National Web-Based Teleconference on
Using Health IT for Chronic Disease Management

June 21st, 2011

Moderator:
Angela Lavanderos
Agency for Healthcare Research and Quality

Presenters:
James Fricton
Helene Kopal
Randall Cebul
The Use of Electronic Health Records to Improve the Quality and Safety of Dental Care for Medically Complex Patients

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Professor, University of Minnesota

I do not have any relevant financial relationships with any commercial interests to disclose.
Acknowledgements

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The many patients and dental providers who participated

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Recent Publication:
The Burden of Chronic Illness

• There is a high prevalence and cost for patients with chronic medical conditions including diabetes, obstructive pulmonary disease, depression, and congestive heart failure in the U.S.

• From a dental perspective, these patients are at increased risk for periodontal disease, dental caries, orofacial pain, and complications during or after dental treatment.

Impact of Chronic Illness on Dental Care

There is a need for dentists to recognize and follow evidence-based guidelines while caring for patients with these conditions to improve safety and quality of care.

To support this effort, organizations such as the American Academy of Oral Medicine have developed clinical guidelines.

Despite the availability of current guidelines, the use of this information at the point of care has been low, not because dentists are disinterested, but rather due to the difficulty of translating guidelines into practical changes in clinical protocol.
Emergence of Health Information Technology (HIT)

HIT through clinician decision support (CDS) tools can improve the quality and safety of medical and dental care through several strategies including:

1. Enhancing communication between clinicians and patients.

2. Facilitating the exchange of health information between and among the teams of health care providers and with patients.

3. Improving access to personalized and evidence based guidelines that match the specific characteristics of the patient.

4. Activating patients and clinicians through reminders, alerts, and point of care introduction of appropriate information.
Comparative Effectiveness Study of Different Approaches to CDS

Research Question: Can CDS through electronic dental records (EDR) or with patients through personal health records (PHRs) activate dental providers toward the use of care guidelines, change provider and patient behavior, and improve the outcomes of care?

Design: Prospective group randomized trial comparing two methods of CDS compared to a usual care control group

Two Interventions;

• Direct provider alert in the EDR with point-of-care access to personalized evidenced based recommendations
• Direct Patient Alert through PHR e-mail or postal letter to review with the dental provider the personalized evidenced based recommendations
Population

Patients

10,890 patients from HealthPartners with one or more of the following medical conditions out of a total of 59,147 dental patients (18.4%) identified by electronic medical record including:

- Diabetes Mellitus
- Xerostomia (Dry Mouth) from Medications
- Chronic Obstructive Pulmonary Disease (COPD)
- Congestive Heart Failure (CHF)

Dental Providers

The 15 clinics with 102 Dental providers of the HP dental group were randomly assigned to the 2 experimental groups and the usual care group. 62 were dental hygienists and 40 Dentists.
Study Protocol

Appointment Scheduled in Dental Clinic in EDR

EDR searches EMR chart for diagnosis and pharmacy data to determine if medical condition is present.

Condition Present?

Yes

Control group

No Alert. Usual Care

Patient Intervention

PHR Alert

Patient receives E-mail and postal mail letter about need for change in dental care. Patient alerts dentist.

Click on alert to access recommendations and EMR.

Usual Care

Usual Care

Dentist Intervention

EDR Alert

Dentist takes action to minimize complications and manage oral aspects of medical condition

