Virginia Health Information

Data Linkage for Public Health & Research
Michael Lundberg
Executive Director
March 19, 2009

www.vhi.org
Virginia Health Information

• Formed in 1993 as a public/private partnership

• Virginia’s state-recognized entity to collect, analyze and disseminate Virginia health care data

• Contracts with State Health Commissioner, DMV, DMHMRSAS, Anthem PFP, private contracts, sales and services
Health Data for Varied Needs

- **Hospital Discharge Data**: 870,000 discharges per year from 90+ hospitals
- **EPICS**: financial and operational information from 370+ ambulatory surgical centers, hospitals and nursing homes
- **Outpatient Surgical Data**: for 7 procedure groups from ambulatory surgery centers, hospitals and physicians
- **HMO Data**: from State Corporation Commission and National Committee on Quality Assurance
- **Long-term care**: adult day care, assisted living, CCRCs, home care and nursing facilities
- Hospital and other facility **licensure data**
- **CODES**: Crash Outcome Data Evaluation Systems www.vacodes.org
VHI Publications

Cardiac Care Reports

Databases/Reports on:
- Hospitals
- Nursing Facilities
- Assisted Living, CCRCs
- Outpatient Surgery
- HMOs, Physicians
- Certificate of Need Data
Common Barriers to Acquiring Hospital Discharge Data for Linking

• **Data Needs Assessment**
  – Purpose/uses of the data
  – What do you need?
  – ? Specifics: time frames, scope, data elements needed?
  – What data exist?
  – Research vs public reports- probabilistic vs deterministic

• **Administrative hurdles:**
  – What is the process for acquisition?
  – Data use agreements or IRBs

• **Legal provisions**
Common Barriers to Data Acquisition (continued)

- Cost of the data (price not published or too high)
- Uncertainty about the ownership, use of and access to the linked data set
  - Issues of secondary release of the data
- Process for requesting/acquiring data is lengthy and time-consuming
Common Data Issues

- Data linkage elements not collected or not releasable
- Missing, invalid data elements or duplicate records
- Data only available in deidentifiable or aggregated format
Data Linkage/imputation

• Why we link/impute data
  – For our public reports
  – For custom private reports
  – For others (agencies, registries, researchers)
VHI Mandate & Solution

The Mandate

• Cannot release any information that could reasonably be expected to identify individuals

A Solution

• VHI links for others collaboratively

Some Examples
6 rounds of one-to-one matching between the Cancer Registry and Inpatient data. The match parameters are as follows:

1) Sex/DOB/SSN 67,042 matches 69.5%
2) DOB & SSN 1,892 matches 1.9%
3) SSN 1,474 matches 1.5%
4) DOB M & Y & SSN4 & Sex 4,216 matches 4.3%
5) SSN4 & DOB 138 matches 0.1%
6) DOB & Sex & Zip 3,712 matches 3.8%

Total 79,474 matches 81.1%

Unmatched 18,470 matches 18.2%
### Hospital Discharge Data/Vital Records Births

<table>
<thead>
<tr>
<th>Pass Number</th>
<th>Pass Description</th>
<th>Number of Matches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SSN &amp; Age (+1) &amp; Admit/Birth Date (+ 4)</td>
<td>81,463</td>
</tr>
<tr>
<td>2</td>
<td>SSN &amp; Age (+1) &amp; Admit/Birth Date (+60)</td>
<td>916</td>
</tr>
<tr>
<td>3</td>
<td>Age &amp; Zip &amp; Admit/Birth Date (+ 4) &amp; Hospital ID &amp; SSN4</td>
<td>895</td>
</tr>
<tr>
<td>4</td>
<td>Age &amp; Zip &amp; Admit/Birth Date (+ 4) &amp; Hospital ID &amp; SSN5</td>
<td>868</td>
</tr>
<tr>
<td>5</td>
<td>Age &amp; Zip &amp; Admit/Birth Date (+ 4) &amp; SSN4</td>
<td>115</td>
</tr>
<tr>
<td>6</td>
<td>Age &amp; Zip &amp; Admit/Birth Date (+ 4) &amp; SSN5</td>
<td>116</td>
</tr>
<tr>
<td>7</td>
<td>Age &amp; Zip &amp; Admit/Birth Date &amp; Hospital ID</td>
<td>6,576</td>
</tr>
<tr>
<td>8</td>
<td>Age &amp; Zip &amp; Admit/Birth Date (+1) &amp; Hospital ID</td>
<td>2,234</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>93,183</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>96.0%</strong></td>
</tr>
</tbody>
</table>
Private and State Mental Hospitals

- **Problem**
  - Neither organization can release SSN

- **Solution**
  - Both organizations “encrypt” SSNs VHI provides encrypted file to state agency for internal use to merge private with public mental health care
## Virginia Cardiac Reports - 2007

