IT and Analytics for ACOs
Topics

- Framework: IT for Population Health
- Challenges and Decisions
  - Cost Accounting
  - Patient-Generated Health Data
- Comparative Clinical Analytics
- Engaging Clinicians with Data
American Medical Group Association

- Member organizations leading transformation

- Collaboratives
  - Quality measures
  - Best practices
  - EHR, eRx adoption

- Benchmarking
  - Patient satisfaction/experience
  - Provider satisfaction
  - Employee satisfaction/engagement

- Advocacy
  - Patient-centered, coordinated care
  - Volume → Value
  - “Population health”
  - High-performing health systems

AMGA supports its members in enhancing population health and care for patients through integrated systems of care.

*Founded in 1949*
Parallel AMGA Strategies

- **Advocacy**: Redesign payment system to align incentives around population health
  - Volume $\rightarrow$ Value
  - ACO $\rightarrow$ High-Performing Health System definition

- **Support members in redesigning the delivery system to manage population health**
  - Strategies for moving from one payment model to another
  - Competencies in understanding and managing population health
  - Data resources and analytical tools $\rightarrow$ Humedica partnership
  - Extend AMGA’s model for shared learning $\rightarrow$ Anceta

![Comparative Data](What to improve)

![Shared Learning](How to improve)
Organizations

American Medical Group Association

Component of AMGA, created to extend AMGA’s model for shared learning, based on comparative clinical analytics

AMGA’s partner, a next-generation clinical informatics company, based in Boston

Recently became part of OptumInsight

“Data factory” — extract and integrate clinical and administrative data, across the continuum of care

Disease-specific analytic models, including predictive analytics

Clinical analytics solution, Humedica MinedShare®
Analytical models (disease-specific)

- Process-outcome relationships

Cost accounting

Comparative data, benchmarking

Exploratory analysis

Practice profile reports for clinicians

External reporting

Patient registration and scheduling

Electronic health record

- Orders, e-prescribing

- Patient portal

Specialized departmental systems

Patient billing and collection

General financial systems

Population Management

- Patient registries
  - Care coordination (chronic diseases)
  - Case management (complex patients)
- Risk stratification
  - Predictive analytics
  - Protocols w/ priorities for intervention
  - Task tracking and documentation

Data Warehouse and Analytics

- Analytical models (disease-specific)
  - Process-outcome relationships
- Cost accounting
- Comparative data, benchmarking
- Exploratory analysis
- Practice profile reports for clinicians
- External reporting

Implement best practices

Develop knowledge

Transaction Systems

Population Mgmt.

HIE

ETL process

External Data

- Claims
- Reporting
- Benchmarking

Vocabulary

Ontology

Patient Level

Operational Systems (Concurrent)

Analytics (Retrospective)

Patient

Population Level

Standard Terminologies:
Semantic Interoperability
Challenges

- Combined organizations with different systems
- “Best of breed” vs. “monolithic”
- Care process integration—operational support
  - Ambulatory and acute care
  - Long-term care, home care
  - Community resources
- Complete picture of care—claims for services from other providers
- Attribution
  - Organizations
  - Care teams
- External reporting
Cost Accounting

- Spread organization’s expenses (broadly construed) across “billable” services
  - Engineered costs (time studies) for high-cost and high-volume services—goal: 80% of total
  - Spread remaining costs across remaining services—allocate proportional to charges?

General financials → Expenses
  - Human resources
  - Supply chain

Patient financials → “Billable” services

- Direct and indirect, fixed and variable components of cost
  - Thoughtful allocation of “overhead” costs to billable items
  - Clarity about assumptions: “In the long run, everything is variable.”

- Contract modeling and management—population perspective
  - FFS → capture and price units of service
  - Bundled payments
  - PMPM—all providers
Cost Model

Comparative “Cost” = Cost-Weighted Utilization
- HealthPartners NQF-approved TCOC Measure
- AMGA’s Anceta Collaborative, Humedica

Patient Volume/Mix → Stratified Comparison, or Statistical Risk Adjustment

Resource Profile × “Typical” Unit Costs → Standardized Cost

Inefficiency—Rework and Delay → Process Analysis and Experience Sharing

Internal Data

Resource Profile × Actual Unit Cost → Real Cost

HealthPartners TCOC: www.healthpartners.com/tcoc
TDI / AMGA PGHD Overview

- **Overall goal**: help clinical teams to efficiently develop personal prevention & care management plans that engage patients & measurably improve outcomes