HealthPartners
Research Foundation
The eDent System Environment

- Disease Registry to Identify patients
- Algorithms Privacy/Security Back-up
- Appointment Schedules
- Text boxes and Alert box
- Privacy/Security Back-up
- Change care in response to Alerts and Guidelines
<table>
<thead>
<tr>
<th>Medical condition</th>
<th>Estimated adult prevalence</th>
<th>Intervention for dentist and patients to reduce risk of problems</th>
<th>Goal of intervention</th>
</tr>
</thead>
</table>
| Diabetes                                         | 7%                          | • Review diabetes treatment and status at visit.  
 Maintain adequate dietary and fluid intake and prevent postsurgical infection  
 • Daily oral hygiene and visits every 6 months  
 • Monitor oral hygiene status                  | • Reduce periodontal, caries, and oral infection risk                               |
| Xerostomia                                       | 10%, with 24% in >65 years of age | • Review saliva production at each visit  
 • Prescription for saliva substitute/fluoride at each visit  
 • Daily oral hygiene and visits every 6 months | • Reduce periodontal, caries, and oral infection risk                               |
| Congestive heart failure                         | 2%-3%                       | • Measures to reduce cardiac strain while receiving dental care (e.g., short visits, upright position, less stress)  
 • Daily oral hygiene and visits every 6 months | • Reduce risk of cardiac problems at dental visit  
 • Reduce periodontal, caries, oral infection risk                                   |
| Chronic obstructive pulmonary disease (COPD)     | 4%-5%                       | • Review history of concurrent heart disease  
 • Avoid use of barbiturates, narcotics, and anticholinergics  
 • Short visit, upright position, avoid use of rubber dam  
 • Avoid nitrous oxide-oxygen inhalation sedation with severe COPD and emphysema  
 • Daily oral hygiene and visits every 6 months  
 • Improved oral hygiene self-care | • Reduce risk of compromised air flow and pneumonia  
 • Reduce periodontal, caries, and oral infection risk                               |
Sample of CDS screen shots
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Provider activation</th>
<th>Patient activation</th>
<th>Usual care</th>
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<tr>
<td>Clinics</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Providers*</td>
<td>31</td>
<td>33</td>
<td>38</td>
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<tr>
<td>Types of providers (%)</td>
<td></td>
<td></td>
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<tr>
<td>Dentist</td>
<td>13 (42%)</td>
<td>13 (39%)</td>
<td>14 (37%)</td>
</tr>
<tr>
<td>Hygienist</td>
<td>18 (58%)</td>
<td>20 (61%)</td>
<td>24 (63%)</td>
</tr>
<tr>
<td>Number of patients seen with condition (%) during the 18-month study period</td>
<td></td>
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<tr>
<td>Any</td>
<td>3,536 (18%)</td>
<td>2,979 (16%)</td>
<td>4,375 (20%)</td>
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<tr>
<td>Diabetes mellitus</td>
<td>1,444 (8%)</td>
<td>1,271 (7%)</td>
<td>1,727 (8%)</td>
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<tr>
<td>Xerostomia</td>
<td>2,256 (12%)</td>
<td>1,872 (10%)</td>
<td>2,800 (13%)</td>
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<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>466 (2%)</td>
<td>383 (2%)</td>
<td>635 (3%)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>258 (1%)</td>
<td>200 (1%)</td>
<td>396 (2%)</td>
</tr>
</tbody>
</table>

* One provider served during the intervention in both the Patient Activation and usual care groups

** Patients were counted multiple times when seen at different dental clinics
Results

Number of hits per provider

- CON
- EDR
- PHR

System on

Month
Results

Percent of providers with a hit by month

Percent

CON
EDR
PHR

Month

System on
Conclusions

• Reminders in the EDR directly targeting dental providers and in PHRs directly targeting patients are both more effective at encouraging the use of care guidelines than reminders targeting patients.

• Both types of reminder alerts have a generalizable effect of increasing the rate at which providers reference guidelines and identify chronic medical conditions for all patients compared to usual care.

• The rate at which hits on guidelines occurs decreases after 12 months of use.

• To date, the value of providing an easily, accessible record of relevant patient health information and subsequent care guidelines at the point of care is demonstrated.
Future Directions

• Further data analysis is occurring to determine change in provider behavior and patient outcomes regarding complications and cost of care.

• There is a need to integrate the CDS with health information exchange organization to allowing transferability of CDS software to any clinic inside or outside of HealthPartners

• Further research is needed to determine how to sustain the results over time.

• Similar CDS is being developed for cancer tracking, weight management, implanted device tracking, and chronic back pain care
CDS and the Management of Hypertension in a Community Health Center

Helene Kopal, MPA, MPH
Primary Care Development Corporation
June 21, 2011

I do not have any relevant financial relationships with any commercial interests to disclose.
Study
Aims

1. Test whether EMR with CDS and performance feedback is more effective in improving hypertension care than EMR alone.

2. Assess the implementation process and delineate factors that influence the adoption of the EMR supported QI intervention.
Conceptual Framework

- Design Factors
- Individual Factors
- Organizational Factors
- Team Factors

✓ Usefulness and Usability of CDS
✓ Compliance with HTN Guidelines
Project Timeline

Pre Intervention
15 mos

Implementation & Acceptance
90 days

Post Intervention
15 mos

Analysis, Protocol Development, Dissemination
9 mos
Subjective:

Chief Complaint(s):

HPI:

