Overcoming the largest obstacle to health information exchange: One HIE’s story

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Conflict of Interest

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Has no real or apparent conflicts of interest to report.
Conflict of Interest - Verato

Brent Williams

Salary: Yes
Receipt of Intellectual Property Rights/Patent Holder: Yes
Ownership Interest (stocks, stock options or other ownership interest excluding diversified mutual funds): Yes
Questions for the audience
Agenda

• Learning objectives / STEPS framework
• About San Diego Health Connect
• The challenges with patient record exchange
• Changing the way we match patient records
• Futures
• Revisiting STEPS framework
• Questions
Learning Objectives

• Introduce the problem of matching patient identities and its impact on Health Information Exchange

• Outline a real-life use case of how San Diego Health Connect overcame obstacles related to patient identity matching in HIE rollout and adoption

• Explain the process of manual data stewardship for potential patient matches, and how the HIE was able to eliminate 75% of this manual effort

• Explore how healthcare organizations are using third party data and a big-data framework to improve matching accuracy
**STEPS framework**

- Better patient matching
- More efficient medical records exchange
- Less manual data stewardship
- Less time to onboard providers
- Fewer redundant tests and procedures
- Lower costs
- Higher quality patient care
“The sheer volume and velocity of data at our fingertips today is unprecedented… As we build a Culture of Health—a nation where everyone has the opportunity to live longer, healthier lives—it will be critical to ensure communities can effectively use and manage this information in ways that help people get healthy and stay healthy.”

~ Risa Lavizzo-Mourey, MD, MBA, President and CEO, Robert Wood Johnson Foundation
The SDHC mission

Our Mission
To connect healthcare stakeholders to deliver quality, comprehensive information for better care.

When every individual’s health information is securely available to their doctors when and where they need it:

• Doctors can provide better, more informed care.
• Duplication of tests and procedure decreases.
• Costs go down.
San Diego Health Connect – What is it?

- Not-for-profit, public benefit organization
- Connectivity – secure, private network
- Medical information exchange
- Portal access
- Secure messaging
- Interoperability
- 100% HIPAA compliant – no greys
San Diego

- 3.2 million people
- Second most populous County in the state, 5th most populous county in the U.S.

- 4,526 square miles
- 70 miles of coastline
- Geographic diversity: Coast, mountain, desert
- 86 miles of international border - Busiest land-border crossing in the world
- 3 Military Facilities
- 18 federally recognized Indian Reservations
- 19 Acute Care Hospitals
- 4 Non-acute/Rehab Hospitals
- 115 clinics
- 9,000 physicians
Connecting San Diego Healthcare

- Lab Companies
- Health Plans
- Home Health
- Nursing Homes
- EMS
- Public Health Agencies
- Behavioral Health Providers
- Schools
- Hospitals
- Physician Practices
- Pharmacies
- Community Health Centers
- Patients and Caregivers
- Health Plans
- Home Health
- Nursing Homes
- EMS
- Public Health Agencies
- Behavioral Health Providers
- Schools
- Hospitals
- Physician Practices
- Pharmacies
- Community Health Centers
- Patients and Caregivers
Why use HIE?

• **Healthier patients**: Fewer medical errors, improved patient safety, improved continuity of care, and better patient outcomes

• **More efficient**: Automated sharing of information, less paperwork, reduced time to access clinical information at the point of care, fewer repeat tests and procedures

• **Informed treatment decisions**: A more complete and up-to-date patient medical record, including information from all a patient's health care providers

• **Supports public health**: Automates process of reporting mandatory reportable conditions to San Diego County Health and Human Services and California’s Department of Public Health
A sample of SDHC’s 25 participating organizations

UC San Diego Health System
Kaiser Permanente
Rady Children’s Hospital San Diego
Scripps
Council of Community Clinics

Health and Human Services
Department of Veterans Affairs
United States of America
HIE Value to San Diego Healthcare

**Community Clinics**
- Access to relevant patient information
- Great access to specialty care
- Speeds referral process

**Health Systems**
- Improves care coordination
- Reduces preventable admissions
- Improves MU compliance
- Improves patient outcomes

**Physicians**
- Strengthens provider engagement
- Office visit improved
- Expands physician reach.
- Reduces costs

**Public Health**
- Automated real time reporting
- Standardized data
- Single platform for community health
- Achieve population health and wellness

**Consumers**
- Care is more coordinated
- Improves office visit
- Strengthens patient engagement
- Less duplicate tests and procedures
- Fewer errors and safer care
- Lower out-of-pocket costs
- Less paperwork
- Important health information is accessible when and where it is needed

**Payors**
- Improves payor/provider workflow
- Lowers utilization
- Reduction of network leakage
- Care coordination improved

**Public Health**
- Automated real time reporting
- Standardized data
- Single platform for community health
- Achieve population health and wellness
Today, the HIE is not:

• A Clinical Data Repository
• Patient facing
• A research tool
• Big Data
• An aggregation tool
• An EHR
SDHC uses an MPI as a record locator service

25 Provider institutions
3.2 M patients

7.5 M transactions / month

Mirth MPI
At providers A, B
At provider C
At providers A, B

SAN DIEGO HEALTH CONNECT
Mirth Match
At providers A, B
At provider C
At providers A, B
When records do not match, they end up in an "Exception queue"
Each new provider led to more backlog, due to data quality and differences in governance

<table>
<thead>
<tr>
<th>Exception queue</th>
<th>Manual effort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 FTEs, 4 months</td>
</tr>
<tr>
<td></td>
<td>2 FTEs, 1 year</td>
</tr>
<tr>
<td></td>
<td>2 FTEs, 2 years</td>
</tr>
</tbody>
</table>

**Ultimately:**
187,000 tasks
2 FTEs, 8 years
“Better is possible. It does not take genius. It takes diligence. It takes moral clarity. It takes ingenuity. And above all, it takes a willingness to try.”

