OMOP Implementation and Environment at the VA

April 4th, 2016
VINCI OMOP and OHDSI Services

Stephen Deppen, PhD
Department of Thoracic Surgery
Vanderbilt University Medical Center
Tennessee Valley Heath System-Nashville, TN
Our Team

Salt Lake VINCI Group
Scott DuVall – Lead
Hamid Saoudian, Kevin Malohi, Jeffrey Scehnet, VINCI Data analysts group, HP development group for OHDSI tools

Nashville TVHS Group
Michael Matheny – Lead/PI

ETL/Development Team
Fern FitzHenry
Jason Denton
Jesse Brannen

QA/Concierge
Stephen Deppen
Daniel Park
Elizabeth Hanchrow
VA Demographics

150 Acute care hospitals
1,400 Community based clinics
53,000 independent licensed health care practitioners
21 million Vets (~9% female)
$59 Billion overall budget FY2015
Majority of care is not fee based
VA Demographics

- Clinical data warehouse (CDW) supports VA research and operational data needs
- Data services supported by VA Informatics and Computing Infrastructure (VINCI) and VA Information Resource Center (VIReC)
- VINCI and VIReC support about 500 health services researchers and operations users of CDW
- Robust, active community with comprehensive data infrastructure
VA OMOP Demographics

~13 million unique patients
25.3 Million Inpatient
2.2 Billion Outpatient (VA and fee basis encounters)
Domiciliary/Nursing Home/Sub-acute care excluded
Encounters from late ‘90s to 10/2015
Table Specific Demographics

Condition_occurrence 2.3 Billion rows

<table>
<thead>
<tr>
<th>Observation Table</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VitalSign</td>
<td>2,939,830,385</td>
</tr>
<tr>
<td>PatLabChem</td>
<td>6,642,418,410</td>
</tr>
<tr>
<td>inpatient</td>
<td>45,914,135</td>
</tr>
<tr>
<td>DentalExam</td>
<td>195,840</td>
</tr>
</tbody>
</table>
## Table Specific Demographics

### Top 10 Lab Tests

<table>
<thead>
<tr>
<th>CONCEPT_ID</th>
<th>concept_name</th>
<th>SOURCE_VALUE</th>
<th>COUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3013682</td>
<td>Urea nitrogen [Mass/volume] in Serum or Plasma</td>
<td>3094-0</td>
<td>137,773,363</td>
</tr>
<tr>
<td>3011424</td>
<td>Glucose [Mass/volume] in Blood by Test strip auto</td>
<td>2340-8</td>
<td>65,686,625</td>
</tr>
<tr>
<td>3024629</td>
<td>Glucose [Mass/volume] in Urine by Test strip</td>
<td>5792-7</td>
<td>35,840,420</td>
</tr>
<tr>
<td>3023539</td>
<td>Ketones [Mass/volume] in Urine by Test strip</td>
<td>5797-6</td>
<td>32,118,157</td>
</tr>
<tr>
<td>3018311</td>
<td>Urea nitrogen/Creatinine [Mass ratio] in Serum or Plasma</td>
<td>3097-3</td>
<td>10,849,999</td>
</tr>
<tr>
<td>3006175</td>
<td>Mucus [Presence] in Urine sediment by Light microscopy</td>
<td>8247-9</td>
<td>10,682,702</td>
</tr>
<tr>
<td>3037072</td>
<td>Urobilinogen [Mass/volume] in Urine by Test strip</td>
<td>20405-7</td>
<td>10,433,455</td>
</tr>
<tr>
<td>3004077</td>
<td>Glucose [Mass/volume] in Capillary blood</td>
<td>32016-8</td>
<td>7,815,582</td>
</tr>
<tr>
<td>3022407</td>
<td>Monocytes/100 leukocytes in Blood by Manual count</td>
<td>744-3</td>
<td>7,642,610</td>
</tr>
<tr>
<td>3016879</td>
<td>Cocaine [Presence] in Urine</td>
<td>3397-7</td>
<td>6,928,029</td>
</tr>
</tbody>
</table>
Issues

Data manipulation and mapping often too unwieldy when issues found (e.g. missing ICD-9 codes from dropped decimal or digit in source or vocabulary) for quick fix and reload.

Lag within data version given long load times of incremental loads.

Complex mapping of certain aspects of VA activity resulting in loss of detail (visit location)
OHDSI Tools

• Development contract to make tools VA compliant
• Hermes, Achilles and Cohort design 1st tools developed to meet internal VA security standards
• Hermes and Achilles are currently in test and training of VINCI staff as to their use is ongoing
• Beginning of cohort design on v5.
• Final QA of v4.5 and training of
OMOP advantages

- Extensive data cleaning, only Vets and not their dependents, duplicates and incorrect SSN removed, etc.
- Robust combination disparate data groups – fee based; SSI, NDI and VA benefits for mortality; inpt and outpt pharmacy and lab testing with cleaning of the top 50 lab tests
- Includes source data to facilitate use by current data users and experts
- Integrates VA specific vocabularies into OMOP model and concept table
- Coded data readily integrated – Dental Tobacco Screening
Where we are now

• Final QA of v4.5 and training of VINCI staff
• Initial marketing of OMOP to VA researchers and operational users
• Help Desk staffed and process for requesting OMOP data completed
• VINCI OMOP users group with documentation and metadata created - VA pulse environment
• v5 partial load begun and QA and documentation initiated
Where we are going

• Anyone with operational access will be able to request OMOP access upon final QA, research must add to their IRB.

• NPL data integration begun – Ejection Fraction and cardiac outcomes, test case.

• Integrated phenotypes, independently verified

• Integrate CMS data and link to Million Vet Project

• Other data – microbiology, pathology, cancer registry, problem list, alerts, service specific notes (TIU), NPL-AKI and cancer screening.