University of Michigan Health System
Enterprise Analytics Roadmap Kickoff

Danto Auditorium
August 4, 2014
12:00pm -1:00pm
## Kickoff Meeting Agenda

<table>
<thead>
<tr>
<th>#</th>
<th>Discussion Item</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Opening Remarks</td>
<td>Andrew Rosenberg, MD</td>
</tr>
<tr>
<td>2</td>
<td>Our Future as an Academic Medical Center</td>
<td>David Spahlinger, MD</td>
</tr>
<tr>
<td>3</td>
<td>The Keys to Our Future</td>
<td>Thomas Shanley, MD</td>
</tr>
<tr>
<td>4</td>
<td>Project Overview</td>
<td>Andrew Rosenberg, MD</td>
</tr>
<tr>
<td>5</td>
<td>Project Approach, Timeline, and Organization</td>
<td>Mary Hill, Michael Brooks</td>
</tr>
<tr>
<td>6</td>
<td>Summary and Q&amp;A</td>
<td>Andrew Rosenberg, MD</td>
</tr>
</tbody>
</table>
Opening Remarks

Andrew Rosenberg, MD
Chief Medical Information Officer
University of Michigan Health System
Meeting Objectives

As a result of attending this meeting, you will:

- Learn about an exciting strategic initiative
- Develop an appreciation for the future role of analytics at UMHS
- Understand how this analytics roadmap will deliver value to care providers, researchers, educators, and other stakeholders
- Receive information on how you can participate
Multiple analytic groups across UMHS operational and research areas report challenges in obtaining useful data to accomplish their missions

Lack of a unified infrastructure and absence of Information Management decision-making across the UMHS enterprise contribute to the above

Now is the time for action .......
Why Analytics?

It is important that we at the Health System put together a plan to manage data analytics in intelligent ways, allowing faculty, staff, students and researchers easier access to data essential to their work.
Why Analytics?

James O. Woolliscroft, M.D.
Dean
University of Michigan Medical School

“From the synthesis of patient care statistics to the aggregation of millions of data points generated by our research enterprise, this analytics program will deliver coordinated education, research, and clinical care analytics enabling us to use powerful tools to track the progress of our tripartite mission.”
Why Analytics?

“
Our health system’s future success will be framed in how we create and sustain value across our missions of patient care, education and research. Enterprise-analytics are key to unlocking the full potential of our information investments, with an aim to provide an integrated approach towards effective use of information, building knowledge and enabling superior outcomes across missions.
”
Project Goals and Objectives

On June 23, the EVPMA Cabinet approved the planning phase of the Enterprise Analytics Roadmap that addresses UMHS care delivery, research, and education programs

- Enterprise Information Management (EIM) Governance Model
- Defined Use Cases and Technical Architecture
- Detailed Implementation Roadmap
- Total Cost of Ownership (TCO) Model
- Potential Quick Wins

As a result of this project, UMHS will have a well-defined roadmap that allows us to quickly focus our efforts and attention on strategic analytic initiatives that promote efficient reuse of data and increase the intelligent use of information resources.
Our Future as an Academic Medical Center

David Spahlinger, MD
Senior Associate Dean for Clinical Affairs
Executive Director of the Faculty Group Practice
University of Michigan Medical School
What does our Academic Medical Center look like in 2025?

- The longitudinal EHR is supplemented by a robust data management system, seamlessly integrating clinical molecular, cellular and phenotypic information to support the unique prevention and therapeutic decisions of each patient.

- Integrated data warehouses and purpose-built data marts will support the tripartite missions while reducing duplicative work.

- These capabilities will streamline, automate, and innovate operational and quality measurement/reporting across multiple domains in order to manage changes in health care financing and to improve outcomes and clinical effectiveness.

- When analytics of physiologic data and clinical outcomes are joined with advanced health and life sciences big data analytics platforms, we will have further enabled:
  - Algorithms that detect early aberrancies and alert providers to patients at risk of decompensation.
  - Further our use of precision medicine.
  - Prescriptive decision support for large populations’ health issues.
  - Translational clinical trials.
The Keys to Our Future

Thomas Shanley, MD
Associate Dean for Clinical and Translational Research
Director of the Michigan Institute for Clinical & Health Research (MICHR)
University of Michigan Medical School
The Keys to Our Future

Our vision is that the investments in information technology and data management systems will continue to facilitate the integration of basic discovery and clinical research. Integration of our academic analytics will allow us to move from hypotheses to more effective data driven decision-making.

A Standards Based Integrated Approach

It is imperative that we leverage appropriate data and technology standards to improve the efficiency and effectiveness of the way we capture, access, maintain and deliver data to our stakeholders.