Atul Gawande
We decided we needed a better way to match.
Our working group was key in making this decision

41 Total members

13 Different organizations

2 Meetings per month
How Verato is different

MPI Technologies
Algorithm RICH
Data poor

Probabilistic Matching
IBM | Informatica
Oracle | SAP

Verato
Algorithm RICH
Data RICH

Referential Matching
Complete, Unified Data

Cloud-based

Information Providers
Data RICH
Algorithm poor

Fragmented Data
Acxiom
TransUnion
Experian | Equifax

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Identity data is a collection of attributes which often change over time

Bio graph
Name(s), Address, Gender, Birthdate

Family graph
Parents, Siblings, Spouses, Children

Cyber graph
Phone, Email, Social IDs, Device IDs, IP

Government graph
SSN, National Benefits ID, Drivers’ Permits, Legal Records

Social graph
Friends, Roommates, Associations

Professional graph
University, Degrees, Employers, Coworkers, Prof credentials, Associations

Commercial graph
Loyalty cards, Purchases

Financial graph
Fin. Accounts, Homes, Cars, Boats, Mortgages, Loans, Credit
Time, errors, and governance lead to multiple “identities” for one person...

<table>
<thead>
<tr>
<th>One person...</th>
<th>...can be represented by old, incorrect, or incomplete data...</th>
<th>...resulting in different identities across provider systems.</th>
</tr>
</thead>
</table>
| Time          | Name change  
Address change  
Phone/email change  
Married | Divorced  
Birth | Death |
| Ambiguity     | Hyphenated name  
Nicknames  
Jr/Sr, Twins  
Default entries  
Missing data |
| Errors        | Spelling error  
Transcription error  
Homonym error |
| Data Gov.     | Data quality  
Data content  
Privacy controls  
Formatting |
CARBON™ – the most comprehensive reference database of identities in the US

Identity Assembly Algorithm

300M+ Identities

Correct and incorrect data

Credit Header Data

Telco Records

Gov’t & Legal Records

60M updates per month
Referential matching is a revolutionary new way to match patient records.

MPI matching (deterministic or probabilistic) can’t see through different or bad identity data.

Referential matching works despite different or bad identity data.

X No Match

Match
Verato automatically resolved 75% of SDHC’s manual tasks

Exception queue (187,000 tasks)

- 95% pediatrics
- 5% very ambiguous data

45,000 tasks
142,000 new matches
90s run time
Verato also found 126,000 additional matches in the MPI.
In total, SDHC increased the number of matches in its MPI by 110%.
Of the new matches identified by Verato...

1.3% Had conflicting birthdates
7% Had a last name difference
13.1% Had a different address

>20% Had at least one of those three critical errors
Futures – Improve edge case matching

1. Incorporate relationship data in ADTs

2. Pediatrics: add twins identifiers to patient data model at institutions

3. Develop twin inference algorithm for newborns to support twin analysis for adults
Futures – Accommodating varying data governance models

1. Understanding an organization’s identity data governance model

2. Demonstrating proof for non-obvious matches while maximizing privacy

3. Accommodating variations in transport protocols
Futures – Connect to the eHealth Exchange

HIOs and other Communities

SDHC

State / Local Governments

Academic Medical Centers

SSA VA / DOD CDC

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A national patient ID is untenable

1. Unique enumerators are notoriously prone to entry errors

2. Patients can’t always communicate an enumerator to the provider

3. Hundreds of legacy health systems would still need to be linked to the correct patient
Trusted health information exchange...

<table>
<thead>
<tr>
<th>Is built on technical interoperability</th>
<th>Uses document standards to achieve functional interoperability</th>
<th>Is enabled by semantic interoperability</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL7</td>
<td>CCR, SNOMED, DICOM, LOINC</td>
<td>Patient Matching: No false positives</td>
</tr>
<tr>
<td>FHIR</td>
<td>NCPDP, RxNorm, CPT, ICD-9/10</td>
<td>Minimal false negatives</td>
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<tr>
<td>ISO</td>
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</table>
STEPS framework revisited

Better patient matching

Less manual data stewardship

Less time to onboard providers

Fewer redundant tests and procedures

More efficient medical records exchange

Lower costs

Higher quality patient care

HIEs

Providers

Patients
STEPS framework revisited

- Better patient matching
- More efficient medical records exchange
- 110% more matches
- HIEs
  - 75% Less manual data stewardship
  - 20% Less time to onboard providers
  - 50% Fewer redundant tests and procedures
- Providers
  - 35% Lower costs
- Patients
  - 25% Higher quality patient care
Questions

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