- **Specific objective**: Work closely with a select set of AMGA groups to determine how best to implement a standard health risk assessment (HRA) that can be used to build an effective personal prevention & care management plan

- **Specific aim**: leverage the Dartmouth HRA with the selected sites over a defined period (90 days, for example) to facilitate the implementation of a patient-centered prevention & care plan
Relevance of Data

- **Quality**
  - OutcomesInsight™ – Outcomes by provider organization
  - Patient Centered Quality Profile™ – outcomes vs. satisfaction
  - Proven early warning solution

- **Cost**
  - Vendor negotiation
  - Controlled care modeling

- **Reimbursement**
  - HCAHPS, SCAHPS, CG-CAHPS
  - Annual Wellness Visit
  - Patient Reported Measures for MU2 and MU3
Mental Health Use Case

Report Features

- Summary of patient survey responses
- Scored, normed real-time
- Color-coded to improve ability to interpret
- Compared longitudinally
- Highlighted red flags, alerts
- Exportable for integration and reporting
- Available real-time for use in clinic

PHQ-9

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Little interest or pleasure
Down, depressed, hopeless
Trouble Sleeping
Tired or no energy
Poor appetite or overeating
Feeling like a failure
Trouble concentrating
Moving or speaking slowly
Better off dead
Difficulty caused by problems

Visits

- # Visits in last year: 1
- Initial Visit: 02/20/2008
- Days Since Last Visit: 412

GAD-7 Anxiety Scale

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PCL-M

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Satisfaction Data

- Last On Record
- Quality of Care: N/R
- Total Score: N/R
- Score: N/R

Where Knowledge Informs Change
“More” isn’t always better

Comparing post surgical outcomes between different implant groups

- No statistical differences in 5 out of 6 PRO instrument scores
  - Physical, mental, bodily pain, activity, mobility, self-care
- Difference in one PRO domain, EQ-5D Mobility (p = 0.04)

| Standard Instruments | Bottom Quartile  | Top Quartile       | Significant *
|-----------------------|------------------|-------------------|----------------
|                       | < $8,000         | $11,000 - $40,000 |                 |
| SF12 (MCS) ↑†         | 54.7 (12.2)      | 55.2 (11.0)       | 0.779           |
| SF12 (PCS) ↑          | 29.1 (8.8)       | 31.6 (10.7)       | 0.089           |
| SF12 (BP) ↑           | 31.8 (10.7)      | 32.3 (10.3)       | 0.759           |
| UCLA Activity Score ↓ | 6.5 (2.3)        | 6.3 (2.2)         | 0.589           |
| EQ-5D (Mobility) ↓    | 2.0 (0.2)        | 1.9 (0.3)         | 0.042*          |
| EQ-5D (Self-care) ↓   | 1.1 (0.3)        | 1.2 (0.4)         | 0.367           |
Process Flow

Patient completes HRA at home (or in the provider setting)

Provider team evaluates results prior to patient visit to ensure the proper care team is assembled

Patient visits practice for preventive visit

Patient & clinician review HRA results during visit

Patient exits practice with care plan tailored to the patient’s needs & preferences
Dartmouth HRA Content

- PROMIS Global-10 (Physical, Mental, Pain & Fatigue scores)
- PHQ-2/9 (Depression risk)
- Dartmouth/Institute for Health Metrics & Evaluation Health Risk Index
- Framingham Index (Cardiovascular Risk)
- AUDIT-C (Alcohol screening)
- Activities of Daily Living, Fall Risk, Social Isolation & Financial Stability
- Socio-Demographics for Patient Stratification
Interactive Risk Calculator

Health Risk Calculator

This health tool was developed to estimate the risk of death over the next 10 years based on potentially modifiable risk factors. By making different diet, exercise and lifestyle choices, you can become healthier and live a longer life.

HOW OFTEN DO YOU WEAR YOUR SEATBELT: Nearly always

WHAT IS YOUR SMOKING STATUS: Former smoker

HOW OFTEN DO YOU DRINK: Monthly or Less
Quality Measures Aren’t Enough

- Can’t we simply track the ACO quality measures?

