How being data-informed is essential to a Population Health strategy

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• Chief Information Officer for DBHIDS since 2014
• Leader of State of NJ Enterprise Data Management from 2000 through 2014
• Chief Technology Officer for K-12 school district from 1997 to 2000
• Cofounder, and CEO of DataStar International from 1991 through 1997
• MIS Director for Johnstone Training and Research Center from 1987 through 1991, after starting as a Research Scientist
• Keynote speaker at ten different technology events
• Presenter of more than 100 papers at more than 60 events in eight countries on three continents
• Coauthor of one book and technical editor of three books in data management field
• Contributing editor for four years for a monthly data management magazine
• Guest speaker at the Bloustein School of Planning and Public Policy, Hubert H. Humphrey Fellowship Program at Rutgers University and the Rohrer College of Business at Rowan University

2015 GMIS Government Best Practices Award for the NJ Data Governance Office
2015 GMIS Government-to-Government Award for the NJ Big Data Alliance
2013 DAMA International Government Achievement Award
2011 NASCIO Government Transparency Award Finalist for YourMoney.NJ.gov
2002 US OMB Government Without Boundaries Superior Leadership Award
1994 The Informant Readers’ Choice Award for best database programming utility product

Served in volunteer fire and emergency medical service for 40 years, including seven years as chief officer
Today’s Topics

• What is a Population Health Approach?
• The Landscape of Health Care
• The Dawning of a Paradigm Shift
• The Desire to be “Data-Driven”, the Need to be “Data-Informed”
• Information Architecture Use Cases
• The Requirement for Data Governance
• Data Quality: Analogous to Population Health
• The Benefits to Population Health
• Questions
What is a Population Health Approach?
What is a Population Health Approach?

Population Health
“the distribution of health outcomes within a population, the health determinants that influence distribution and the policies and interventions that impact the determinants.”
(Nash, Fabius, Skoufalos, Clarke & Horowitz. 2016)

1st Wave: Building the Foundation
• De-institutionalization
• Expanding Provider Network
• Creating CBH as MCO
• Creating DBHIDS and single-payer system

2nd Wave: Transformation Decade
• Recovery, Resilience and Self-Determination
• Improving Quality of Life
• Creating Learning Organization

3rd Wave: Population Health
• Promoting Health and Wellness for the entire population
• Unified framework for all services and populations
• Reaching everyone efficiently and effectively
THE LANDSCAPE OF HEALTH CARE
Our health care system has been programmed to treat people who present themselves and are diagnosed. We have not focused on the much larger population that is not yet diagnosed. The system is REACTIVE.
The Black Box of Treatment

We measure this.

Symptom reduction, not wellness.
Outcomes are not Measured Well

Symptom treatment does not automatically confer wellness. Rather than guided to the healthy tier, people are discharged from treatment and can land anywhere on the continuum.
It is a Reactive System

Black Box of Treatment

Little or no awareness of the impact of other factors not seen in the treatment room.

Little or no insight into what moves someone from wellness to diagnosed.

Little or no effort to address issues before the need for treatment.
The behavioral health care system is no different. Most resources go to treating those diagnosed with serious mental illness.
We Need to Move Upstream

Upstream

Healthy

At-Risk

Reduce At-Risk

Effectiveness

Downstream

At-Risk

Diagnosed

Reduce Diagnosed

Treatment
There are population health goals for each of the population tiers in a behavioral health care system. Resources are directed at keeping people healthy and at early intervention and mitigation.

But there is a problem...
Health Care is but a Small Component

Environment and Lifestyle Factors have **seven times** more impact on overall population wellness than Health Care.
THE DAWNING OF A PARADIGM SHIFT
We are starting to get good at measuring activity, so reporting volume is not difficult. How do we measure value? We need to determine what determines value.
Social Determinants of Health

Source: Dahlgren and Whitehead, 1993
Another SDOH Framework

Social Determinants of Health

- Economic Stability
- Neighborhood and Built Environment
- Health and Health Care
- Social and Community Context
- Education

Adapted from: http://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health
Yet Another SDOH Framework

