The Patient Identity Imperative

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Patient identities from multiple EMR, MPI, and Pop Health systems...

...linked or enriched using the Verato cloud-based identity resolution service...

...so healthcare organizations can do...

- Accountable Care Value-based Care
- Health Analytics
- HIE and Meaningful Use
- Consumer Engagement

Cloud-based Big Data + Referential Matching
The Healthcare Imperative for Accurate Patient Identification

• Why Accurate Patient Identity and Why Now
• The Federal Perspective
• The Private Collaborative Perspective
• The Verato Solution addresses the Challenge in a Whole New Way
The Industry Imperatives for Better Patient ID

- Triple Aim
- Consumer Engagement
- Precision Medicine
- Value-Based Reimbursement
- Population Health
- ACOs
- Analytics
- Health Information Exchange
- Research

Precision Medicine
Consumer Engagement
ACOs
Healthcare organizations need to engage with consumers, discover insights and make effective decisions to succeed.

- 64% of healthcare CXOs believe personalized care is an important consumer expectation today\(^1\)
- 66% of healthcare CXOs are actively pursuing product and service innovation\(^1\)
- #3 Killer: Medical error in USA is preventablemedical error\(^2\)

\(^1\)IBM Institute for Business Value 2015
\(^2\)Johns Hopkins University 2016
Patient Matching Imperative: Industry Perspectives

Government
- The Office of the National Coordinator for Health Information Technology
- pcori
- CMS
- AHRQ
- EHR, HIE, Pop Health

Associations
- The Sequoia Project
- AHIMA
- IHE
- CHIME
- FHIR
- Transforming Health through IT

Identity Specialists
- ORION Health
- mirth
- Epic
- athenahealth
- Health Catalyst
- Cerner
- OPTUM
- CERN
- OPTUM
- LifeMed ID
- Imprivata
- CERTIFY
- RightPatient
“20% could relate a serious adverse event back to patient identification problems”
- 2012 CHIME member survey

“FHIR is being talked about as the universal magic bullet. I am amazed by the hype of it. People are looking for an answer, and need a magic bullet.”
- Micky Tripathi, President and CEO of the Massachusetts eHealth Collaborative and Chair of the Information Exchange Working Group of the HIT Policy Committee

“The IoT healthcare market is expected to grow from $32.47 Billion in 2015 to $163.24 Billion by 2020”
- Research and Markets

“However good patient-matching algorithms are, I would never argue that you have the perfect algorithm. It's really contingent on the quality of the demographic data you've collected and that tends to be error-filled. Even if we do get a patient identifier, we'll still have problem with data entry in the identifier.”
- Dr. Charles Jaffe, CEO of HL7
THE FEDERAL PERSPECTIVE of the Patient Identity Imperative
HHS and ONC Perspective

- 2014: Patient Identification and Matching Final Report by Audacious Inquiry, LLC
- 2015: Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap
  - Developing and Testing a Data Management Model and Maturity Scale Tailored to Improving Patient Matching Accuracy, by Venesco, LLC
- 2016: CMS SMD 16-003
  - Report to House Appropriations Committee 2017
  - Labot-HHS Spending Bill
Connecting Health and Care for the Nation:
A Shared Nationwide Interoperability Roadmap – Final Version 1.0
HIT Joint Advisory Committee Presentation
October 6, 2015
Goals:

**2015-2017**: Send, receive, find and use priority data domains to improve health care quality and outcomes.

**2018-2020**: Expand data sources and users in the interoperable health IT ecosystem to improve health and lower cost.

**2021-2024**: Achieve nationwide interoperability to enable a learning health system, with the person at the center of a system that can continuously improve care, public health, and science through real-time data access.

Source: ONC “A Shared Nationwide Interoperability Roadmap” 2015
Accurate Individual Data Matching

Whether aggregated in a repository or linked "just in time," electronic health information from disparate sources must be accurately matched to prevent information fragmentation and the incorrect merging of records. As technology evolves, provider identities, system identities, device identities and others that support public health and clinical research will need to be accurately matched.

**2015–2017**

- Send, receive, find and use priority data domains to improve health and health care quality

**L1.1** All organizations that match electronic health information have an internal duplicate record rate of **no more than 2% at the end of 2017.**

**2018–2020**

- Expand interoperable health IT and users to improve health and lower cost

**L1.2** All organizations that match electronic health information have an internal duplicate record rate of **no more than 0.5% at the end of 2020.**

**2021–2024**

- A learning health system enabled by nationwide interoperability

**L1.3** All organizations that match electronic health information have an internal duplicate record rate of **no more than 0.01% at the end of 2024.**
Achieving the ONC target is daunting in light of industry practices

0.5%
The internal duplicate record error rate that organizations must achieve by 2020.