- ACO Measures for CHF:
  - #10 = Number of Discharges
  - #31 = Beta Blockers for LVSD

- How will these two measures help you prevent hospitalization and readmissions among patients with CHF?
Primary Care-Sensitive Conditions

Dean Health System—Primary care: 6% of direct cost → impacts 80% of overall spend

Cost of Care Defects

(Percent of Total Costs, by Condition)

Health Care Incentives Improvement Institute (2010)
Anceta Collaborative

- Use data to identify opportunities for improvement and “best” performance
  - Medical groups: Humedica MinedShare®
  - Anceta: provocative analyses
- Learn “the rest of the story” from other medical groups

- Finding “best” performance
  - Current: Incidental observations, clinical intuition
  - Future: Systematic exploration—regression models
- Expanding scope
  - Detailed models for chronic disease
  - All active patients—Adult preventive services, Population management dashboard
  - Adjudicated claims data—all covered services

Once you move away from the push of information to the pull of learning, you liberate creative powers in your people.

— *The New Social Learning*
Tony Bingham and Marcia Conner
Prevalence of Chronic Conditions

- 20 medical groups, 7.0 million patients, age 18–89, who had an ambulatory visit in 2011 or 2012
- Left: Proportion of patients who fall into each combination of Humedica disease cohorts
- Right: Total ambulatory wRVUs for the patients who fall into each combination of cohorts

Patients by Disease Cohort

None

45.5%

Ambulatory Work RVUs by Disease Cohort

None

29.3%

Diagnoses:
- CAD: Coronary Artery Disease
- DM: Diabetes
- DYL: Dyslipidemia
- HTN: Hypertension
- COPD: Chr. Obstr. Pulm. Disease
- CHF: Congestive Heart Failure
- PAS: Pediatric Asthma
Prevalence of Chronic Conditions

- 20 medical groups, 7.0 million patients, age 18–89, who had an ambulatory visit in 2011 or 2012
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- Right: Total ambulatory wRVUs for the patients who fall into each combination of cohorts

Patients by Disease Cohort

Ambulatory Work RVUs by Disease Cohort

- All combinations involving HTN are colored red
Chronic Conditions – Pct. of Amb. wRVUs

- 20 medical groups, 7.0 million patients, age 18–89, who had an ambulatory visit in 2011 or 2012
- Total ambulatory wRVUs for the patients who fall into each combination of cohorts
- All combinations involving hypertension are colored red

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**Abbreviations**
- CAD: Coronary Artery Disease
- DM: Diabetes
- DYL: Dyslipidemia
- HTN: Hypertension
- COPD: Chr. Obstr. Pulm. Disease
- CHF: Congestive Heart Failure
- PAS: Pediatric Asthma
Current Anceta Participants

- Aurora Health Care – Milwaukee, WI
- Baylor Quality Alliance—Dallas, TX
- Billings Clinic – Billings, MT
- Brown & Toland Physicians – San Francisco, CA
- Carilion Clinic – Roanoke, VA
- Carolinas HealthCare System – Charlotte, NC
- Colorado Springs Health Partners – Colorado Springs, CO
- Community Physician Network – Indianapolis, IN
- Cornerstone Health Care – High Point, NC
- DuPage Medical Group – Downers Grove, IL
- The Everett Clinic – Everett, WA
- Florida Medical Clinic – Zephyrhills, FL
- HealthEast – St. Paul, MN
- Henry Ford Health System – Detroit, MI
- Holston Medical Group (Apogee) – Kingsport, TN
- The Iowa Clinic – West Des Moines, IA
- Lahey Clinic – Burlington, MA
- Mayo Clinic Health System – Rochester, MN
- Mercy Health System – St. Louis, MO
- Mid Hudson Medical Group – Fishkill, NY
- Mount Kisco Medical Group – Mount Kisco, NY
- Riverside Health System – Newport News, VA
- Sentara Healthcare – Norfolk, VA
- SwedishAmerican Health System – Rockford, IL
- Wilmington Health – Wilmington, NC
Humedica’s “Data Factory”

**Acquiring**
- Extraction across leading EMRs
- Multiple data sources
- Various data types
- Several access methods
- Numerous extraction frequencies

**Preparing**
- Integrating data, clinical insight, and science
- Validation
- Normalization
- Data Repository

**Analyzing**
- Building proprietary models, algorithms, and methods
- Predictive modeling
- Bench-marking
- NLP

**Accessing**
- Providing usable and actionable SaaS applications
- Therapeutic cohort matching

Cost-effective, state-of-the-art technology, coupled with customer engagement on analytics
## Data Normalization and Mapping

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Humedica MinedShare® – Typical Query

Even relatively complex clinical questions can be answered by point-and-click queries, since Humedica’s disease models include variables that support typical clinical questions, including relevant lab values, clinical observations (BP, BMI), medication classes and subclasses, and resource measures for ambulatory care.

