Data Orchestration and Governance Harmony
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Omni-HealthData/Information Builders

Massachusetts Health Data Consortium

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Agenda

Why are Data Important?

Healthcare Data Challenges

Enterprise Strategy
Data: A Core Challenge

- Value Based Care and Shared Risk
- Interoperability and FHIR
- Digitalization
- Population Health
- AI and Machine Learning
Treat Data As A Valued Asset – WHY?

WE CANNOT SOLVE OUR PROBLEMS WITH THE SAME THINKING WE USED WHEN WE CREATED THEM

Albert Einstein

YOU must achieve the Quadruple AIM!

Quality
Cost
Consumer/Clinician Satisfaction

OmniHealthData
Agenda

- Why are Data Important?
- Healthcare Data Challenges
- Enterprise Strategy
#SolvingDataRichInformationPoor

What to do with All the Data

AMOUNT

DATA

INFORMATION

GAP

GAP

GAP

KNOWLEDGE

CLINICAL UTILITY

TIME

Source: Michael N. Liebman, PhD
Executive Director Windber Research Institute
Quality is Key

“Data is useful. High-quality, well-understood, auditable data is priceless.”

– Ted Friedman, Gartner
The Situation
HealthCare Data Management: The Typical Approach

Data Sources
- Amb EMR
- Hosp EMR
- Amb Bill
- Hosp Bill
- Claims
- HR, Time
- G/L, A/R
- Costing

Big Data 1  Big Data 2  Big Data 3

Typical Data Store/Lake

Data Jail

Typical Reports and Analytics
- Amb EMR Rpts
- Hosp EMR Rpts
- Amb Bill
- Hosp Bill Rpts
- Claims Rpts
- HR/Time Rpts
- G/L, A/R Rpts
- Costing Rpts

Is this Enterprise Data Management?
Does it support sustainable Data Analytics and Reporting that scales?
Healthcare Data Challenges – Example #1

Gender(27)

- M: Male
- F: Female
- T: Transgender
- I: Interlocutory
- N: Not applicable
- <NULL>

Marital Status (37)

- M: Married
- S: Single
- W: Widowed
- D: Divorced
- A: Ambiguous
- N: Not applicable
- R: Registered domestic partner
- L: Living together

Reference Data

Validation
Harmonization
Standardization

Code Sets

Other Reference

Medical Terminology

Patient Gender (6)
- A: Ambiguous
- F: Female
- M: Male
- N: Not applicable
- O: Other
- U: Unknown

Marital Status (16)
- A: Ambiguous
- B: Unmarried
- C: Common law
- D: Divorced
- E: Legally Separated
- G: Living together
- I: Interlocutory
- M: Married
- N: Annulled
- O: Other
- P: Domestic partner
- R: Registered domestic partner
- S: Single
- T: Unreported
- U: Unknown
- W: Widowed
Healthcare Data Challenges – Example #2

Hospital Name
IBH of New York
IB and NY Medical Center
IBHealth Hospital of New York
IBNY Med Center
The IBHealth Medical Center, NY

In other systems:
IBNY Medical Center
IBHealth Medical Center
IB NY
CMS Hospital Name...
TIN Hospital Name...

Unit
4 North
4-North
4_North
04North
4N

Bed
4N 420
4N-420
RM_420
420
N420
Healthcare Data Challenges – Example #3

Terminology Sets (partial list)
- SNOMED CT
- ICD-9-CM
- ICD-10-CM/PCS
- CPT-4
- Medical necessity
- Age/gender edits
- HCPCS
- APC
- MS-DRG, AP-DRG
- LOINC
- DSM IV
- Medications:
  - RXNorm, FDB, NDC, NDF-RT, Medi-Span, Multum
- HLI Medical Specialty Subsets
- PQRS Subsets
- HLI Medical Specialty Subsets
- Nursing: NIC, NOC, NANDA
- HL7
- CDT
- UCUM
- UNI
- HRG
- CCI
- CVX, MVX
- Rev codes
- Multiple languages

Mappings (partial list)
- SNOMED CT to ICD-9-CM
- SNOMED CT to CPT
- SNOMED CT to MeSH
- SNOMED CT to ICD-10-CM/PCS
- ICD-9-CM to ICD-10-CM/PCS
- ICD-10-CM/PCS to ICD-9-CM
- ICD-9-CM to SNOMED CT
- ICD-10-CM to SNOMED CT
- CPT to SNOMED CT
- DSM IV to SNOMED CT
- RxNorm to NDF-RT
- CPT to CVX
Agenda

Why are Data Important?