Leveraging the Power of Big Data & Traditional Data Analytics

We will enable data visualization and discovery for research, clinical and business purposes through the use of high performance analytic technology platforms, innovative analytic methods, traditional BI/reporting and strategic collaborations.
Embedding Analytics in the Way We Operate

Healthcare will increasingly use analytics to drive clinical and operational improvements to meet business challenges.

**Foundational**
- What happened?
- When and where?
- How much?

**Advanced, Predictive**
- What will happen?
- What will be the impact?

**Prescriptive**
- What are potential scenarios?
- What is the best course?
- How can we pre-empt and mitigate the crisis?

---

**Transaction reporting**
- Basic reporting
- Spreadsheets

**Data integration Data warehouse**
- Dashboards
- Clinical data repositories
- Departmental data marts

**Decision support analytics**
- Enterprise analytics
- Evidence-based medicine
- Outcomes analytics
- Real time analytics

**Predictive analytics**
- Personalized healthcare
- Consumer engagement
- Patient/population behavior

© 2013 IBM Corporation
Project Overview

Andrew Rosenberg, MD
Chief Medical Information Officer
University of Michigan Health System
The UMHS Enterprise Analytics Vision

A UMHS member has a question......

**Care Delivery:**
- How similar or different is this patient from other UMHS patients?....from patients elsewhere?
- How many of these patients have I seen?
- Did an educational intervention lead to better outcomes?

**Personalized Medicine:**
- What novel (molecular/population-based, patient-experienced) information is available that might help me understand/manage this patient differently?

**Sustainable Margin:**
- Where do the best opportunities lie to reduce costs while improving quality and service?
- What are the impacts of changes in reimbursement?

**Research & Education:**
- How can data used for patient care be repurposed for educational portfolios, registries and other data marts?

**Comparative Effectiveness:**
- What treatments have been more cost-effective using UMHS vs. State vs. National data?

**Quality & Safety:**
- How do I use data from both ambulatory and inpatient encounters to track individual and patient groups by conditions selected by different services that have regulatory/P4P requirements?

The Answer
There should be a flexible, easy to use system of standards-based tools that provide a uniform, consistent, results-oriented experience for faculty, staff, and students.
The Value of an Enterprise Approach

Without enterprise data management, each project is currently a silo activity. With enterprise data management, the effort for each additional project decreases, yielding cost and time savings.

**Without Enterprise Data Management**

- Project 1
- Project 2
  - Duplicative Effort
- Project 3
  - Duplicative Effort
- Project 4
  - Duplicative Effort
- New Project
  - Duplicative Effort

**With Enterprise Data Management**

- Project 1
- Project 2
- Project 3
- Project 4
- New Project
What Will We Look Like?

A highly integrated healthcare environment enabling bench to bedside: powered by an interconnected intelligent platform that combines unstructured, structured, and streaming data to surface new insights and promote continuous improvement.
Analytic Use-Cases Across UMHS

Use cases will define the enabling elements of architecture, data, processes, and people that maximize value to analytics customers while minimizing the risk of lost efficiency, higher cost, and wasted time.

1. Clinical: Individual and Population Health Queries
2. Quality: Regulatory, P4P, and Peer-Review Analyses
3. Operations and Outcomes Analyses
4. Finance and Cost-effectiveness Analyses
5. Longitudinal Health Services and Health Equity-Based Clinical Research
6. Basic Discovery Research
7. Translational Research
8. Clinical Research
9. Education/Learner Analytics
Identified UMHS Analytics Domains

UMHS has identified three analytics domains that provide logical groupings for the definition of requirements for each of the nine use cases:

**Domain #1**
Enterprise Data Assets, Integration, Reporting & Analytics

- **Federated Information Management environment**
  - Master data management
  - Enterprise architecture
  - Standards based
  - Supports the common and unique needs of care delivery, research and education

**Domain #2**
Real-Time Decision Support

- An engineered platform for big data, real-time decision support
  - Involves large, proven vendor(s) that provides the base from which specialized platforms may emanate
  - Co-developed applications to serve as innovation outlets for traditional federal funding opportunities
  - New industry partnerships

**Domain #3**
Open Analytics Ecosystems

- An open research platform
  - Low cost of entry
  - Robust collaboration tools with public and other non-proprietary data.
  - Supports individual PIs thru multi-disciplinary centers: Cancer, Omics, Pharma, Population Management, Others
Analytics Framework

An enterprise master data management program will provide the coordination for the implementation of the analytics use cases and architecture domains.
Enterprise Information Management
Federated Hub and Spoke Model

