ENABLING ADVANCED ANALYTICS
TO IMPROVE OUTCOMES

Beth Schneider, August 23, 2012
AGENDA

- Introduction to Truven Health Analytics
- Improving outcomes - MITA Maturity Model vision
- Integrating clinical data
  - Challenges
  - Value
- Case study
Expertise Across the Spectrum of Healthcare

- **EMPLOYERS**
  - Over 200

- **HEALTH PLANS**
  - Over 100

- **HOSPITALS**
  - Over 3,000

- **GOVERNMENT**
  - Over 25 State Governments, All Healthcare-related Federal Agencies & more

- **PHARMA/BIO TECH**
  - All major U.S. pharma companies

- **CLINICIAN**
  - Dozens of solutions for improving patient safety and making informed decisions at the point of care

- Clients in all 50 states plus 83 countries.
- 35+ years experience, exclusively in healthcare.
- Managing data from 1000 suppliers in 3500 unique data formats each year.
- Managing more than 400 unique customer databases.
- Truven MarketScan research database contains 27 years of data on more than 140 million US lives.
- Research staff that has published more than 200 articles in peer-reviewed healthcare journals.

The leading source of information for healthcare businesses and professionals.
Providing policy consulting, data analysis and integrated data management, from claims to clinical information.
# MITA MATURITY MODEL VISION LAYER

**Medicaid Mission:** To provide quality health care to members by providing access to the right services to the right people at the right time at the right cost.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal:</strong> Improve health care outcomes for Medicaid Members</td>
<td><strong>Goal:</strong> Transformation of capability to measure health care outcomes</td>
<td><strong>Goal:</strong> Ensure efficient, effective, and economical management of the Medicaid program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory compliance to encourage providers to participate and thereby promote access to care</td>
<td>Improved health outcomes are a byproduct of creative efforts to control costs, e.g., managed care, waiver programs</td>
<td>Widespread adoption and use of national standards for administrative data; in-state collaboration and coordination</td>
<td>All stakeholders have access to clinical data that produces a major leap forward in analysis of health outcomes</td>
<td>National interoperability among state and federal agencies in the most comprehensive way we can now envision</td>
</tr>
<tr>
<td>Outcomes measurement limited to observations based on administrative data</td>
<td>Researchers conduct evaluations of cost-effectiveness that report on health care outcomes</td>
<td>Use of national standards, shared services, collaboration across programs, and intrastate exchange</td>
<td>Access to clinical data transforms the measurement of outcomes</td>
<td>The Medicaid agency realizes economies of scale and focuses on strategic goals, e.g., healthcare outcomes</td>
</tr>
<tr>
<td>Automated application of rules meets statutory requirements for error rates</td>
<td>Program evaluations show savings from managed care &amp; waivers; decision support tools improve program analysis</td>
<td>Consolidation of programs / processes with economies of scale through shared, re-usable services and standard data</td>
<td>Access to and use of clinical data increases the efficiency and effectiveness of decision-making</td>
<td>The Medicaid agency realizes economies of scale and focused on strategic goals, such as effective management.</td>
</tr>
</tbody>
</table>

Source: MITA 3.0 Part 1 Business Architecture, Appendix B Maturity Model Details
CHALLENGES IN CLINICAL DATA EXCHANGE AND INTEGRATION: THE “AS IS” ENVIRONMENT

- Governance and policies may not fully support exchange or data sharing
- Application of technology and coding standards remains inconsistent
- Accountability to meet standards not shared by all parties
- Level of provider readiness for and adoption of new technology varies
- Care management and decision support applications evolving to make the information easily actionable
# Value of Clinical Data

