CONFLICTS OF INTEREST

We have no affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this presentation.
OBJECTIVES

- HSSC Introduction
- CDW Overview
- Current Scope
- i2b2 and Security
- Collaborations
- Q&A
STATEWIDE COLLABORATIVE RESEARCH ORGANIZATION

Created in 2004 to leverage existing resources, attract partners, create momentum and drive results in the health sciences research domain

Focus over the past 3 years: development of technology tools to accelerate research
CLINICAL DATA WAREHOUSE OVERVIEW
HSSC CDW

Collection

Healthcare Institutions
- Medical University South Carolina
- Greenville Health System
- Palmetto Health
- Spartanburg Regional Health System

Data Scope:
- Demographics
- Diagnoses
- Procedures
- Medications
- Labs

Data Feed Types:
- HL7, 837A, CSV

Storage

Data Feed
Consolidation & Mapping

Operational Data Store

MPI

HSSC integrated Clinical Data Warehouse (CDW)

Analysis

i2b2 Cohort Analysis

No PHI

Data Marts & Registries (Future)
## CDW PATIENT DATA
### 1993-2013

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>COUNTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Unique Patients</td>
<td>3,249,877</td>
</tr>
<tr>
<td>Total Patients Received (Before Merging)</td>
<td>3,430,444</td>
</tr>
<tr>
<td>Total Patients Merged</td>
<td>180,567</td>
</tr>
<tr>
<td>Total Patients GHS (1995)</td>
<td>1,055,928</td>
</tr>
<tr>
<td>Total Patients MUSC (1993)</td>
<td>1,257,987</td>
</tr>
<tr>
<td>Total Patients PH (2001)</td>
<td>1,116,529</td>
</tr>
</tbody>
</table>
### CDW VISIT/ENCOUNTER DATA
**FULLY INTEGRATED: 2011-2013**

<table>
<thead>
<tr>
<th>Description</th>
<th>Totals</th>
<th>IP</th>
<th>OP</th>
<th>ED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Visits</td>
<td>13,277,677</td>
<td>575,334</td>
<td>12,080,319</td>
<td>622,024</td>
</tr>
<tr>
<td>Total Visits GHS</td>
<td>6,688,683</td>
<td>305,639</td>
<td>6,383,044</td>
<td></td>
</tr>
<tr>
<td>Total Visits MUSC</td>
<td>4,593,208</td>
<td>127,477</td>
<td>4,242,223</td>
<td>223,508</td>
</tr>
<tr>
<td>Total Visits PHS</td>
<td>1,995,786</td>
<td>142,218</td>
<td>1,455,052</td>
<td>398,516</td>
</tr>
</tbody>
</table>
CURRENT CDW DATA TYPES

- Patient Demographics
  - Gender, Race, Ethnicity, Language and more

- Hospital Visit
  - Visit Type, Hospital Service, Admit/Discharge Dates, Financial Class, and more

- Diagnosis – ICD9 Codes, Dates

- Procedure—ICD 9 Codes, Dates

- Coming in 2014: Medications, Lab Results
I2b2 is an open source validated query tool
- NIH-funded National Center for Biomedical Computing based at Partners HealthCare System
- Our use: Query Tool and associated Data Mart created from full CDW for de-identified searches
- Limited data set for exploratory purposes
- Master IRB agreement in place for these purposes
SECURITY
DATA PROTECTION

Two levels of protection, unique to multi-institutional CDW

- Site specific protection
  - Tasked with preventing inadvertent “un-masking” of institutions

- Patient specific protection
  - Complying with federal regulation for privacy-HIPAA
  - Complying with minimizing individual risk—OHRP/Common Rule
INVESTIGATOR LEVEL:
DATA USAGE AGREEMENT

Highlights:
> Prohibited from attempting to identify individuals using i2b2
> Only authorized access is permitted; no sharing login information
> All user actions are audited
> For research purposes only
> Researchers must have completed the appropriate HIPAA or Information Security training required by institution (i.e. CITI)

If you have access to use eIRB, then you have access to i2b2 and need to no additional training or make any notifications.
USE OF I2B2
https://i2b2.healthsciencesssc.org

Good Health Made Possible™

HSSC Federated Login

Select your Home/Affiliated Organization

Welcome to HSSC’s IT Services. In order to access these services, you must first authenticate yourself. Once authentication is complete, you will be given access to your selected service.

Select your Home/Affiliated Organization

Continue

☐ Remember selection for this web browser session.

This Web Application was developed by HSSC Information Services. By using this application you are liable for any actions that occur during the time you are logged in. Use of this application is logged and monitored by an authorized security personnel.
I2B2 SAMPLE QUERIES

> Type II Diabetes patients, ages 18 – 65, who have been hospitalized between 2011 and 2013

> Individuals with the diagnosis of prostate cancer, are within the age range of 50-90, and having at some point received chemotherapy treatment
BEYOND DE-IDENTIFIED DATA: LIMITED DATA SET REQUEST PROCESS

> The web request form is available at datarequest.healthsciencessc.org
INTEGRATED DATA WAREHOUSE: COLLABORATION ACCELERATOR
SAMPLE COLLABORATIONS:

> Use technology to create model for pattern recognition
  > Work with Harvard School of Public Health and Computer Science Departments to apply Natural Language Processing and Machine Learning tools to the CDW to identify signals for complications of surgery (Safe Surgery 2015)

> SC Children’s Hospital Collaborative
  > Use data in the CDW to evaluate variance in treatment
  > Evaluate outcomes as they relate to changing guidelines
  > Basis for developing Patient/Family-centered implementation accelerator

> Post-cardiac Arrest State-wide System of Care
  > Use data in CDW to evaluate how and why patients are selected for different interventions following cardiac arrest
  > Evaluate patterns of decision making post-cardiac arrest
CAROLINAS PATIENT-CENTERED OUTCOMES NETWORK

- Collaborative project with:
  - HSSC institutions
  - University of North Carolina-Chapel Hill
  - Duke University
  - Wake Forest University

- Federate NC institutions with HSSC (integrated data) to create bi-state data network

- Goals:
  - Create mechanism for single portal for multi-institution query
    - Return single data set
  - Create cooperative review by IRBs
SUMMARY

- HSSC is a statewide collaborative research organization
- Created to leverage existing resources, attract partners, create momentum and drive results in the health sciences research domain
- CDW is a tool available for use now to enable PCOR and CER and holds the potential to be an accelerator of innovation and an important tool that may enhance the likelihood of funding

Questions?
THANK YOU!