Typical Humedica MinedShare display. Medical groups can see which medications their physicians are prescribing for glycemic control in any subgroup of patients with diabetes, in this case type 2 diabetes, HbA1c > 9.0, and at least three E&M visits in the past 24 months. The green bars show the group’s own prescribing patterns, and the black line shows comparative data for similar patients of other medical groups participating in the Anceta Collaborative Data Warehouse. This group is using DPP-4 inhibitors (orange arrows) in more patients and insulin (blue arrows) in fewer patients, compared to other groups.
Humedica MinedShare® – Dashboard

Current Measure Status

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<th>Comparator</th>
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<th>Target</th>
<th>Comparator</th>
<th>% vs. Target</th>
<th>Last 12 Mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pts w/ 1 or more eye exams</td>
<td>15,542</td>
<td>5.2%</td>
<td>2%</td>
<td>2.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean # of Visits for Pts w/o an eye exam</td>
<td>14,713</td>
<td>6.2</td>
<td>5</td>
<td>4.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pop Mgmt | Prev Svcs | DM | CAD | CHF | COPD | DYS | HTN | PAS

Combined

<table>
<thead>
<tr>
<th># of Pts</th>
<th>Result</th>
<th>Target</th>
<th>Comparator</th>
<th>% vs. Target</th>
<th>Last 12 Mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pts w/ 1 or more SBP, DBP, LDL &amp; A1c tests</td>
<td>15,542</td>
<td>53%</td>
<td>55%</td>
<td>56.2%</td>
<td></td>
</tr>
<tr>
<td>Pts in Control</td>
<td>8,242</td>
<td>14.6%</td>
<td>25%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Mean # of Visits - High Risk Pts (Any)</td>
<td>1,773</td>
<td>8.6</td>
<td>5.9</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Mean # of Visits - High Risk Pts (All)</td>
<td>0</td>
<td>N/A</td>
<td>4</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Pts at High Risk: Any Metric</td>
<td>8,242</td>
<td>21.5%</td>
<td>25%</td>
<td>25.2%</td>
<td></td>
</tr>
<tr>
<td>Pts at High Risk: All Metrics</td>
<td>8,242</td>
<td>0%</td>
<td>0.1%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

Resource Measures

<table>
<thead>
<tr>
<th># of Pts</th>
<th>Result</th>
<th>Target</th>
<th>Comparator</th>
<th>% vs. Target</th>
<th>Last 12 Mos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean # of Any Amb Visits</td>
<td>15,542</td>
<td>9.8</td>
<td>7</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Mean # of Inpatient Visits</td>
<td>15,542</td>
<td>5.5</td>
<td>5</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Mean # of Amb Work RVUs</td>
<td>15,542</td>
<td>18.5</td>
<td>10</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>Mean # of Level 4/5 F &amp; M Visits</td>
<td>13,352</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Mean # of Non-Mdl Level F &amp; M Visits</td>
<td>11,001</td>
<td>0.8</td>
<td>0.5</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Costly DM Amb Rx Ratio</td>
<td>8,297</td>
<td>0.5</td>
<td>0.8</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Mean # of ED/ER Visits/1000 DM Pts</td>
<td>15,542</td>
<td>15.8</td>
<td>14%</td>
<td>14.8%</td>
<td></td>
</tr>
<tr>
<td>Mean # of ED/ER Visits/1000 DM Pts</td>
<td>15,542</td>
<td>261</td>
<td>200</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>Mean # of IP Visits/1000 DM Pts</td>
<td>15,542</td>
<td>119</td>
<td>12%</td>
<td>11.9%</td>
<td></td>
</tr>
</tbody>
</table>

Mean # of IP Visits/1000 DM Pts | 15,542 | 194 | 75 | 194 | | |

Mean Inpatient LOS | 1,842 | 8.8 | 8 | 9.8 | | |
| # of Pts w/ ICU/CCU Stay | 1,842 | 27% | 25% | 26.8% | | |
| Mean ICU/CCU LOS | 1,842 | 1 | 1.5 | 1.4 | | |
| Rate of Pts w/ 7-day Readmission | 1,842 | 8.5 | 7.5% | 7.3% | | |
| Rate of Pts w/ 30-day Readmission | 1,842 | 18% | 15% | 17.4% | | |
Humedica’s CHF Predictive Model