<table>
<thead>
<tr>
<th>Value</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Timely and Improved Care Coordination</td>
<td>- Timely follow-up after ER visit or discharge</td>
</tr>
<tr>
<td></td>
<td>- Medication adherence – reconcile orders with prescriptions</td>
</tr>
<tr>
<td>2. Real Outcome Measures</td>
<td>- Hypertensive patients whose blood pressure is in control</td>
</tr>
<tr>
<td></td>
<td>- Diabetic patients whose lipid levels (LDL) are in control</td>
</tr>
<tr>
<td>3. Next Generation Predictive Risk Segmentation</td>
<td>- Identify patients with heart disease and an ejection fraction &lt; 40% for ongoing management after discharge</td>
</tr>
</tbody>
</table>
INTEGRATING CLINICAL AND ADMINISTRATIVE DATA

DATA INTAKE
- CLAIMS
- ADT
- LABS
- RADIOLOGY
- CARE MANAGEMENT
- PHARMACY
- PATIENT SCHEDULING
- TRANSCRIPTION
- AFFILIATED PRACTICE DATA
- CLINICAL DATA WAREHOUSE

TRANSFORM
- Master Patient Index/Record Locator Service
- Terminology Management
- Security & Data Integrity Management

INTEGRATE
- Enterprise-wide Data Integration
- Data Model for Analytic Readiness
- On-demand Data Queries

ACCESS
- Single Patient Record Clinician Portal
- Point-of-Care Apps
- Patient Portal

ANALYZE
- Population Health Mgmt
- Physician Performance
- Public Health Reporting
- Operational Reporting
- Ad Hoc Reporting
- Rules & Alert

IMPROVE
- Care Coordination & Management
- Quality of Care
- ACO Readiness
- Physician Alignment
- Financial Performance
- Consumer Engagement

The result – powerful new insights into performance measurement

©2012 Truven Health Analytics Inc.
CASE STUDY: WEST VIRGINIA HEALTH INFORMATION NETWORK

- Real-time clinical and administrative data from EMRs, healthcare claims, and other sources
- Timely and insightful access to longitudinal patient history before clinical decisions are made
- Retrospective analytics of HIE utilization and population health management

Improved Coordination of Care

Improved Outcomes

Reduced Fragmentation

Reduced Costs
CASE STUDY: WVHIN IMPLEMENTATION, CONT’D

- Exchange populated with:
  - State Medicaid claims data
  - Clinical data from pilot sites Wheeling Hospital and West Virginia University Healthcare
- Interoperable data feeds to the public health department for disease and immunization registries
- WV e-Directive Registry – online access to patient DNR, Living Wills, etc.
- Fully compliant interoperability standards and meaningful use certified
- Nationwide Health Information Network Connect and Direct functionality
- Clinical analytics
**Diabetes Prevalence by Age & Gender**
Total number of patients diagnosed with diabetes for the previous six months

![Bar chart showing diabetes prevalence by age and gender.]

**Diabetes Lab Tests and Results**
Percentage of diabetic patients receiving lab tests & results under control for the previous six months

![Bar chart showing diabetes lab test results.]

