Health System, Hospital of the University of Pennsylvania, Weill?Cornell Medical College/New York Presbyterian Hospital).

Driving Project Background

Through the Medicare program, the Centers for Medicare & Medicaid Services (CMS) provide health insurance coverage to approximately 47 million Americans. Because of the Medicare program's large scale, changes in Medicare have the potential to affect a large number of beneficiaries and providers and often affect the overall health system. Therefore, when introducing innovations in the Medicare program or making significant changes in programs or policy, CMS often implements demonstration projects to test the impact of the changes on a smaller scale.

The Medicare Imaging Demonstration (MID) was authorized by the US Congress in the Medicare Improvements for Patients and Providers Act of 2008. The goal of the demonstration is to assess whether the use of decision support systems (DSS) that promote appropriate use of imaging services based on medical specialty guidelines, can improve quality of care and reduce unnecessary radiation exposure.

Through the MID project, CMS collects data on physician compliance with appropriateness criteria for imaging services. The demonstration will examine the impact of using a DSS on physicians' rate of ordering advanced imaging services and the appropriateness of the orders. Existing coverage and payment policies under Medicare do not change under this demonstration. The MID is focused on three advanced imaging modalities: magnetic resonance imaging (MRI), computed tomography (CT) and nuclear medicine. Within those modalities, the demonstration targets 11 of the most frequently used advanced imaging procedures.

Data Mapping Architecture

The mapping of the CMS-mandated data to the i2b2's Star Schema utilizes code modifiers to account for the multiplicity of the atomic observations recorded during the interaction of the ordering physician with the DSS system. For example, each of the distinctive steps of data collection during the ordering process (initial exam to be ordered based on signs/symptoms and differential diagnoses, characterization of the disease state of the patient via up to 10 diagnoses using their ICD9s, the alternative imaging studies suggested a) by the system and b) by the radiologist, and the final exam performed) results in multiple rows in the Observation_Fact table. Additional imaging exam types, CPT4, appropriateness and utilization management ontologies were built to facilitate store and querying of the data.
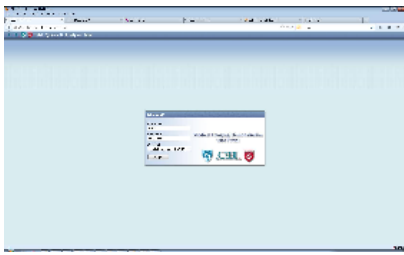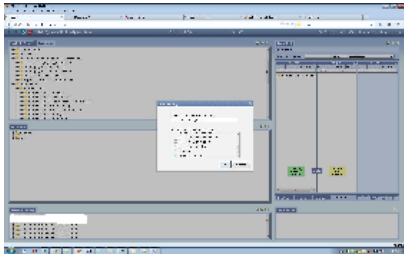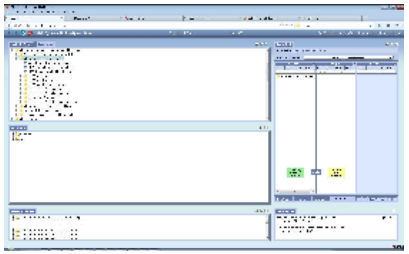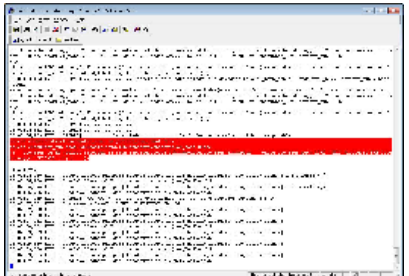
About Us

The new core i2b2 functionality was developed by the Center for Evidence Based Imaging (CEBI), a Center of Excellence of the Brigham and Women's Hospital in Boston, Massachusetts, in close collaboration with New Atlantic Tech Group, LLC of Newton, Massachusetts.

Sources and Documentation

Version 1.6.09 of the i2b2 core server was used for implementing the #studies query. Download the complete archive here and make the server following the corresponding Install Guide. The changes in the sources and the database are detailed here.

Screen Shots

Title page of the i2b2 instance	
The Query Selection page with the Number of Studies query visible	
The result of Number of Studies query	
The Console output showing the SQL for the new query	

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