A federated model involves standards and guidelines established by enterprise “hub” and provides flexibility for clinical, research, education, and administration groups “spokes” to access data for their respective analytics needs.
Project Approach, Timeline, and Organization

Mary Hill  
UMHS Project Leader

Michael Brooks  
Deloitte Project Leader
Enterprise Analytics Journey
– A Phased Approach

Phase 0: Analytics Plan, Roadmap, and Pre-Planning Infrastructure

Phase I: Data Discoverability Infrastructure & Process

Phase II: Data Exploration and Delivery Analytics Organization & Architecture Design

Phase III: Specific Use Case Implementations
Phase 0 Planning {~6 months}

Phase 0 activities will focus on the development of a detailed UMHS analytics roadmap, with refined cost estimates and identified management infrastructure to coordinate future phases.

<table>
<thead>
<tr>
<th>Phase 0 Workstreams</th>
<th>Project Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workstream 1: Enterprise Information Management (EIM)</td>
<td>• Enterprise Analytics Governance Structure and Ramp-Up Plan</td>
</tr>
<tr>
<td></td>
<td>• Data Governance Playbook</td>
</tr>
<tr>
<td></td>
<td>• Master Data Management Plan</td>
</tr>
<tr>
<td>Workstream 2: Analytics Architecture Requirements and Roadmap</td>
<td>• Use Cases</td>
</tr>
<tr>
<td></td>
<td>• Functional Requirements and Technical Specifications</td>
</tr>
<tr>
<td></td>
<td>• High-level Data and Technical Analytics Architecture (Use Case Driven)</td>
</tr>
<tr>
<td></td>
<td>• Implementation Roadmap</td>
</tr>
<tr>
<td></td>
<td>• Total Cost of Ownership (TCO) Model</td>
</tr>
<tr>
<td></td>
<td>• Potential Quick Wins (e.g. Prototypes, Data Set Catalog, Data Access Tool)</td>
</tr>
<tr>
<td>Workstream 3: Analytics Program Management</td>
<td>• Integrated Implementation and Management Plan</td>
</tr>
<tr>
<td></td>
<td>• Status Reporting Processes and Procedures</td>
</tr>
<tr>
<td></td>
<td>• Change Management Framework</td>
</tr>
<tr>
<td></td>
<td>• Communications Plan</td>
</tr>
</tbody>
</table>
Phase 0, Workstream 1: Enterprise Information Management

Define governance requirements, design governance model, execution plan, and conduct initial implementation. Define Master Data Management strategy and roadmap.

<table>
<thead>
<tr>
<th>Key Activities</th>
<th>Key Deliverables</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identify high-level governance vision, scope and priorities</td>
<td>• Initial data governance organization with executive sponsorship and participants identified</td>
</tr>
<tr>
<td>• Design initial governance and decision-making organization</td>
<td>• Recommended ramp-up plan and orientation program</td>
</tr>
<tr>
<td>• Identify initial participants, roles, responsibilities, and decision rights</td>
<td>• Data governance playbook describing charter, roles, responsibilities, decision rights and processes, and success criteria</td>
</tr>
<tr>
<td>• Design data management effectiveness criteria and metrics</td>
<td>• Master Data Management plan and roadmap</td>
</tr>
<tr>
<td>• Identify high-level governance architecture and toolset</td>
<td></td>
</tr>
<tr>
<td>• Develop enterprise communication plan</td>
<td></td>
</tr>
<tr>
<td>• Conduct governance orientation workshop</td>
<td></td>
</tr>
</tbody>
</table>

Initial Governance Organization

Data Governance Playbook

Master Data Management Plan
Phase 0, Workstream 2: Analytics Architecture Requirements and Roadmap

Translate use case requirements into data and technical architecture, and analytics capabilities portfolio (e.g., services, tools, etc.).

<table>
<thead>
<tr>
<th>Workstream 2: Analytics Architecture Requirements and Roadmap</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Activities</strong></td>
</tr>
<tr>
<td>• Refine use case requirements with key stakeholders, identifying the specific users, data domains, data flow, and success criteria</td>
</tr>
<tr>
<td>• Conduct technical interviews, discovery sessions, and use case workshops</td>
</tr>
<tr>
<td>• Define the scope and requirements for an enterprise logical data model</td>
</tr>
<tr>
<td>• Design high-level future-state data and technical architecture</td>
</tr>
<tr>
<td>• Identify analytic requirements that are common to multiple stakeholder groups to share services and resources</td>
</tr>
<tr>
<td>• Develop Total Cost of Ownership model – additional costs and implementation roadmap</td>
</tr>
<tr>
<td>• Prepare executive summary</td>
</tr>
<tr>
<td><strong>Key Deliverables</strong></td>
</tr>
<tr>
<td>• High-level Data and Technical Analytics Architecture (Use Case Driven)</td>
</tr>
<tr>
<td>• Refined Analytics use case technical, data and end user requirements</td>
</tr>
<tr>
<td>• Recommended standards for technology, data, inoperability and other areas</td>
</tr>
<tr>
<td>• Total Cost of Ownership Model – estimated high level capital and operating costs</td>
</tr>
<tr>
<td>• Implementation portfolio with prerequisites and suggested priorities</td>
</tr>
<tr>
<td>• Implementation Roadmap – three-year timeline for major analytics portfolio initiatives with dependencies, requirements, and assumptions</td>
</tr>
</tbody>
</table>