Healthcare Data Challenges

Enterprise Strategy
Where is “Data Utopia” - can the EMR do it all?
For good results, data sets must be accurate, complete and large. It’s easy to understand why: A computer algorithm can’t tell if data it receives is wrong. If it continues to learn and evolve based on inaccurate or incomplete information, the downstream results can be deeply flawed. “ -Forbes

Top health industry issues of 2018
A year for resilience amid uncertainty

Data are crucial to AI success.

An AI tool is only as good as the data it uses for decision-making. Companies should invest in finding, acquiring and creating good data, standardizing it and checking it for errors. Companies should consider how their systems capture, collect, clean, integrate, enrich, store and analyze data. They should collect data in a way that allows it to be integrated with other relevant systems and in a way that allows questions to be answered.
Gartner “Must Have” – Health Data Curation/Enrichment Hub

- Data Silos
- Curation and Enrichment Hub
- Data Cleansing Applied
- Reference Data Management
- Data Governance
- Consumption and Metric Layer
- Healthcare Designed Data Warehouse
- Batch and Streaming
- Data Enrichment
- Consolidate Disparate Systems

Consumption
“Successful deployment of a comprehensive health data curation and enrichment hub is a foundational component of the real-time health system, conducting digital healthcare, and the ability to execute population health and community care management.”

-Laura Craft, Gartner
Hype Cycle – Health Data Curation & Enrichment Hub

Health Data Curation & Enrichment Hub
Omni-HealthData is the peer-enriched Enterprise Data Management platform that *scales*. It supports *sustainable* organizational analytics with minimal FTE requirements.
Healthcare Data Analytics & Interoperability Data Chain

**Foundational**
- Source Data
- MDM/DQ

**Structural**
- Clinical Data
- Code Sets

**Semantic**
- Value Sets
- Algorithms

**Organizational**
- Presentation

**Canonical Healthcare Information Model**
- Subject driven data onboarding simplifies data integration.
- Optimized canonical data model for integration of 30,000+ attributes in over 80 subject areas.
- Batch or transactional:
  - Databases
  - Flat files
  - HL7 v2, v3, FHIR
  - EDI transactions

**Medium Complexity**
- Centralized multi-domain mastering & data quality across:
  - Patient
  - Provider
  - Provider Practice
  - Payer
  - Facility
  - Workforce
  - Member
- Longitudinal, 360-degree view of patient’s clinical history, SDOHs and risk – tied back to the mastered patients, members, providers and facilities.
- Materialized in health data marts for ease of consumption.

**High Complexity**
- Longitudinal, 360-degree view of patient’s clinical history, SDOHs and risk – tied back to the mastered patients, members, providers and facilities.
- Using Wolters Kluwer HLI and other standards, OHD provides over 200 curated code sets with 10M+ codes.
  - Includes ICD-9/10, CPT, HCPCS, LOINC, RXNORM, NDC, SNOMED, and custom company codes.
  - Our data quality is driven by over 1,000 pre-built cleansing rules for healthcare.

**Medium Complexity**
- Data driven regulatory value set management centralizes labor intensive effort at the data level vs. hard-coding at the analytic or presentation layer for each metric.
- More than 5,000 value sets managed.
- Pre-built industry metric sets spanning numerator/denominator algorithm, and time dimensions for annual or rolling 12 month materialized metrics views/marts.
  - Includes complex query processes and patient, member and episode cohorts, and population sets.

