Diabetes Statistics

- Diabetes is reaching epidemic proportions worldwide
- 23.6 million people in U.S. have diabetes
- 6 million are undiagnosed
- Marked increase in vulnerable populations: Hispanic, African-American, Asian Americans
- $174 Billion in annual costs in US
- Correlation with obesity in populations with economic and social disparities

March 6, 2009
Status of Diabetes Care

*There is a lack of...*

- standardized care.
- consistent data collection and analysis.
- ability of providers to identify and triage high risk, high cost patients
- Feedback to providers and health plans for quality improvement
The context:

- Type 2 diabetes is the real public health problem
- Most patients with diabetes are cared for by generalists as a part of primary care
- High intensity, time consuming
- As patients get older, focus of care moves from glucose control to surveillance and treatment of complications
- Affected by movement from capitation to “pay for performance”

March 6, 2009
Proactive Management of Chronic Diseases May Reduce Overall Healthcare Costs

Diabetes disease management program increases use of diabetes medicines and reduces total healthcare spending

Mean cost per patient per year (in 2001 US$) for n=187

- Baseline: 6096
- Year 1*: 666 (Insurance claims 488, Diabetes prescriptions 178, Other prescriptions 6)
- Year 2*: 724 (Insurance claims 889, Diabetes prescriptions 140, Other prescriptions 35)
- Year 3*: 894 (Insurance claims 1440, Diabetes prescriptions 157, Other prescriptions 38)
- Year 4*: 1027 (Insurance claims 1572, Diabetes prescriptions 140, Other prescriptions 44)
- Year 5*: 1170 (Insurance claims 1409, Diabetes prescriptions 170, Other prescriptions 50)

March 6, 2009
*Follow-up (12-month intervals following baseline)
Better Adherence Associated With Higher Drug Costs and Lower Total Healthcare Costs

- Medical and drug cost ($) by adherence level

<table>
<thead>
<tr>
<th>Adherence level (%)</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–19</td>
<td>8812</td>
</tr>
<tr>
<td>20–39</td>
<td>6959</td>
</tr>
<tr>
<td>40–59</td>
<td>6237</td>
</tr>
<tr>
<td>60–79</td>
<td>5887</td>
</tr>
<tr>
<td>80–100</td>
<td>3808</td>
</tr>
</tbody>
</table>

March 6, 2009

Focus on Quality Outcomes May Lead to Better Results in Diabetes Care

- Diabetes is prevalent and its incidence is increasing
- Diabetes has enormous clinical and economic implications
- Standards of care for diabetes have been established
- Importance of glycemic control has been highlighted in clinical studies
- Gaps in glycemic control exist
- Investing in diabetes care has been shown to reduce total healthcare costs and improve health

March 6, 2009
Healthcare Team

Providers:
- Primary Care MD
- Endocrinologist
- Nurse Practitioner

Support Systems:
- Family
- Community

Diabetes Educator:
- Nurse
- Dietitian
- Pharmacist
- Exercise Specialist
- Behavioral Health

Specialists:
- Ophthalmologist
- Podiatrist
- Nephrologist
- Neurologist
- Cardiologist

Learning resources:
- Handouts
- Videos
- Web

March 6, 2009
What is Disease Management?

Disease Management is a system of coordinated healthcare interventions and communications for populations with conditions in which patient self-care efforts are significant.*

- Telemedicine
- Registries
- Remote monitoring
- Case management
- Risk stratification
- Patient education
- Call centers
- Provider education

*DMAA March 6, 2009
Keys to Success

- Practical, patient-specific interventions
- Risk-stratify large populations
- Address multiple diseases and co-morbidities
- Demonstrate clinical and economic outcomes
- Strong infrastructure, data, and analytical capabilities
  - Call center, health coaching, telemonitoring, predictive modeling
  - Education and communication with members and providers
- Channel programs through providers

March 6, 2009
Key Features for Registry Success

- Proper identification of patients
- Easy electronic data entry
- Availability to clinicians in real time
- Web-based
- Linking of system to diabetes guidelines
- Clear, focused reports
- Feedback to providers
- Ability to generate communications to appropriate patients.