Determinants of Health

- Income and social status
- Social support networks
- Employment and working conditions
- Physical environments
- Education
- Healthy child development
- Biology and genetic endowment
- Health services
- Personal health practices and coping skills

http://www.conceptdraw.com/How-To-Guide/what-is-a-circle-spoke-diagram
New Approach – Dr. Arthur C. Evans

1. Working at the Community and Group Level
2. Working “Upstream”
3. Employing a Broad Set of Strategies
4. Working with “Non-Diagnosed” Populations
5. Delivering Health Promotion Interventions
6. Working in Community and Other Non-Clinical Settings
7. Using Health Activation Approaches and Empowering Others
Paradigm Shift to a Proactive System

- Addresses **social determinants** of health
- Is focused on **long-term outcomes**
- Has **health as the goal** (not symptom reduction)
- Requires **partnership**
- Requires **creativity and innovation**
- Utilizes a **data driven approach**
- Involves **systemic strategies**
- Can use **managed care approaches**

This necessitates identifying the right data, ensuring its quality, and using it to make policy and program decisions. “Data-informed”
THE DESIRE TO BE DATA-DRIVEN;
THE NEED TO BE DATA-INFORMED
The Desire to be Data-Informed

This necessitates identifying the right data, ensuring its quality, and using it to make better policy and program decisions.

Data to inform policy making

Data to inform clinical care
New Data Sources are Required

• Sources will need to be identified.
• Need to integrate new data with existing data.
• Meaningful data will need to be delivered to different communities of data consumers.
• The data will need to be evaluated.

There are Four Common Approaches

1. The DBA Approach
2. The Analyst Approach
3. The New Super System Approach
4. The Information Architecture Approach
The Traditional DBA Approach

• I have Data
• I give people Reports
• I drink in the Power

I am the “System DBA”, but I think it means I am the “Data Owner”.

backtraxamerica.com/wp-content/uploads/2011/06/begging.png
This is Happening Everywhere!

Better Informed, Better Health
One Day, Our “System” Looks Like This
The New Super System Approach
One System Solves All Our Problems!

Super SystemOne
Version 1

Better Informed, Better Health
But Wait – Everyone Else Has One

These other systems are in different business units—or–

they are built to address (perceived) functional gaps—or–

they are built to provide “control” somewhere else—or–

they are built for a combination of these reasons.
We Just Need Another Super System!

Sensing a pattern?
(Lather – Rinse – Repeat)

Super SystemOne
Version 2

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The Provider Information Landscape

Operational Systems (Concurrent)  
- Transaction Systems
- Population Management
- Data Warehouses and Analytics

Analytics (Retrospective)  
- External Population Mgmt Systems
- External Transactional Systems
- Public health and other providers

Patient Level  
- Use of Standard Terminologies
  - Implement best practices

Population Level  
- System Interaction
- Develop knowledge

Adapted from Nash, D. B. et al. (2012.) (p. 242)
Information Architecture Use Cases

**Transaction Processing**
- Applications that collect and maintain data about interactions within the business units in support of their business functions. They exchange data with each other in real time.

**Operational Reporting**
- Traditional reporting against transactional systems about current operations with limited or no history, analysis or integration with multiple data sources.

**Key Performance Indicators**
- Integration of operational metrics to provide a 360-degree view of the organization with an ability to track changes and trends over time through dashboards.

**Analytical Reporting**
- Sophisticated reporting, visualizations and statistical analysis of historical data from purpose-built data publication environments (data marts).

**Data Integration and Persistence**
- The data warehousing layer that manages master data, reference data, metadata, and data for historical analysis; the authoritative source of data.
Information Architecture in a Slide

**Transaction Processing**
- **Do**
- **Operational Data Store**
- **Master Data Management**
- **Operational Reporting**

**Analytical Reporting**
- **Learn**
- **Metadata Management**
- **Enterprise Data Warehouse**
- **Key Performance Indicators**

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Why Data Warehousing?

• Improve Performance of Operational Systems
• Improve Performance of Reports
• Improve Security of Operational Data
• Provide Timelier Reporting Solutions
• Reduce the Cost of Development and Maintenance of Reports and Interfaces
• And the Most Important Reason...