**High Complexity**
- Analytic consumption layer featuring clinical and business subject area data marts.
- Pre-built analytic applications developed with St. Luke’s.
- World class reporting, BI & advanced analytical predictive and prescriptive capabilities.
Advance Analytics Descriptive > Predictive > Prescriptive
Data Driven Decision Making – Enabled!

Strategic

What Happened?
- Clinical-Operational-Financial KPIs

Performance Scorecards
- 714K
- 1,413M

Analytical

Why did it happen?
- Discover Patterns and Outliers
- Visualize Improvement Opportunities

Business Discovery

Operational

Do something about it!
- Take Action with Fit for Purpose Analysis
- Reactive to Real Time to Prescriptive

Push Externally - Consumerism!
- Payers, Providers, Patients, SNF, Services

Operationalize!
Omni-HealthData
Powered By Information Builders


Healthcare Passion
Dedicated healthcare team with deep industry experience.

Proven. Scalable. Trusted.
Information Builders has provided the most scalable data and analytics platform for 43 years with the world's largest deployments across industries.

Best of Both Worlds
Leverage robust healthcare accelerators to drive ROI built on a proven platform.
Expertise and experience across industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>Ford, PACCAR, NSK, Penske, Jaguar, GM</td>
</tr>
<tr>
<td>Business Services</td>
<td>Allegis Group, InSperity, Palm Coast, JPL, CDS Global, JOC Group, Paycor</td>
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<tr>
<td>Communications</td>
<td>CenturyLink, CC Crown Castle, Telefonica, AT&amp;T, Bell</td>
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<tr>
<td>Consumer Packaged Goods</td>
<td>Coty, Kirin, Suntory, Cascades, Canon, Hanesbrands Inc, Toshiba</td>
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<tr>
<td>Financial Services: Banking</td>
<td>US Bank, BBVA, PNC Bank, Scotiabank, Citizens Bank, First Hawaiian Bank</td>
</tr>
<tr>
<td>Financial Services: Capital Markets</td>
<td>Northern Trust, Fidelity, ExtraTrade, Pershing, Securities America</td>
</tr>
<tr>
<td>Financial Services: Payments</td>
<td>Elavon, Moneris, Black Knight, First Data, Worldpay, Global Payments, TSYS</td>
</tr>
<tr>
<td>Healthcare: Payers</td>
<td>Amerisure Insurance, Healthcare Association of New York State, Fidelis Care</td>
</tr>
<tr>
<td>Healthcare: Providers</td>
<td>University of Alabama Health Services Foundation, Halifax Health, Floyd, St Luke’s, Lutheran Life, Alaska Native Tribal Health Consortium</td>
</tr>
<tr>
<td>Insurance</td>
<td>GEICO, LGI, Farm Bureau Services, Nationwide, Erie Insurance, Basler, BAE Systems</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Siemens, Vemmer, Boeing, Lockheed Martin, ThyssenKrupp, Airbus, OFS Brands, Tata Steel, Victory Packaging</td>
</tr>
</tbody>
</table>
### Expertise and experience across industries

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<tbody>
<tr>
<td>Natural Resources</td>
<td>VEOLIA, CLOUD PEAK ENERGY, Apache, FUJI OIL, OURA OIL, VITERRA</td>
</tr>
<tr>
<td>Not for Profit</td>
<td>United Way, younglife, BC HOUSING, WCF, DCi, Lutheran Life Communities</td>
</tr>
<tr>
<td>Pharmaceutical &amp; Medical Supply</td>
<td>McKesson, Takeda, Henry Schein, TakeCare, Takeda, OHARA, Otsuka</td>
</tr>
<tr>
<td>Retail</td>
<td>ACE Hardware, DOLLAR GENERAL, SIGRO, HELZBERG DIAMONDS, AutoZone, Brinker International, ROSNET, Arcadia, Food Lion</td>
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<tr>
<td>Technology</td>
<td>Xerox, KRONOS, PLEX Systems, Sparta Systems, attenti, ardocs, CHROMERIVER, REAL 3D</td>
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<tr>
<td>Transportation and Logistics</td>
<td>FedEx, AIR CANADA, Empire Flights, BNSF, Maverick Transportation LLC, TNT, Hapag-Lloyd, AJ Logistics</td>
</tr>
<tr>
<td>Travel and Entertainment</td>
<td>WINGS, Sabre, Hertz, Carlson, AAA, Travelport, travel and transport, Carnival</td>
</tr>
<tr>
<td>Government: Provincial, State, Local</td>
<td>Brampton, Irving, Maryland, Texas Higher Education Coordinating Board, University of Texas at Austin, Florida Atlantic University, University of Friends University</td>
</tr>
<tr>
<td>Education</td>
<td>UCONN, UFL, FORHAM, Houston Community College, Texas Higher Education Coordinating Board, ATM, FAU, friends University</td>
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</tbody>
</table>
Our healthcare experience spans many decades
Recognition from industry analysts