**Goal:**
- Stratify patients with CHF by the likelihood that they will be admitted to the hospital for CHF or have a CHF-related ED visit in the next 6 months (after the end of data)

**Inclusion criteria:**
- CHF diagnosis on EHR problem list or on a bill/claim
- Patient has had an E&M and/or procedure visit over the past 12 months
- Patient is at least 18 years old

**Model development and results**
- Training and test samples
- Logistic regression: Area under the ROC (Receiver Operating Characteristic) Curve was 0.73 for IDNs and 0.70 for non-IDNs

**Variables of interest**
- Demographics
- Medications
- Lab results
- Vital signs
- Utilization
- Co-morbid conditions
Predicting an Initial Admission or ED Visit

- Clinical data → predict an initial admission or CHF-related ED visit in a patient with heart failure
  - Often begins a downward spiral of infirmity and increasing utilization, including rehab

- Prediction covers 6 months in the future
  - Measured intervention, when the patient may be relatively stable

- Additional Humedica predictive models, introduced April 2013
  - Diabetes
  - COPD

- MinedShare presents relative, not absolute probability
  - Stratifies patients in percentile bands → 5% of patients at greatest risk, next 5%, etc.
Which Patients Are at Greatest Risk for a CHF-Related Hospital Admission or ED Visit?
Patients with CHF-Related Admissions + ED Visits, by Percentile Band

<table>
<thead>
<tr>
<th>Percentile Band</th>
<th>Number of CHF-Related Admissions</th>
<th>Number of Patients with CHF-Related Admissions or ED Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.2% of CHF pts.</td>
<td>4.2% of CHF pts.</td>
</tr>
<tr>
<td>2</td>
<td>17.9% of pts. w/ CHF-related hosp. admit or ED visit in next 6 mos.</td>
<td>24.0% of CHF-related hosp. admits and ED visits in next 6 mos.</td>
</tr>
<tr>
<td>3</td>
<td>4.3X concentration</td>
<td>5.7X concentration</td>
</tr>
</tbody>
</table>
Similar Results across Six Organizations

- Previous slide shows combined results for 6 integrated delivery networks
- The graphs below are for each organization individually, confirming similar performance across diverse patient populations
Anceta Interaction

- **In-person meetings**
  - Two dedicated collaborative meetings each year
    - Spring, after AMGA Annual Conference
    - Fall, coordinated with AMGA Institute for Quality Leadership/ACO Summit
  - Dedicated sessions at AMGA Annual Conference

- Webinars, between meetings

- Outreach and consultation by Anceta staff
  - Assist with data interpretation and supplemental analyses
  - Discover and document best practices

- Anceta Collaboration Portal
  - Collaborative materials, reference documents
  - Discussion forum (e-mail)

**Typical Team for Collaborative Meetings**
- Physician leader with an interest in process redesign
- Operational leader, nurse-manager, or “change agent”
- Quality analyst—how data reflect the process
How Care Teams Are Using Predictive Analytics and Comparative Data to Optimize Interventions for High-Risk Patients

October 4, 2012

AMGA Institute for Quality Leadership
Volume to Value

• Clinic Journey
  • 2006 – 2011
    • Physician leadership development
      • Physician Leadership Academy
      • Committee Structure
      • Clinical Departments, Board of Governors
    • Increased physician employment
    • Consolidation of practices to one site
    • Research and education
    • System-wide EMR
    • PCMH development
Volume to Value

• Clinic Journey
  • 2012 – 2017
    • Payment Partnerships
      • Aetna Partnership
      • Medicare Advantage Plan, Medicaid HMO
      • MSSP
      • Anthem
    • System-wide protocols
    • Improved analytics
      • Risk Stratification
      • Predictive Modeling
    • PCMH expansion and optimization
      • CHF

Who’s the sickest?
→ Whom can we help?
Primary Care Chronic Disease Management

30 Ambulatory Care Sites across 3 Regions / 4 Counties

Supported by Center for Clinical Care Design
Patient Centered Medical Home
Physician Group Incentive Program
Organized Systems of Care
Michigan Primary Care Transformation Project

6 Diabetes Care Centers
Medical Nutrition Therapy
Diabetes in Active Control Program
Diabetes Self Management Program

Integrated Depression Care
Regional Psych Nurse Practitioners
PCP Practices Screening and Managing Depression