BETTER DATA QUALITY
From a Single Source of the Truth
THE REQUIREMENT FOR DATA GOVERNANCE
What is Data Governance?

- Data Governance is the exercise of decision-making and authority for data-related matters.
- Data Governance also refers to the organizational bodies, rules, decision rights and accountabilities of people and information systems as they perform information related processes.
- Data Governance is how we “decide how to decide.”
Data Governance – Business & IT

• It is NOT a Technology Function
• It is NOT a Business Function
• It is a Business/Technology Fusion

Executive Management

Business

CIO

IT Units

Business Users

Data Governance

Technologists

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Slide 40
From a brief produced by Forrester Research entitled *Establish A Data Governance Journey Toward Data Citizenship*

- Organizations are starting the journey toward *Data Citizenship*

- Data Citizenship is the state where everyone understands, learns, and acts according to their responsibility in light of current and future data objectives.

- What this tells us:
  - Data governance involves more stakeholders.
  - Objectives become more complex with more dependencies.
  - Collaboration supplements process to involve multiple viewpoints.
Public sector and healthcare organizations are asking about

- Business alignment (17%)
- Privacy (12%)
- Big data (9%)

Much of the data is regulated. Thus, privacy, and the need to balance more-complex objectives, will be a key driver for the data governance journey in these industries.

Source: Forrester surveys of clients
• As data becomes increasingly central to how organizations function, data governance must become central to organizational process.

• The CoE will provide support to the data governance process and evangelize the strategy to involve all data citizens.

• Data Governance must be federated, with data ambassadors working with the CoE to address business concerns, provide direction and guidance, and formulate strategy.

• Moving toward data citizenship requires a culture shift toward more transparency as well as more shared responsibility.
The New World of Data Governance

- All employees have to become *Data Citizens*
- Instead of “Data Stewards”, we need *Data Ambassadors*
- Data Governance is not a responsibility of the CIO, it is a responsibility of *Executive Management*
- Data Stewardship is not a CIO-led activity, but a collaboration, a *United Nations of Data Ambassadors*
DATA QUALITY
ANALOGOUS TO POPULATION HEALTH
The Goal of Data Governance

To improve Data Quality System-wide, by improving processes and controls at the point of data collection, not at data publication.
Data Quality without Governance

We measure this.

Reports and analysis are produced, but with no assurance of consistency.

Look familiar? Data Governance for Data Quality is like a Population Health approach for overall health (slide 8). Traditional efforts only address data quality symptoms.
We Need to Move Upstream

**Upstream**

- Fix Data Quality at the Source

**Data Quality Improvement**

**Downstream**

- Data Integration Processes
- Reporting

**Transactional**

**Integrated Data**

**Error in Reports**
Data Governance Leads to Quality

Data Governance
- Data Architecture Management
- Data Development
- Database Operations Management
- Data Security Management
- Reference & Master Data Management
- Data Warehousing & Business Intelligence Management
- Document & Content Management
- Metadata Management
- Data Quality Management

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We’ve Seen a Similar Framework

Determinants of Health

- Income and social status
- Social support networks
- Employment and working conditions
- Physical environments
- Education
- Healthy child development
- Biology and genetic endowment
- Health services
- Personal health practices and coping skills
In order to have a holistic, integrated understanding of someone’s health, we need a holistic, integrated information delivery system.
THE BENEFITS TO POPULATION HEALTH
How to Realize the Benefits

• A data quality-driven approach requires data governance.
• A data quality-driven approach will lead to a better data-informed healthcare system.
• Better data available to the right components at the right time will inform not just providers but patients and policy makers.
• Using the right information service delivery use case reduces inefficiency and improves reusability.
The Most Important Lesson

• The solution to empowering population health will not be “Big Data”.
• Big data technologies will likely assist with developing better information, but...

We must not abdicate our responsibility for better health care by turning over decision-making to algorithms, what Cathy O’Neil calls “Weapons of Math Destruction”

We must be data-informed, not data-driven.
References


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