**BARC**
- Highest ranking in the most (22) categories

**Dresner**
- Highest rank of BI Platforms
- Perfect customer recommendation score

**EMA**
- Top Leader in BI & Analytics (EMA is a Research firm Focused on Midsize Organizations)

**Forrester**
- Leader in Business Intelligence Platforms

**Gartner**
- Leader in BI FrontRunners Report
- New WebFOCUS Designer tool in Modern BI
- Visionary in Data Quality
- Visionary in Data Integration

**Ventana Research**
- #1 Hottest vendor in Business Intelligence
- Hottest Vendor in Mobile BI

**Crowd**
- Market Leader

**Nucleus Research**
- Market Leader
A Note About Data Governance

CULTURE EATS STRATEGY FOR BREAKFAST

Peter DRUCKER

(and technology for lunch)
## Culture – Treat Data as a Valued Asset

<table>
<thead>
<tr>
<th>HUMAN RESOURCES</th>
<th>FACILITIES/EQUIPMENT</th>
<th>MONEY</th>
<th>DATA</th>
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</thead>
<tbody>
<tr>
<td><strong>QUALITY</strong></td>
<td></td>
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<tr>
<td>Performance Reviews</td>
<td>Preventative Maintenance</td>
<td>Balancing Totals</td>
<td>Proactive Profiling</td>
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<tr>
<td>Applicant Screening</td>
<td>Scheduled Testing</td>
<td>Threshold Alerts</td>
<td>Defining Rules</td>
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<tr>
<td>Training</td>
<td></td>
<td>Audits</td>
<td>Assigning Ownership</td>
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<tr>
<td><strong>META DATA</strong></td>
<td></td>
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<tr>
<td>Demographics</td>
<td>Inventories</td>
<td>Balance Sheet</td>
<td>Business Glossary</td>
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<tr>
<td>Employment History</td>
<td></td>
<td>Income Statement</td>
<td>Application Inventory</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>Code &amp; Reference Sets</td>
</tr>
<tr>
<td><strong>MASTER DATA</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Titles</td>
<td>Standardized Equipment</td>
<td>Standardized Currency</td>
<td>Patients/Members</td>
</tr>
<tr>
<td>Employee ID</td>
<td>Standardized Vendors</td>
<td>Currency Conversions</td>
<td>Workforce</td>
</tr>
<tr>
<td><strong>POLICY/PROCESS</strong></td>
<td></td>
<td></td>
<td>Organization &amp; Facility</td>
</tr>
<tr>
<td>Job Descriptions</td>
<td>Clear Accountability</td>
<td>Clear Accountability</td>
<td>Provider &amp; Clinical</td>
</tr>
<tr>
<td>Reporting Structures</td>
<td>Clearly Defined Processes</td>
<td>Decision Rights</td>
<td>Payer &amp; Financials</td>
</tr>
<tr>
<td>Defined Processes</td>
<td></td>
<td>Regulated Processes</td>
<td></td>
</tr>
</tbody>
</table>

- **What does this mean?**
- **Who needs to fix this?**
- **Whose decision is it?**
What We’ve Covered

Why are Data Important?

Healthcare Data Challenges

Enterprise Strategy
Bring it all together and see your stars align!
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