**Heart Failure**

<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Total Cases</th>
<th>Mortality Rating</th>
<th>Readmission Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bon Secours DePaul Medical Center</td>
<td>246</td>
<td>🌟🌟🌟</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>Bon Secours Mary Immaculate Hospital</td>
<td>183</td>
<td>🌟🌟</td>
<td>🌟🌟</td>
</tr>
<tr>
<td>Children's Hospital of The King's Daughters</td>
<td>5</td>
<td>🌟</td>
<td></td>
</tr>
<tr>
<td>Hampton Roads Specialty Hospital</td>
<td>1</td>
<td>🌟</td>
<td>N/A</td>
</tr>
<tr>
<td>Rappahannock General Hospital</td>
<td>102</td>
<td>🌟🌟🌟</td>
<td>🌟🌟🌟</td>
</tr>
<tr>
<td>Sentara Bayside Hospital</td>
<td>277</td>
<td>🌟🌟</td>
<td>🌟🌟</td>
</tr>
<tr>
<td>Sentara Norfolk General Hospital</td>
<td>562</td>
<td>🌟🌟</td>
<td>🌟🌟</td>
</tr>
<tr>
<td>Sentara Obici Hospital</td>
<td>419</td>
<td>🌟</td>
<td>🌟</td>
</tr>
</tbody>
</table>

**Begin A New Search**

**Definitions**

- **Actual Mortality**
### Virginia Cardiac Reports - 2007

**Click any column to sort**

<table>
<thead>
<tr>
<th>Hospital Name (click for all hospital information)</th>
<th>Teaching Status</th>
<th>Cases Cat.</th>
<th>Total Cases</th>
<th>Hospice Cases</th>
<th>Adj Vol</th>
<th>Act</th>
<th>Exp</th>
<th>Ratio</th>
<th>Rating</th>
<th>Adj Vol</th>
<th>Act</th>
<th>Exp</th>
<th>Ratio</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bon Secours DePaul Medical Center</td>
<td>ACGME</td>
<td>Mid-Low</td>
<td>246</td>
<td>3</td>
<td>239</td>
<td>0.84%</td>
<td>3.14%</td>
<td>0.27</td>
<td>💔💔💔</td>
<td>238</td>
<td>15.13%</td>
<td>17.85%</td>
<td>0.85</td>
<td>💔💔💔</td>
</tr>
<tr>
<td>Bon Secours Mary Immaculate Hospital</td>
<td>None</td>
<td>Mid-Low</td>
<td>183</td>
<td>2</td>
<td>180</td>
<td>3.33%</td>
<td>3.44%</td>
<td>0.97</td>
<td>💔💔💔</td>
<td>175</td>
<td>17.71%</td>
<td>18.06%</td>
<td>0.96</td>
<td>💔💔💔</td>
</tr>
<tr>
<td>Children's Hospital of The King's Daughters</td>
<td>COTH</td>
<td>Low</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>0.00%</td>
<td>2.14%</td>
<td>0.00</td>
<td>💔💔💔</td>
<td>3</td>
<td>0.00%</td>
<td>18.21%</td>
<td>0.00</td>
<td>💔💔💔</td>
</tr>
<tr>
<td>Hampton Roads Specialty Hospital</td>
<td>None</td>
<td>Low</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>100.00%</td>
<td>4.05%</td>
<td>24.70</td>
<td>💔💔💔</td>
<td>0</td>
<td>N/A</td>
<td>19.84%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Rappahannock General Hospital</td>
<td>None</td>
<td>Mid-Low</td>
<td>102</td>
<td>2</td>
<td>91</td>
<td>4.40%</td>
<td>4.26%</td>
<td>1.03</td>
<td>💔💔💔</td>
<td>88</td>
<td>12.50%</td>
<td>18.16%</td>
<td>0.69</td>
<td>💔💔💔</td>
</tr>
<tr>
<td>Sentara Bayside Hospital</td>
<td>None</td>
<td>Mid-High</td>
<td>277</td>
<td>6</td>
<td>253</td>
<td>3.80%</td>
<td>3.86%</td>
<td>0.98</td>
<td>💔💔💔</td>
<td>256</td>
<td>18.36%</td>
<td>18.16%</td>
<td>1.01</td>
<td>💔💔💔</td>
</tr>
<tr>
<td>Sentara Norfolk General Hospital</td>
<td>COTH</td>
<td>High</td>
<td>562</td>
<td>10</td>
<td>552</td>
<td>2.90%</td>
<td>3.20%</td>
<td>0.91</td>
<td>💔💔💔</td>
<td>545</td>
<td>19.45%</td>
<td>18.08%</td>
<td>1.08</td>
<td>💔💔💔</td>
</tr>
<tr>
<td>Sentara Obici Hospital</td>
<td>None</td>
<td>Mid-High</td>
<td>419</td>
<td>7</td>
<td>412</td>
<td>3.67%</td>
<td>2.73%</td>
<td>2.06</td>
<td>💔💔💔</td>
<td>390</td>
<td>17.18%</td>
<td>17.58%</td>
<td>0.98</td>
<td>💔💔💔</td>
</tr>
</tbody>
</table>
Welcome to the Virginia CODES Website

Information for Virginians on Motor Vehicle Crashes, Costs, and Outcomes

**Crash Facts** - Printer ready posters and flyers with topical Virginia crash information.

**Ready to Use Reports** - Quick reports with information on the most common areas of interest about crashes and outcomes.

**Create a Report** - Make your own report on crashes using variables you select.
“Without health there is no happiness. An attention to health, then should take place of every other object.”

Thomas Jefferson, 1787