Using Data-Driven Decisions to Improve Health using Tools like 1Data:

Pediatric Health Information System (PHIS)

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Outline

• Pediatric Health Information System (PHIS) Platform
• Illustrative Example
• Expanded Use of 1Data-type Platforms
Financial Disclosures

• None
Conflict of Interest

• ?? % confidence interval for time to resolution:
  (2 months, 4 months)
PHIS Data Platform
Stronger Together: Our Collective Mission

We advance children’s health through the quality, cost and delivery of care with our children’s hospitals.

Photo by Julie Stefaniak, Women & Children’s Hospital of Buffalo, Buffalo, NY
What Data are in PHIS?

PHIS By The Numbers (Since 2004)
- Children’s Hospitals: 52
- Inpatient Cases: 8.4 million
- Inpatient Days: 52.2 million
- ED encounters: 36.4 million
- Total Charges: $629.9 billion
- Total ICD-9/10 Codes: 217.2 million

Over 125 data items submitted by hospitals for each patient. No manual data entry!
What’s collected on each encounter

**Patient Abstract and ICD Coding**
- Patient Abstract
- Diagnoses (ICD-9/10)
- Procedures (ICD-9/10)
- CPT Codes

**Billed Transaction/Utilization Data**
(all items/services billed to the patient)
- Pharmacy
- Imaging / Radiology
- Lab
- Clinical
- Supplies
- Other
  - Room/Nursing
  - Surgical Svcs
  - Other Misc.

**Patient Encounter**
- Hospital ID
- Patient ID
- Dates/LOS
- Age, Bw, Gest Age
- Principal Diagnosis
- Principal Procedure
- Disposition
- APR-DRG
- MS-DRG
- Key Physicians
- Payer

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Data Standardization

12 ➔ Anti-infectives (Drug Class = 12)
125 ➔ Urinary anti-infectives (Therapeutic Cat = 125)
125217 ➔ Voricanazole (Generic Drug= 125217)
12521710 ➔ oral (Route of Administration=10) …

• Data standardization by IBW Watson/Truven Health Analytics
• Data audited for minimum quality thresholds
• Integrated into CHA’s Pediatric Data Warehouse (SQL)
• Quarterly refresh of data resulting in a 3-6 month lag
Accessing PHIS Data

Standard Reports
- Easy to run
- Modifiable only by ad hoc report analysts

Ad Hoc Reporting
- Allows custom reporting and requires training

Data Extraction
- Designed for extracting large data sets for specified cohorts
- Typically utilized for research projects or in-hospital analytics
Illustrative Example
Practice Variation in Surgeries at CH

Aims:
1. Identify surgical conditions with high inter-hospital cost variation (e.g. inter-hospital practice variation)
2. Quantify the cumulative financial burden of cost variation for each surgical condition

Results: Variation among appendectomies accounted for more than one-third of total variation in surgical costs.

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## Practice Variation in Surgeries at CH

### Appendixitis Report Card

<table>
<thead>
<tr>
<th></th>
<th>Outlier Status</th>
<th>Quartile</th>
<th>Measure (+/- 95% CI or IQR)</th>
<th>Peer Median</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complicated Patients: 15</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Uncomplicated Patients: 71</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Preoperative Diagnostic Evaluation (All Patients)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Diagnostic Imaging Rate (US or CT)*</td>
<td>H</td>
<td>3</td>
<td>100.0% (70.1 - 100.0)</td>
<td>100.0%</td>
</tr>
<tr>
<td>CT Scanning Rate*</td>
<td>H</td>
<td>1</td>
<td>1.2% (0.0 - 3.6)</td>
<td>7.2%</td>
</tr>
<tr>
<td>US Rate*</td>
<td>N/A</td>
<td>3</td>
<td>100.0% (88.3 - 100.0)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Compliance with American College of Radiology Imaging Guidelines</td>
<td>H</td>
<td>1</td>
<td>100.0% (100.0 - 100.0)</td>
<td>88.9%</td>
</tr>
<tr>
<td>Ultrasound Diagnostic Success Rate</td>
<td>H</td>
<td>1</td>
<td>97.4% (92.3 - 100.0)</td>
<td>88.2%</td>
</tr>
<tr>
<td><strong>Postoperative Resource Utilization (Complicated Patients Only)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Diagnostic Imaging Rate (US or CT)*</td>
<td>3</td>
<td></td>
<td>18.2% (0.0 - 38.8)</td>
<td>13.0%</td>
</tr>
<tr>
<td>CT Scanning Rate*</td>
<td>2</td>
<td></td>
<td>6.7% (0.0 - 19.8)</td>
<td>10.1%</td>
</tr>
<tr>
<td>US Rate*</td>
<td>N/A</td>
<td>4</td>
<td>18.5% (0.0 - 39.4)</td>
<td>6.5%</td>
</tr>
<tr>
<td>PICC line Utilization (Complicated Patients)</td>
<td>3</td>
<td></td>
<td>6.7% (0.0 - 19.8)</td>
<td>3.6%</td>
</tr>
<tr>
<td>TPN Utilization (Complicated Patients)</td>
<td>H</td>
<td>2</td>
<td>0.0% (0.0 - 0.0)</td>
<td>0.9%</td>
</tr>
<tr>
<td><strong>Readmission and Revisit Rates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complicated Patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission Rate (Inpatient Setting)*</td>
<td>4</td>
<td></td>
<td>34.9% (0.7 - 69.1)</td>
<td>14.9%</td>
</tr>
<tr>
<td>Revisit Rate (ED or Inpatient Setting)*</td>
<td>3</td>
<td></td>
<td>33.0% (0.7 - 65.4)</td>
<td>22.5%</td>
</tr>
<tr>
<td>Uncomplicated Patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission Rate (Inpatient Setting)*</td>
<td>3</td>
<td></td>
<td>2.9% (0.0 - 6.3)</td>
<td>1.8%</td>
</tr>
<tr>
<td>Revisit Rate (ED or Inpatient Setting)*</td>
<td>3</td>
<td></td>
<td>6.0% (0.7 - 11.2)</td>
<td>5.2%</td>
</tr>
<tr>
<td><strong>Treatment - Related Cost and Hospital Days (Index + 30 day)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complicated Patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median cost of index admission</td>
<td>3</td>
<td></td>
<td>$16,585 (13,773 - 19,397)</td>
<td>$16,290</td>
</tr>
<tr>
<td>Median cumulative cost for all visits (Index + revisit encounters)</td>
<td>4</td>
<td></td>
<td>$19,559 (13,247 - 25,871)</td>
<td>$17,112</td>
</tr>
<tr>
<td>Median Hospital Days Per Cure</td>
<td>3</td>
<td></td>
<td>7 days (3.56 - 9.91)</td>
<td>6 days</td>
</tr>
<tr>
<td>Uncomplicated Patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median cost of index admission</td>
<td>L</td>
<td>4</td>
<td>$9,169 (8,783 - 9,556)</td>
<td>$7,835</td>
</tr>
<tr>
<td>Median cumulative cost for all visits (Index + revisit encounters)</td>
<td>L</td>
<td>3</td>
<td>$9,243 (8,824 - 9,663)</td>
<td>$7,914</td>
</tr>
</tbody>
</table>

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Expanded Use of 1Data-type Platforms
Linking PHIS to clinical registries

- Leverage the strengths of both systems

- Linkage with direct patient identifiers requires approval from both parties and linkage at CHA

- Linkage with indirect identifiers can be done without CHA’s participation
Thank you!