DATA DETECTIVES: PROMISING STRATEGIES TO IDENTIFY SUSPECT CLIENT RECORDS IN OREGON'S IMMUNIZATION INFORMATION SYSTEM (ALERT IIS)

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Background

- ALERT Immunization Information System (IIS)
  - Started in 1996 as statewide childhood registry
  - Lifespan in 2008
  - ~6 million client records
  - ~350k new in 2014
It’s Raining Data
Record Merging

- Goal: Minimize duplicate records in system by proactively merging records

DATA IN

DATA AFTER MERGE

DEDUPLICATION
Record Merging

- Automatic client and immunization record merging
- Targeted Manual Merging
- Future Enhancements of match algorithms and processes
Data Scene Investigation

- ~8% more clients over population estimates

Migration

- Move away
- Death

Fragmentation

- Sparse Data
- Complex Names

Data Quality

- Content Frequency Accuracy
CDC NCIRD* Sentinel Program

- Project supported by Center for Disease Control and Prevention
- Six contiguous counties
- Monitor vaccine trends
- Conduct evaluations

* National Center for Immunization and Respiratory Diseases
CDC Sentinel Program

- Oregon one of six CDC Sentinel sites across US
- Leading national data quality improvement effort

[Logos of CDC Sentinel sites]
There’s a Method for that…

- Statistical methods exist…
  ...but are they enough?
- The purpose of investigating records:
  - To enhance existing statistical methods
  - To enhance overall ALERT IIS data quality
  - To make record resolution more efficient and effective
And more help is on the way...

- Major improvements in demographic field population:
  - More fields are populated
  - Populated more frequently
  - Populated more accurately

- Of interest today:
  - Numeric fields
  - Address field
# Leverage Numeric Data Fields

Names are good… numbers are better

Table 1: Likelihood that selected fields were populated among client records that were successfully merged (Oregon Sentinel data, n=2,876)

<table>
<thead>
<tr>
<th>Traditional Merging Fields</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s First Name</td>
<td>1.23</td>
</tr>
<tr>
<td>Mother’s Maiden Name</td>
<td>1.20</td>
</tr>
<tr>
<td>Client’s Middle Name</td>
<td>1.01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Numerical fields</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid ID</td>
<td>3.78</td>
</tr>
<tr>
<td>Encrypted Social Security Number</td>
<td>2.99</td>
</tr>
<tr>
<td>Phone Number</td>
<td>2.15</td>
</tr>
</tbody>
</table>
Leverage Address Field

Kids with bad addresses: it starts out bad… and gets worse

Percent of clients with only one vaccination recorded in ALERT IIS

<table>
<thead>
<tr>
<th>Ages 4-12</th>
<th>Ages 13-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Address</td>
<td>3.00%</td>
</tr>
<tr>
<td>Bad Address</td>
<td>6.00%</td>
</tr>
<tr>
<td>Complete Address</td>
<td>1.00%</td>
</tr>
<tr>
<td>Bad Address</td>
<td>9.00%</td>
</tr>
</tbody>
</table>
What else?

Leverage Migration Patterns

Every year, some kids move out of Oregon...

... and every year, some kids’ shots stop showing up in ALERT IIS...

...coincidence???
Leverage Migration Patterns

Match pattern of moving to vaccination pattern:

Discount Rate

Calculate discount rate by comparing last update figures with known state migration patterns

Years since update

Determine years since last update for each record
Difference between date record entered system vs. since last update date

National Standards

Utilize National DQ Standards
Recommendations on record inactivation following period of inactivity, other factors
How close can we get to Census population estimates? It depends on which method(s) we use.
Sentinel Next Steps

- All methods presented promise to improve accuracy of rates calculations using ALERT IIS data, and can help target suspect records for resolution
- Project in its infancy but momentum is building
- National white paper on IIS data quality will result
Thank you

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