Ambulatory Case Management
23 Nurse Case Managers across 17 sites
Panel Managers - 10
Focus on closing gaps in care

Henry Ford Medical Group - 41 specialties, 30 ambulatory centers

Supported by Henry Ford Health System
Designing Effective Hand-off

Identify opportunities for hand-off and collaboration between:
- Inpatient case management
- Ambulatory case management
- Clinic nurses
- Home Health care
- e-Home Care Tele-health nurse

Promoting Candidate Retention

- Human Resources advanced screening questions
- Transparency of model, project details, salary range **PRIOR** to interview
- Preference for top 3 sites to work with, in on-line application
- Strong problem solving, organizational, planning as well as good computer skills
- Initial screen by central office for abilities and overall recommendation, 2nd interview by site leadership to ensure “right fit” for both the site and the candidate
Outreach Protocols – Flow Charts

- Facilitates CM outreach within 24–48 hours
- Educates team on role
- Decreases physician interruptions
- Leveraging technology

How we use Humedica MinedShare

- Reports provide actionable data at panel, physician, and case manager level
- Stratification of High Risk CHF patients using predictive model
  - Identify ED and inpatient high utilizers
  - Identify patients who require more intense ambulatory attention
- Evaluating outcome metrics for patients receiving coaching and education, over time
- Coding opportunities, where clinical evidence exists but no related diagnostic code
- Estimating populations for studies/research
Type 2 Diabetes: First Drug after Metformin

- Patients with type 2 diabetes
- At least 2 E&M visits in each of 2 successive years
- At least 14 months on metformin (only)...
  - Change in therapy
  - Continue metformin through end of data
- Choice of second drug, by A1c
  - Last A1c prior to change in therapy
  - Last A1c, if continuing on metformin
- By medical group

- All groups achieved similar improvement in glycemic control
  - Overall (by initial A1c)
  - By major subgroups—age, comorbidities, sociodemographic factors, “engagement” with medical group (visit frequency)
Break Out ΔRx Cohort by Drug Class

- Proportion of patients at each initial A1c level receiving each drug class or combination
  - All eRx activity within 30 days of ΔRx
- Overall, a “graded response” to initial A1c level

<table>
<thead>
<tr>
<th>A1c Level</th>
<th>Sulfonylurea</th>
<th>Sulf + Insulin</th>
<th>Other</th>
<th>DPP-4 Inhibitor</th>
<th>GLP-1</th>
<th>TZD</th>
<th>Sulf + TZD</th>
<th>Continue Metformin</th>
</tr>
</thead>
<tbody>
<tr>
<td>7–8%</td>
<td>24.6%</td>
<td>53.8%</td>
<td>17.3%</td>
<td>39.0%</td>
<td>39.0%</td>
<td>17.3%</td>
<td>9.7%</td>
<td>9.6%</td>
</tr>
<tr>
<td>8–9%</td>
<td>3.4%</td>
<td>43.6%</td>
<td>17.5%</td>
<td>53.8%</td>
<td>53.8%</td>
<td>17.5%</td>
<td>5.8%</td>
<td>6.3%</td>
</tr>
<tr>
<td>9–10%</td>
<td>4.0%</td>
<td>63.6%</td>
<td>16.2%</td>
<td>53.8%</td>
<td>53.8%</td>
<td>16.2%</td>
<td>11.1%</td>
<td>6.3%</td>
</tr>
<tr>
<td>10–11%</td>
<td>5.9%</td>
<td>49.9%</td>
<td>12.8%</td>
<td>53.6%</td>
<td>53.6%</td>
<td>12.8%</td>
<td>15.6%</td>
<td>6.5%</td>
</tr>
<tr>
<td>&gt; 11%</td>
<td>5.9%</td>
<td>44.4%</td>
<td>10.3%</td>
<td>23.8%</td>
<td>23.8%</td>
<td>10.3%</td>
<td>23.8%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>
Prescribing Patterns Vary across Medical Groups

- Wide variation across groups in use of insulin, DPP-4 inhibitors, TZDs, and GLP-1 agonists
  - DPP-4 inhibitors cost approximately $3,000 per year, GLP-1’s are similarly expensive
- All groups achieved similar improvement in glycemic control

Medical groups identified by two-letter codes
Prescribing Patterns Vary across Medical Groups