34%
of webcast participants’ organizations hadn’t started a governance program

44%
of survey respondents don’t know their duplicate error rate

58%
don’t know the formula for calculating their duplicate error rate

1HDM and AHIMA webcast June 23, 2016
2AHIMA member survey August 2015
THE PRIVATE COLLABORATIVE PERSPECTIVE of the Patient Identity Imperative
Patient Matching Decoded

A Framework for Cross-Organizational Patient Identity Management
The Blind Spot: Cross Organizations Patient Matching

Why is Patient Matching still an unsolved problem?

All organizations perform patient matching and have controls in place to keep track of patient identity. This is key to providing care while ensuring privacy.

Matching across organizations is different than identifying the patients locally.

- Vastly different data characteristics
- Data quality
- Data completeness
- Data field consistency
- Default or temporary values
- Vocabulary adoption and versioning
- Vastly different scope of data (specialty practice vs. large integrated delivery network)
- Presence/absence of an enterprise-wide active master patient index (MPI)
- Use of multiple MPIs
- Research Institutional Review Board stipulations
- Legal jurisdictions and requirements (minors, reproductive health, etc.)
- Organizational size, resource allocation, project timelines, commitment, skill levels
- Corporate cultures (being “friendly” to clients vs. being meticulous for registries)
- Different tolerances in terms of matching accuracy
- Different patient matching rules and algorithms
- Human and system workflows (latency, variations, definitions, etc.)
- Consent, security, sensitive data sharing, and other policies
- Vendor engagement, version updating strategy, staffing
- Software (vendors, update lifecycle, configuration)
- Change management
- Internal enterprise software architecture
- Services levels/response times
- Data exchange latency

Overview of Steps to Increase Match Rates

Unconstrained Demographics
Data cleaning, Normalization
Algorithmic refinement, Operational improvement
Pre-worked & reused correlations
Lessons Learned

Performance Limit of demographic traits
90-95%

10-15%  60-70%  85-90%  95%+

Identifying Best Patient Match Attribute

### Patient Attributes Analysis

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Completeness</th>
<th>Validity</th>
<th>Distinctiveness</th>
<th>Comparability</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPI</td>
<td>100%</td>
<td>--</td>
<td>100%</td>
<td>Very High</td>
<td>Very High</td>
</tr>
<tr>
<td>Last Name</td>
<td>99.85%</td>
<td>99.84%</td>
<td>5.1%</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>First Name</td>
<td>99.85%</td>
<td>99.33%</td>
<td>3.1%</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Middle Name</td>
<td>60.54%</td>
<td>60.54%</td>
<td>2.6%</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Suffix Name</td>
<td>0.08%</td>
<td>0.08%</td>
<td>0.08%</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>SSN</td>
<td>61.40%</td>
<td>60.92%</td>
<td>98.0%</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Sex</td>
<td>99.98%</td>
<td>99.98%</td>
<td>0.00008%</td>
<td>High</td>
<td>High</td>
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<tr>
<td>Date of Birth</td>
<td>98.18%</td>
<td>97.38%</td>
<td>0.8%</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Date of Death</td>
<td>3.36%</td>
<td>3.36%</td>
<td>3.4%</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Street Address (1 or 2)</td>
<td>95.00%</td>
<td>94.61%</td>
<td>44.4%</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>City</td>
<td>94.84%</td>
<td>94.83%</td>
<td>0.8%</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>State</td>
<td>94.81%</td>
<td>94.39%</td>
<td>0.8%</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Facility MRN</td>
<td>99.90%</td>
<td>99.90%</td>
<td>99.90%</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Postal Code</td>
<td>92.31%</td>
<td>92.0%</td>
<td>0.6%</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Primary Phone Number</td>
<td>90.68%</td>
<td>87.26%</td>
<td>51.6%</td>
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<td>Medium</td>
</tr>
<tr>
<td>Work Phone Number</td>
<td>20.28%</td>
<td>19.79%</td>
<td>51.6%</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>25.25%</td>
<td>25.25%</td>
<td>0.0003%</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Race</td>
<td>76.25%</td>
<td>76.25%</td>
<td>0.0001%</td>
<td>High</td>
<td>Very High</td>
</tr>
</tbody>
</table>

Cross-Organizational Maturity Model

A SDO-based tool to assess and adopt more advanced patient identity management in a methodical manner.