March 6, 2009
Diabetes Registry and Risk Stratification System

- Originally geared to primary providers
  - Now used by NPs and Pharm. Ds in Diabetes Clinic setting in Mississippi
- User-friendly data entry
- Stratifies patients into risk levels
- Provides a “To Do List”
- Provides reports
- Collects data for:
  - NCQA Provider Recognition
  - ADA Education Program Recognition

March 6, 2009
### Diabetes Registry and Risk Stratification System

**Patient Level**

**Panel Level**

**March 6, 2009**

#### Practice Risk Stratification Summary

**Education Report**

**Aurora**

**Clinic:** Aurora  
**Start Date:** 1/1/2005  
**End Date:** 8/30/2005

#### Diabetes Performance Measure Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Key Indicator</th>
<th>Aurora</th>
<th>Initial Target</th>
<th>All Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glycemic C</strong></td>
<td>Current Average A1C</td>
<td>8.26</td>
<td>7.5</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Cardiac</strong></td>
<td>Average of Earliest A1C</td>
<td>8.1</td>
<td>0</td>
<td>8.57</td>
</tr>
<tr>
<td><strong>PVD/Periph</strong></td>
<td>A1C done once/year</td>
<td>87.50%</td>
<td>20%</td>
<td>70.45%</td>
</tr>
<tr>
<td><strong>Retinopathy</strong></td>
<td>A1C &lt; 6.0%</td>
<td>50.00%</td>
<td>55%</td>
<td>40.91%</td>
</tr>
<tr>
<td><strong>Nephropathy</strong></td>
<td>A1C &lt; 9.0%</td>
<td>68.75%</td>
<td>79%</td>
<td>50.00%</td>
</tr>
<tr>
<td><strong>PVD/Periph</strong></td>
<td>Dilated Eye Exams at least once/year</td>
<td>68.75%</td>
<td>61%</td>
<td>40.91%</td>
</tr>
<tr>
<td><strong>Retinopathy</strong></td>
<td>Foot Exams done once/year</td>
<td>75.00%</td>
<td>80%</td>
<td>59.09%</td>
</tr>
<tr>
<td><strong>Nephropathy</strong></td>
<td>Blood Pressure done at least 2X/year</td>
<td>25.00%</td>
<td>65%</td>
<td>18.16%</td>
</tr>
<tr>
<td><strong>PVD/Periph</strong></td>
<td>Blood Pressure &lt; 130/80</td>
<td>26.00%</td>
<td>50%</td>
<td>13.64%</td>
</tr>
<tr>
<td><strong>Retinopathy</strong></td>
<td>Blood Pressure &lt; 140/90</td>
<td>31.25%</td>
<td>65%</td>
<td>25.00%</td>
</tr>
<tr>
<td><strong>Nephropathy</strong></td>
<td>Micro albumin done once/year</td>
<td>100.00%</td>
<td>73%</td>
<td>100.00%</td>
</tr>
<tr>
<td><strong>PVD/Periph</strong></td>
<td>Lipid Profile done once/year</td>
<td>81.25%</td>
<td>85%</td>
<td>61.36%</td>
</tr>
<tr>
<td><strong>Retinopathy</strong></td>
<td>LDL &lt; 100</td>
<td>6.25%</td>
<td>45%</td>
<td>20.45%</td>
</tr>
<tr>
<td><strong>Nephropathy</strong></td>
<td>LDL &lt; 130</td>
<td>68.75%</td>
<td>63%</td>
<td>63.64%</td>
</tr>
<tr>
<td><strong>PVD/Periph</strong></td>
<td>Counseled Smokers</td>
<td>70.57%</td>
<td>75%</td>
<td>61.48%</td>
</tr>
<tr>
<td><strong>Retinopathy</strong></td>
<td>Taking Aspirin Over Forty</td>
<td>100.00%</td>
<td>60%</td>
<td>57.58%</td>
</tr>
<tr>
<td><strong>Nephropathy</strong></td>
<td><strong>Total Number of Patients</strong></td>
<td>16</td>
<td>N/A</td>
<td>44</td>
</tr>
</tbody>
</table>
Patient Trend Report

DM ID: 1049
Name: Stewart, Martha
Diabetes Type: TYPE 2
D.O.B: 1/13/1949
Provider: Welby, Marcus

A1C

<table>
<thead>
<tr>
<th>Date</th>
<th>A1C</th>
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<tbody>
<tr>
<td>11/12/2003</td>
<td>10</td>
</tr>
<tr>
<td>02/17/2004</td>
<td>8</td>
</tr>
<tr>
<td>04/27/2004</td>
<td>8.2</td>
</tr>
<tr>
<td>06/02/2004</td>
<td>8.3</td>
</tr>
<tr>
<td>12/07/2004</td>
<td>6.9</td>
</tr>
<tr>
<td>03/28/2005</td>
<td>8.2</td>
</tr>
<tr>
<td>05/05/2005</td>
<td>7.9</td>
</tr>
<tr>
<td>08/30/2005</td>
<td>7.3</td>
</tr>
</tbody>
</table>