- Breaking out each group’s prescribing by initial A1c, there is a “graded” response within many groups, but drug choices vary across groups.
- For each group, five bars, by initial A1c: 7–8%, 8–9%, 9–10%, 10–11%, ≥ 11%
ΔBMI in Patients with Type 2 Diabetes

- 22,160 patients with ΔBMI measured, across 21 medical groups
ΔA1c vs. Household Income

- 29,611 patients with ΔHbA1c measured, across 21 medical groups
- Horizontal axis: Median household income (imputed by zip code)
Prevalence of Comorbidities

- Wide variation across medical groups in the proportion of active patients age 20–85 who have these chronic conditions
  - Important to account for these differences, in order to obtain valid, apples-to-apples comparisons
- Currently developing multiple regression models to adjust for differences in comorbidities and sociodemographic factors
Prevalence of Comorbidities in Patients with Diabetes

- Among patients with diabetes, there is a three-fold variation across groups in the prevalence of COPD and a four-fold variation in the prevalence of heart failure.
- Among these patients, the prevalence of hypertension varies from 53 to 86%, dyslipidemia from 59 to 85%.
- While high and low prevalence tends to be concentrated in certain groups, there are some differences across these conditions.
Level of Education

- Distribution of patients by level of education in zip code of residence: Percent of persons age ≥ 25 with some high school
  - These data reflect 1.7 million patients with hypertension across 20 medical groups who had an E&M visit between Dec. 1, 2010 and Nov. 30, 2012
  - Variation across medical groups in presumptive level of health literacy, based on imputed education level

- In three medical groups, approximately one-fourth of patients fall below the 10th percentile of the overall patient population
Rural–Urban Distribution

- Medical groups differ in the proportion of their patients who come from non-metropolitan zip codes
- 6.95 million patients, across 20 medical groups, with ambulatory E&M or Procedure visit during 2011 or 2012
  - Omits patients with zip codes that do not map to current RUCA tables
Type 2 Diabetes: BMI by Age

- 21 medical groups — 389,000 patients with type 2 diabetes, age 20–89
- E&M visit during 2012 and BMI recorded
- Bars represent 5-year age bands

BMI

≥ 40 Obesity – Class 3
35 – 40 Obesity – Class 2
30 – 35 Obesity – Class 1
25 – 30 Overweight
18.5 – 25 Normal weight
< 18.5 Underweight
Type 2 Diabetes: BMI by Age

- 21 medical groups — 389,000 patients with type 2 diabetes, age 20–89
- E&M visit during 2012 and BMI recorded
- Within each medical groups, bars represent 5-year age bands

BMI
- ≥ 40: Obesity – Class 3
- 35 – 40: Obesity – Class 2
- 30 – 35: Obesity – Class 1
- 25 – 30: Overweight
- 18.5 – 25: Normal weight
- < 18.5: Underweight
Depression in Diabetes

- 21 medical groups — 566,000 patients in Humedica diabetes cohort, age 20–89, with E&M visit during 2012
- Diabetes type 1, type 2, type unknown: Dx or Rx for depression in year prior to last E&M visit
- Within each medical group, bars represent 5-year age bands
Evidence for Diabetes

- 21 medical groups — 510,000 patients in Humedica diabetes cohort, age 20–89, with E&M visit during 2012
- Across all groups, about 12% of patients with diabetes do not have a Dx on a claim or an EHR problem list entry
Performance over Time: Following a patient cohort over 3 years

- **Diabetes Cohort**
- **Type 1, Type 2, Unknown**

- E&M visit Dec 2009 – Nov 2010 (year = 2010)
- At least one E&M visit in each of the next 2 years (2011, 2012)

- **D3 Bundle:**
  - A1c < 8, LDL < 100, BP < 140/90
  - Last values in each year
Visit Counts, by Patient Complexity

Patients with HTN, Age 18–85, E&M Visit 1/1/2012–7/31/2012, Patients of “Designated” Providers

Designated providers are those specified by the medical group whose patients are included on enterprise dashboard displays in Humedica MinedShare, generally providers associated with a “designed” primary care practice (e.g., a patient-centered medical home initiative).
AMGF Chronic Care Challenge

Hypertension Campaign Goal: 80% of Patients at Goal BP According to JNC 7

Process Planks for Achieving Goal

PRIMARY PROCESS PLANKS

- Direct Care Staff Trained in Accurate BP Measurement
- Hypertension Guideline Used and Adherence Monitored
- BP Addressed for Every Hypertension Patient, Every Primary Care Visit
- All Patients Not at Goal and with New Rx Seen within 30 days
- Prevention, Engagement, and Self-Management Program in Place