---

©2012 Truven Health Analytics Inc.
# Diabetes Prevalence by Demographics

## Testing & Prescriptions

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Gender</th>
<th>Prevalence</th>
<th>Prevalence</th>
<th>HbA1c Under Control</th>
<th>HbA1c Tested</th>
<th>LDL-C Under Control</th>
<th>LDL-C Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-17</td>
<td>Female</td>
<td>120</td>
<td>1.2%</td>
<td>35.2%</td>
<td>65.0%</td>
<td>28.2%</td>
<td>58.5%</td>
</tr>
<tr>
<td>18-44</td>
<td>Female</td>
<td>150</td>
<td>1.5%</td>
<td>33.9%</td>
<td>45.0%</td>
<td>27.1%</td>
<td>40.5%</td>
</tr>
<tr>
<td>45-64</td>
<td>Female</td>
<td>560</td>
<td>5.6%</td>
<td>11.7%</td>
<td>78.0%</td>
<td>9.4%</td>
<td>70.2%</td>
</tr>
<tr>
<td>65+</td>
<td>Female</td>
<td>620</td>
<td>6.2%</td>
<td>22.6%</td>
<td>22.0%</td>
<td>18.1%</td>
<td>19.8%</td>
</tr>
<tr>
<td>0-17</td>
<td>Male</td>
<td>120</td>
<td>1.2%</td>
<td>35.2%</td>
<td>65.0%</td>
<td>28.2%</td>
<td>58.5%</td>
</tr>
<tr>
<td>18-44</td>
<td>Male</td>
<td>150</td>
<td>1.5%</td>
<td>33.9%</td>
<td>45.0%</td>
<td>27.1%</td>
<td>40.5%</td>
</tr>
<tr>
<td>45-64</td>
<td>Male</td>
<td>560</td>
<td>5.6%</td>
<td>11.7%</td>
<td>78.0%</td>
<td>9.4%</td>
<td>70.2%</td>
</tr>
<tr>
<td>65+</td>
<td>Male</td>
<td>620</td>
<td>6.2%</td>
<td>22.6%</td>
<td>22.0%</td>
<td>18.1%</td>
<td>19.8%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>2,900</strong></td>
<td><strong>3.6%</strong></td>
<td><strong>25.9%</strong></td>
<td><strong>52.5%</strong></td>
<td><strong>20.7%</strong></td>
<td><strong>47.3%</strong></td>
</tr>
</tbody>
</table>

- Red: Does not meet target
- Green: Meets or exceeds target
- Gray: No target specified

Target Detail - HbA1c Under Control: State Goal - Over 25%
CONTACT INFORMATION

Beth Schneider
Vice President, Practice Leadership
Truven Health Analytics
beth.schneider@truvenhealth.com
(404) 812-4508
D2: Enabling Advanced Analytics to Improve Health Outcomes
Decentralized Interoperability and Integration

Chris Curtis
August 23, 2012
Advanced analytics are particularly dependent on **understanding**.
Challenges to Interoperability

Proliferation of Data Types

Unsynchronized Changes

Inconsistent Value Mappings

Complex Relationships

Independent Models

Mature Systems and Data Structures

Trivial Incompatibilities

Unstructured Data
Complex Interchange Relationships

Simple Interchange Community

- Medicare
- Medicaid

Rapidly grows to...

Canonical models can help for centralized communities.

- CMS
- Medicare
- Medicaid
- IRS
- AHA

Canonical Model Interchange Community
Decentralized Communities are the Trend

New paradigms far more complex than traditional Medicare- or Medicaid-only.

Clinical quality systems have different architectures from payment systems.

ACOs may integrate or structure internal systems entirely differently.

Even within the enterprise, canonical models are fragmented.

Integration becomes more important even as it becomes more difficult!
Embrace the Complexity

Leverage semantic web and linked data technologies to enable linking and mapping.

Entities can borrow and map to each other’s vocabularies.
Core vocabularies emerge and adapt organically from actual usage and needs.
Opportunities and Challenges

- Robust technologies with a long research pedigree
  - Still growing in the enterprise space

- Models can be linked as they are, without restructuring
  - Significant shift in thinking about data and definitions

- Results can be broadly useful across the enterprise as well as externally
  - Vocabulary development takes expertise and effort

- Enables connections you don’t plan for
Contact Information

Chris Curtis
Lead, Enterprise Services

chris.curtis@noblis.org
703-610-2370
The Evolutionary Path of the IME Data Warehouse

Enabling Advanced Analytics to Improve Health Outcomes

Jody Holmes, PMP
Iowa Medicaid Enterprise
IME DW – Organization

• The IME business model has multiple contract organizations.
• Iowa Medicaid has a MOU with DHS DDM to manage the Medicaid Data Warehouse.
• Initial Focus
  – Bring Data In, Ad-Hoc Queries, Parameterized Reports
  – Grow into rich analytics as the IME grows
IME DW Data – Source to Use
IME DW – What We Have Learned

- Lots of variation in similar requests.
- Lots of variation in how data is used.
- More “what if?” and impact analysis than reporting.
- Using the data requires program understanding, and context interpretation of the data.
- More data, systems, requests, complexities, … more more more more more more!
IME DW – How Iowa has adjusted

• Focus shifts
  – Data acquisition and ETL
  – Ad-Hoc queries
  – Enabling others

• The IME model is about flexibility, enabling organizations, and teamwork.