March 6, 2009
Diabetes Registry Users

Boston Inner-City Practices
- Provider and patient education
- Feedback to provider
- Used system for 3 years
- Improvement in outcomes

U. of Miss. Medical Center
- Four clinics linked by system for 8,000 patients
- Clinics compared via key diabetes measures
- Education interventions tracked
- Using system for 4 years

March 6, 2009
Boston Pilot: Methodology

- Data collection - baseline and follow-up over a 36 month period
  - System for ongoing data collection

- Physician education

- Patient education

- Feedback on a regular basis

March 6, 2009
Percent in A1C Ranges

***p<0.001 *p<0.05

March 6, 2009
Practice Process Measures

***p<0.001  **p<0.01

March 6, 2009
Documented Foot Exams

March 6, 2009

p<0.001
Diabetes SmartStart™

- Innovative diabetes education program focused on 1600 primary care providers in NYC and Detroit, their office staff and their patients
- Develops and delivers educational support material
- Offers provider education (consultation, monograph, textbook)
- Offers patient survival skills teaching via flipcharts and handouts
SmartStart Outcomes

Reduction in Mean A1C

- Year 1: 8.10% (At Enrollment), 7.50% (6 Months Post)
- Year 2: 7.61% (At Enrollment), 7.14% (6 Months Post)

March 6, 2009
Collaboration with Alere Medical on a Comprehensive Diabetes Disease Management Program

Outcomes Analysis On A High Risk Diabetes Program For Client HABC’s Medicare Population
Summary of Methodology

Study Periods:
- Baseline period = 12 months
- Evaluation period = 12 months

Study Populations:
- Population selection: Senior Diabetes with CAD who were enrolled with the health plan for at least 12 months
  - Avg. age=75, male=57.1%
- Age-sex matched control-study groups are formed
- 467 members referred for management
- Intervention group contained 356 patients
- Control group contained 67 patients
Unique Aspects of Program

- Diabetes program supports the physician treatment plan for his/her patient
- Physician is engaged in the program via an enrollment fax that is sent to MD office as soon as patient joins program
- Progress reports to physician throughout the visit, via Pre-visit, Status and Alert reports. Timed to MD pt. interaction
- Alert process includes a call to the physician and an Alert report. Require physician review and patient intervention within 24 hours
- Medication report sent to physicians for patients not on class medication or non-adherent with physician treatment plan

March 6, 2009
Diabetes Program Outcomes

Patients’ Co-morbidity Profile
(Preliminary analysis based on 6-month program evaluation period)

Data Source: Client’s Claims Database 2005-2007
Diabetes Program Outcomes

All Cause Inpatient Admissions Per Thousand Members Per Year

Data Source: Client’s Claims Database 2005-2007
Diabetes Program Outcomes

Diabetes-Related Inpatient Admissions
Per Thousand Members Per Year

Data Source: Client’s Claims Database 2005-2007
Diabetes Program Outcomes

All Cause Care Costs Per Thousand Patients Per Year
(in thousands)

Data Source: Client’s Claims Database 2005-2007
Cost by Type of Service

Cost Per Patient Per Month
(Preliminary analysis based on 6-month program evaluation period)

Data Source: Client’s Claims Database 2005-2007
Increases in Clinical Goals

Percentage Increases from Surveys
(Patients managed at least 6-months)

- Annual Retinal Exam: 6%
- Annual Foot exam: 11%
- ACE or ARB use: 7%
- Annual Microalbumin Test: 26%
- Aspirin use in patients >40: 8%
- Annual AIC: 22%
- Annual LDL: 13%

Data Source: Client’s Claims Database 2005-2007
Current Initiatives

- Coordinated diabetes care interventions in Boston Medical Center primary care clinics and 15 affiliated Community Health Centers
- Low literacy educational materials designed to be delivered by local staff, with appropriate training
- Standardized protocols for care and clinical pathways
- Data sharing, risk stratification, development of a diabetes registry
- Wider use of technology, such as continuous glucose monitoring, point-of-service A1C, non-mydriatic camera for retinal screening

March 6, 2009
Conclusions

- A comprehensive disease management program, when used appropriately, is associated with improved clinical and economic outcomes.

- A program providing diabetes education support can be an effective intervention in improving measures of diabetes care.

- Disease management programs providing exportable diabetes education for patients and support for providers are effective.
Thank You!

Questions?