**Level 0**
- Ad hoc
- No oversight
- Unpredictable

**Level 1**
- Data quality
- Basic processes
- Limited oversight

**Level 2**
- Increasing algorithm use
- Quality metrics gathered
- Standards use

**Level 3**
- Advanced technologies
- Management controls quality metrics
- Community involvement

**Level 4**
- Ongoing optimization
- Active management
- Leadership

Create consistent, accurate, real-time holistic view of person data

1. Remember this will be person including member, patient, consumer—think broadly to sources and strategic goals
2. Approach must support EMRs, HIE, pop health, claims and MUCH more
3. Data consumers will come from all sectors – make sure diverse stakeholders involved

Develop a cost effective, metric driven, agile approach to meeting ONC metrics

1. Measure and improve, even though measurements aren’t standardized
2. Quantify today’s costs of data stewardship and not meeting strategic goals
3. Be open to new ways to solve this long standing problem

Don’t wait for the silver bullet: multi-faceted problems requires multi-faceted solutions

1. People, process and technology have to be part of the organizational and industry solution
2. No single standard or approach or identifier will solve interoperability or patient identity

Be innovative. Be agile. Take action now.
Verato offers a different approach
You can’t get 20X better results without a radical change in your approach

0.5%

The internal duplicate record error rate that organizations must achieve by 2020.

AHIMA has found that the current average error rate is 8-12%.

Can you cut your duplicates by 20X in less than 4 years?

Source: ONC interoperability roadmap
CARBON™ is a complex self-learning graph database of identities

- **COMPREHENSIVE**: Over 300M identities with 30 years of data
- **CURRENT**: Over 60M identity updates/month
- **AUTHORITATIVE**: Combines databases from credit, telco, and govt
- **SELF-CORRECTING**: Every new database corrects errors in previous data
- **SELF-LEARNING**: Every query makes CARBON smarter
- **INTELLIGENT**: CARBON contains more “metadata” than data
- **EXTENSIBLE**: Private client attributes can be stored for each identity
Key differentiator: historical data

**ONC**

Historical last name, historical address, and historical phone number “should be required data attributes for relevant exchange transactions.”

**The Sequoia Project**

Address attributes have low stability.

**Our Findings**

Over 10% of true matches have different addresses.

**Our Approach**

Stability does not matter when you can use historical information in patient identification and matching processes.

Address history
Name history
Phone history

**CARBON**
Key differentiator: true knowledge of “uniqueness”

The combination of first name, last name, and date-of-birth attributes provides 95.7% uniqueness.

Our Findings

It’s actually closer to 85%.

And the combination of first name, last name, and address provides just as much uniqueness.

Our Approach

When you have insight into everyone, you can know when a set of attributes uniquely identifies someone.

The Sequoia Project

Our Findings

<table>
<thead>
<tr>
<th>Combination of Traits</th>
<th>Uniqueness</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN+LN+DoB</td>
<td>95.7%</td>
</tr>
<tr>
<td>FN+LN+DoB+Sex</td>
<td>95.9%</td>
</tr>
<tr>
<td>FN+LN+DoB+Sex+ZIP(first 5)</td>
<td>99.2%</td>
</tr>
<tr>
<td>FN+LN+DoB+Sex+Phone</td>
<td>99.5%</td>
</tr>
<tr>
<td>FN+LN+DoB+Sex+MN</td>
<td>98.9%</td>
</tr>
<tr>
<td>FN+LN+DoB+Sex+MN(initial)</td>
<td>97.7%</td>
</tr>
<tr>
<td>FN+LN+DoB+Sex+SSN(last 4)</td>
<td>99.7%</td>
</tr>
</tbody>
</table>
Key differentiator: rapid, automatic decisions on difficult matches

AHIMA

In-depth study of 400,000 duplicates, looking at which differences in data caused the duplicates.

But resolving these duplicates took months and extensive (and expensive) manual effort.

Our Findings

Automatic resolution of 75% of tricky potential matches takes days, not months.

Our Approach

An “answer key” that can help with tricky matches

When you compare against a veritable “answer key,” you can make matches quickly and automatically.
Get a jump start on meeting the ONC duplicate error rate

2%

The internal duplicate record error rate that organizations must achieve by the end of 2017.

Source: ONC interoperability roadmap
Get a jump start on meeting the ONC duplicate error rate

2%

The internal duplicate record error rate that organizations must achieve by the end of 2017.

Source: ONC interoperability roadmap

Verato can get you to 2% in just 2 months
Next steps

Contact Verato if:

1. You want to use historical address data in your patient identification processes.

2. You want to match patient records that have very sparse data using uniqueness matching.

3. You want to automatically match difficult potential duplicates without manual effort.
Find us on YouTube!
tinyurl.com/veratoyoutube

Watch past webinars
View our overview video
Watch our interview with Dan Chavez, Executive Director of San Diego Health Connect