• Enabling other analytical organizations is more productive than trying to do it all.
IME DW – Framework Adjustment
IME DW – Final thoughts

• Be an enabler
  – Have the data
  – Know the data (or know who knows)
  – Provision the data

• Coordinate and flow source data to various end-user needs

• Allow for multiple “right tools”
Contact Information

Jody Holmes
Iowa Medicaid Enterprise

jholmes1@dhs.state.ia.us

(515) 256-4616
Michigan: Using the Data Warehouse to Achieve Results

Cynthia Green-Edwards
Director, Office of Medicaid HIT

August 20, 2012
MDCH Data Warehouse
Major Integration Milestones

- Unique Client Identifier (UCI), Immunizations, WIC, Vital Records, Lead
- Eligibility System Replacement, MARS Reporting, Waivers, NPI, Part D, HIE
- CHAMPS (MMIS Replacement), MSIS, Medicare, MIHP
- Medicaid (FFS, SURS)
- Behavioral Health, LTC, NCPDP, HIPAA/837, Paternity
- Master Person Index (replace UCI), EHR

Expansion / Addition of Medicaid, Health and Other Data Sets
MI Enterprise Data Warehouse
Data Sets

- Community Mental Health
- Children’s Special Health Care Services
- Early & Periodic Screening, Diagnostic, and Treatment (EPSDT)
- Habilitation Support Waiver
- HIV/AIDS (structure only; data deleted)
- Home Help Payments
- Lead Screening
- Long Term Care
  - Home Care
  - Nursing Home
  - OASIS
- Michigan Care Improvement Registry (MCIR)
- Medicaid Fee-for-Service
- Medicaid Beneficiary Eligibility
- Medicaid Managed Care
  - Payments
  - Encounters
  - Provider Networks
- Medicaid Provider
  - Eligibility
  - License
  - Network
  - DEA/CLIA
- MIChild (SCHIP)
- MIHP (Maternal and Infant Health Program)
- Medicare
- Pharmacy
  - Claims
  - NDC
  - MAC
  - CMS rebate
- Substance Abuse
- Third Party Liability
- Vital Records - Death/Birth/Paternity
- Women Infants and Children
- Medicaid MI Choice Minimum Data Set

Other

- Human Services
- Corrections
- State Police
- Licensing and Regulatory Affairs
- Natural Resources

- Secretary of State
- Treasury
- State Courts
- Federal Data

[32]
MDCH Data Warehouse – Key to Integration Master Person Index (MPI)

- Developed Unique Client Identifier (UCI) in 2001
- Replaced with IBM/Initiate’s Master Person Index/Provider Index (MPI/PI) March 2012
- Links person-level records from distinctly different data sets
- Future – households
Integration Results – Medicaid / Birth

- **Automatic Enrollment of Newborns**
  - Validate that mom is in a Medicaid Health Plan
  - Add newborn to mom’s Health Plan
  - Clarifies coverage to providers
  - Eliminates chronic duplicate newborn enrollments
  - Reduces staff time to resolve

- **Citizenship Validation**
  - Identified that 70% of Medicaid beneficiaries were born in Michigan; helped determine how to implement policy
  - Developed interface to locate birth facts for new enrollees
Integration Results – Medicaid / Death

- Cost Avoidance - prevent payment of claims for deceased beneficiaries
- Eligibility - stop activity for deceased persons
- Post-payment recovery of Medicaid claims after date of death
  - Legacy MMIS/Claim Adjustment Generator
  - New MMIS - Death records loaded daily to Data Warehouse and interface to MMIS and Eligibility Systems
Integration Results – Medicaid / Lead

- Support Medicaid Health Plan Performance Measures
  - Medicaid / Lead reports to Health Plans and Local Health Departments
  - Spurred intensive efforts to dramatically increase outreach and education
  - Increased testing / decreased incidents of elevated levels