High Level Technical Analytical Architecture
Total Cost of Ownership Model
Implementation Roadmap

Copyright © 2014 Deloitte Development LLC. All rights reserved.
Phase 0, Workstream 3:
Analytics Program Management

Key Activities
- Establish Program Management framework and processes
- Work with UMHS to coordinate program activities, status meetings and other specific functions
- Confirm initial project priorities and success measures
- Develop enterprise Communication Plan
- Develop Change Management Plan
- Define framework for reporting on progress and risks
- Advise UMHS on development of Phase 0 ramp-up/activation plans & implementation of Phase 1

Key Deliverables
- Integrated Implementation & Management Plan
- Communication Plan
- Program Management templates, processes and procedures
- Change Management Framework
- Status reporting
Phase 0 Timeline of Activities

We estimate that the Phase 0 project will require approximately 6 months with established signoff milestones as shown below.
Project Team

UMHS EVPMA Cabinet

UMHS Enterprise Analytics Roadmap Steering Committee
Andrew Rosenberg
Ted Hanss
Sue Schade
Tim Smith

Phase 0 Roadmap Management
Mary Hill
Mike Brooks

UMHS Analytics Faculty Advisory Group

UMHS Clinical, Research and Education Enterprise Architecture Team (CREEATE)

Workstream 1: EIM Governance
Mary Hill
Mike Brooks
Governance: Cindy Leavitt
MDM: Kyle Kerbawy

Workstream 2: Analytics Architecture Requirements & Roadmap
John McPhall/Jack Kufahl
John Sencabaugh
Use Cases: Frank Manion/Karen Hollingsworth
Technical Architecture: Amitava Shee/Brian Braun
Logical Data Model: Kyle Kerbawy

Workstream 3: Program Management
Mary Hill
Mike Brooks

TCO/Roadmap: Jared Hopkins

Other UHHC/UMMS Representative Stakeholders
Next Steps

1. Conducting participant interviews and workgroup sessions (July-Sep.)


3. Developing Use Case Functional Requirements & Technical Specifications (Oct. – Nov.)

4. Designing High-Level Data & Technical Architecture (Oct. – Nov.)
Summary

Andrew Rosenberg, MD
Chief Medical Information Officer
University of Michigan Health System
Summary of Benefits to UMHS

1. World Class Patient Care
   - Population health management
   - Value based care
   - Comparative effectiveness
   - Outcomes analysis
   - Evidence-based medicine

2. Personalized Medicine
   - Clinical genomics
   - Genetic profiling
   - Molecular diagnostics
   - Targeted therapy

3. Innovative Scientific Discovery
   - Multi-center clinical trials
   - Registries
   - Integrated molecular data
   - Translational research

4. Continuous Learning
   - Continuous improvement
   - Capability driven delivery organization
   - Free up UMHS resources for strategic work

5. Sustainable Margin
   - Refine and improve operating standards
   - Compliance to agreed organizational policies
   - Efficiencies through improved operational KPIs

An enterprise analytics roadmap will enable UMHS to achieve our vision of “creating the future of healthcare through discovery” and deliver value to our various stakeholder communities.
What We Need From You

We need your ongoing participation, cooperation, and dedication to drive this effort to a win for UMHS

How can you help?

- Identify opportunities for high value quick wins
- Share your insights and perspectives on the Use Case Requirements
- Identify existing initiatives and capabilities that we need to consider
- Make time in your calendar for the next 3 months to participate in workgroups and other forums
For Additional Information

Key Contacts:
Andrew Rosenberg
arosen@med.umich.edu
(734) 936-7241

Ted Hanss
ted@med.umich.edu
(734) 998-0086

Mary Hill
maryhill@med.umich.edu
(734)763-6751

Mike Brooks
mibrooks@deloitte.com
(303)204-7332

Sue Schade
sgschade@med.umich.edu
(734) 764-4262

Resources:
Website: http://analytics.medicine.umich.edu
Mailbox: umhs-analytics@med.umich.edu
Questions & Discussion