VALUE-ADD PROCESS PLANKS

- Registry Used to Identify and Track Hypertension Patients
- All Team Members Trained in Importance of BP Goals
- All Specialties Intervene with Patients Not in Control
Blood Pressure Recording

Last BP for Patients Age 18–85 with E&M Visit 1/1/2012–7/31/2012, “Designated” Providers
Designated providers are those specified by the medical group whose patients are included on enterprise dashboard displays in Humedica MinedShare, generally providers associated with a “designed” primary care practice (e.g., a patient-centered medical home initiative) and identified as the patient’s Current PCP in the EHR or practice management system or who provided the plurality of E&M services during the last full calendar year prior to the last E&M visit. (n = 309,000)
• JNC 7 recommendations:
  – Patients with diabetes or chronic kidney disease, BP < 130/80
  – All other patients, BP < 140/90
BP Control at Last E&M Visit: Complicated Patients

- Evidence of diabetes or chronic kidney disease (Dx/PL, lab, or meds): control threshold 130/80
- 488,000 patients with Dx/PL or BP evidence of hypertension and at least one E&M visit, 9/1/2011 – 8/31/2012
- All providers, 19 medical groups

<table>
<thead>
<tr>
<th></th>
<th>BA</th>
<th>BY</th>
<th>CB</th>
<th>DA</th>
<th>DQ</th>
<th>EW</th>
<th>GB</th>
<th>HV</th>
<th>KT</th>
<th>LA</th>
<th>MB</th>
<th>NQ</th>
<th>PR</th>
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<th>TU</th>
<th>VB</th>
<th>WD</th>
<th>YQ</th>
<th>ZW</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Control</td>
<td>58%</td>
<td>63%</td>
<td>48%</td>
<td>66%</td>
<td>56%</td>
<td>69%</td>
<td>54%</td>
<td>5%</td>
<td>6%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>7%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Not In Control</td>
<td>40%</td>
<td>36%</td>
<td>42%</td>
<td>42%</td>
<td>39%</td>
<td>44%</td>
<td>40%</td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
<td>6%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
<td>7%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Missing BP</td>
<td>5%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
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</tr>
</tbody>
</table>

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HTN Control – Variation within a Medical Group

- Patients in hypertension cohort with at least one E&M visit between 12/01/2011-11/30/2012
- All family medicine or internal medicine sites of care with over 500 hypertension patients
- HTN control among patients with BP measured at last E&M visit
  - Evidence of diabetes or chronic kidney disease (Dx/PL, lab, or meds): BP < 130/80
  - All other patients: BP < 140/90
Typical Collaborative Meeting Topics

- Techniques for breakthrough improvement
  - Complexity theory

- Hypertension
  - Plank-by-plank dialogue
  - Presentations by groups with superior outcomes and costs
  - Exercise: Comparative data → Action plan

- Diabetes
  - Cost of medications for glycemic control
  - Reducing proportion of patients with incomplete measures

- “PCMH 2.0”
  - Staffing models
  - Which elements drive the value?
  - Can we do it more efficiently?

- Ambulatory intensive care
  - Risk stratification: Whom to target? When?
  - What disciplines/services are key?
  - How does it integrate with the rest of the system?
Why We Needed Clinical Analytics

- Quality program was good but it lacked
- Claims data versus clinical data – BIG difference
- Risk stratification – who did we really need to get to?
- Humedica demo at AMGA blew me away
  - flexibility to explore and change questions without needing to depend on reporting
  - easy clicks versus asking and waiting (or longer) for someone to run a report in the EMR

Lessons learned so far

Without the kind of data MindShare can provide, you’re only getting part of the picture
- Uncoded patients (way more than anticipated)
- ER utilizers - $$$
- Cause and effect answers
- Comparisons... how good or how bad
- Can make physicians believers
- Dedicated staff to pursue what is uncovered
- Now to bigger populations
Key Takeaways

• Learn your data before using it
  • **Examine**: Find the trends in your population
  • **Diagnose**: Focus on the actionable opportunities
  • **Treat**: Design evidence-based interventions

• Choose opportunities that are sized to current resources

• Balance centralized standards with customized application

• Design initiatives with measurement in mind