- Data Quality Improvement – in Lead and Eligibility databases (missing/incomplete/inaccurate)

- Support CDC-mandated requirements
Integration Results – Medicaid / Immunization Registry

- Web service to Data Warehouse
  - Lead screening results
  - EPSDT
    - Services
    - Due/Overdue status
  - High risk flu indicator
- Improved match results with MPI
## High Risk Conditions

### Influenza Screening Notification

<table>
<thead>
<tr>
<th>Immunizations</th>
<th>Lead</th>
<th>EPSDT</th>
<th>NBS Mailers</th>
<th>EHDI</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series</strong></td>
<td>Dose 1</td>
<td>Dose 2</td>
<td>Dose 3</td>
<td>Dose 4</td>
<td>Dose 5</td>
</tr>
<tr>
<td>DTaP</td>
<td>04/16/1997 DTaP 8wks 3days</td>
<td>06/11/1997 DTaP 16wks 3days</td>
<td>08/27/1997 DTaP 27wks 3days</td>
<td>05/07/1998 DTaP 1yr 2mos</td>
<td>08/26/2002 DTaP 5yrs 6mos</td>
</tr>
<tr>
<td>Polio</td>
<td>04/16/1997 OPV 8wks 3days</td>
<td>06/11/1997 OPV 16wks 3days</td>
<td>08/27/1997 OPV 27wks 3days</td>
<td>08/26/2002 IPV 5yrs 6mos</td>
<td><strong>Series Complete</strong></td>
</tr>
<tr>
<td>MMR</td>
<td>02/25/1998 MMR 1yr 16days</td>
<td>08/26/2002 MMR 5yrs 6mos</td>
<td><strong>Series Complete</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIB</td>
<td>04/16/1997 Hib-PedvaxHIB 8wks 3days</td>
<td>06/11/1997 Hib-PedvaxHIB 16wks 3days</td>
<td>08/27/1997 Hib-PedvaxHIB 27wks 3days</td>
<td>02/25/1998 Hib-PedvaxHIB 1yr 16days</td>
<td><strong>Series Complete</strong></td>
</tr>
<tr>
<td>HEPB</td>
<td>02/12/1997 HepB (Ped) 3days</td>
<td>04/16/1997 HepB (Ped) 8wks 3days</td>
<td>08/27/1997 HepB (Ped) 27wks 3days</td>
<td><strong>Series Complete</strong></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>10/22/1998 Varicella 1yr 8mos</td>
<td><strong>DUE NOW Varicella</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>10/20/2004 Influenza-split 7yrs 8mos</td>
<td>10/19/2006 Influenza (hist) 9yrs 8mos</td>
<td><strong>Series Complete</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV7</td>
<td>04/16/1997 PCV7 (Prevnar)</td>
<td>08/27/1997 PCV7 (Prevnar)</td>
<td><strong>DUE NOW PCV7 (Prevnar)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
General Information

If this is not the correct person you may Search Again or Add Person.

Personal Information:

Legal Last
Alias Last
Birthdate

Gender:
- Male
- Female
- Multiple Birth

Responsible Party: Add New

Nancy Dearing 439 Thomas St, So Grand Rapids MI 49503

10-14 venous
- Provide caregiver lead education
- Provide follow-up testing (3 months)
- Local public health encouraged to provide family nursing visits (lead assessment and education); suggested within 30 days
- Additional information at 517.335.8885
- more...

Spec. Date | Spec. Id | Reported | Sample Type | Result (µg/dL)
---|---|---|---|---
05/15/2006 | 06-135-02988 | 05/23/2006 | Venous | 11
03/03/2006 | 06-062-03084 | 03/10/2006 | Venous | 15
12/20/2005 | 05-354-02430 | 01/06/2006 | Venous | 18
09/15/2005 | 0525802893 | 09/29/2005 | Venous | 37
09/14/2005 | 6732 | 09/20/2005 | Capillary | 46

Birth Facility Information:

Name: Spectrum Hlth-Butterworth
State: MI
County:

MCIR options:
- Person does not receive medical care in Michigan
- Person is deceased
- Use alias name on reports

39
### General Information

#### Personal Information:

<table>
<thead>
<tr>
<th>Legal Last</th>
<th>Legal First</th>
<th>Middle</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Alias Last</th>
<th>Alias First</th>
<th>Mother's Maiden Name</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Birthdate</th>
<th>Gender*</th>
<th>Multiple</th>
</tr>
</thead>
</table>

#### Responsible Party: Add New

- **Ingham County**

#### High Risk Conditions:

- Influenza Screening Notification
- Patient is due/overdue for EPSDT

#### Additional Information

<table>
<thead>
<tr>
<th>Date</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/03/2006</td>
<td>V70.3</td>
<td>Other general medical examination for administrative purposes</td>
</tr>
<tr>
<td></td>
<td>99213</td>
<td>Office or other outpatient visit for the evaluation and management of an established patient</td>
</tr>
<tr>
<td></td>
<td>99391</td>
<td>Periodic comprehensive preventive medicine reevaluation and management; established patient; infant (age under 1 year)</td>
</tr>
<tr>
<td>08/30/2006</td>
<td>V20.1</td>
<td>Other healthy infant or child receiving care</td>
</tr>
<tr>
<td></td>
<td>99201</td>
<td>Office or other outpatient visit for the evaluation and management of a new patient</td>
</tr>
</tbody>
</table>

#### Birth Facility Information:

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
<th>County</th>
</tr>
</thead>
</table>

#### MCIR options:

- [ ] Person does not receive medical care in Michigan
- [ ] Person is deceased
Integration Results – Asthma / Medicaid

- **Puff City**
  - Collaboration with Henry Ford Hospital
  - Web-based asthma education and management
  - Initial phase – annual medical costs nearly cut in half

- **Children’s Healthcare Access Program (CHAP)**
  - Pilot in Kent County for high-risk children
  - 30% drop in ED visits; 63% drop in inpatient admissions

- **Asthma Mortality Review Project (AMRP)**
  - Michigan State University and Asthma Initiative of Michigan (AIM)
  - Developed provider education model
  - Design interventions to prevent deaths, improve care management
Integration Results - EHR

- Provider participation projections
- Focus outreach in geographic areas where gaps identified
- Cost avoidance – pre-payment audits to eliminate future recovery efforts
- Future
  - EHR incentive monitoring
  - Meaningful Use reporting
  - Outcome assessment
Integration and Analytics for HIE in Michigan

- Data Warehouse
  - Meaningful Use, Analytics

- MDCH Systems
  - EMPI
  - User/Provider Directory
  - Integration Engine
  - Web Services
  - Security Services
  - Meaningful Use Tracking
  - Data Audit & Logging
  - Labs

- SOM HIE

- MCIR (Immunization Registry)
- CHAMPS (MMIS)

- Michigan Disease Surveillance System
- Michigan Syndromic Surveillance System
- Chronic Disease Registry (to be developed)
- Cancer Registry
- Vital Records (Birth / Death) Registry

MiHIN (Michigan Health Information Network)

MDCH Systems
Integration – Medicaid / Medicare

- Positioned to address Integrated Care needs
  - Population analysis
  - View of integrated client-level data to develop a tool for person-centered planning and/or case management
- Integrate with EHR/HIE once available
Enabling Advanced Analytics 2012 and Beyond

- Beneficiary Monitoring Program
- Breast and Cervical Cancer Control Program
- Foster Care, Chronic Disease Registry
- Population Health
- 2012: HIV
- 2013: Integrated Care
- 2014: Maternal and Infant Health Program Expansion

Expansion / Addition of Medicaid, Health and Other Data Sets
Questions?

Cynthia Green-Edwards
Director, Office of Medicaid HIT
Michigan Department of Community Health
EdwardsC@michigan.gov