Hypertension

Current Medication:

Medical History:
- asthma
- Hypertension

Allergies/Intolerance:

ROS:

Objective:

Vitals:

Staff Name and title: pf, Pain scale (0-10) 0, BP 150/90 left arm, 210/76 right arm
Assessing Patient Adherence
# Hypertension Order Set

## Labs

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<tr>
<th>Description</th>
<th>Date</th>
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<tr>
<td>CBC With Differential/Platelet</td>
<td>-</td>
<td>Other Actions</td>
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<tr>
<td>Lipid Panel</td>
<td>07/15/2007</td>
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<tr>
<td>C-MET Comp. Metabolic Panel (14)</td>
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## Diagnostic Imaging

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<tr>
<td>ECG without BCW interface</td>
<td>-</td>
<td>Other Actions</td>
</tr>
<tr>
<td>ECG with BCW Welch Allyn interface</td>
<td>-</td>
<td>Other Actions</td>
</tr>
<tr>
<td>ECG with Midmark interface</td>
<td>-</td>
<td>Other Actions</td>
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</table>

## Procedures

## Immunizations

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<th>Dose</th>
<th>Date</th>
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</thead>
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<td>FLU VACCINE (Adult)</td>
<td>0.5 ml</td>
<td>-</td>
<td>Other Actions</td>
</tr>
<tr>
<td>Pneumovax 23 (Adult)</td>
<td>0.5 ml</td>
<td>-</td>
<td>Other Actions</td>
</tr>
</tbody>
</table>

## Smart Forms

- EN1
- Tobacco Control

## Appointments

- Follow-Up In: 4W for uncontrolled Stage 1
- Follow-Up In: 2W for uncontrolled Stage 2
- Follow-Up In: 3M for controlled blood pressure
- Follow-Up In: schedule with Patient Advocate
- Follow-Up In: schedule with Nutritionist

## Referrals

## Physician Education

## Patient Education

- PDF
- WEB REFERENCE
Reminders
## Provider Performance Reports

<table>
<thead>
<tr>
<th>Provider</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>Total # Hypertensive Patients</td>
<td>36</td>
<td>60</td>
<td>12</td>
<td>21</td>
<td>43</td>
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<tr>
<td>% DM BP Controlled &lt;130/80</td>
<td>9.00%</td>
<td>30.00%</td>
<td>25.00%</td>
<td>10.00%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Hypertension no DM Well Controlled &lt;140/90</td>
<td>55.00%</td>
<td>52.60%</td>
<td>36.40%</td>
<td>70.00%</td>
<td>50.00%</td>
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<tr>
<td># of patients Order Sets Used</td>
<td>0</td>
<td>19</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>% of patients with order Set Used</td>
<td>0.00%</td>
<td>31.67%</td>
<td>8.33%</td>
<td>19.05%</td>
<td>18.60%</td>
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</table>
Attitudes: HTN and JNC7 Guidelines

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<th></th>
<th>Mean ± S.D.</th>
<th>P (paired t-test)</th>
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<tr>
<td>Baseline</td>
<td>4.1 ± .54</td>
<td>.17</td>
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<tr>
<td>Follow-up</td>
<td>4.3 ± .65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.8 ± .60</td>
<td>.01*</td>
</tr>
<tr>
<td></td>
<td>4.5 ± .52</td>
<td></td>
</tr>
</tbody>
</table>

Source: Provider Surveys March 2008 and March 2010
Satisfaction with CDS Components

Source: Provider Surveys March 2010
Primary Outcomes: HTN Control

Adult hypertensives seen at least twice during baseline and follow-up periods

Source: Open Door EMR
Process of Care: Follow Up Appts

Adult hypertensives seen at least twice during baseline and follow-up periods

- S1 F/U Appt: 93% Baseline, 92% Follow Up (n=505)
- S2 F/U Appt*: 71.8% Baseline, 79.1% Follow Up (n=217)
- Nutrition Visit***: 7% Baseline, 12% Follow Up (n=1947)

Source: Open Door EMR
Process of Care: Lab Tests

Adult hypertensives seen at least twice during baseline and follow-up periods

Source: Open Door EMR

N=1947
Adult hypertensives seen at least twice during baseline and follow-up periods

Valid BMI***

Pre: 75
Post: 84.9

Ask re: Tobacco***

Pre: 4
Post: 54.1

Source: Open Door EMR
Qualitative Findings

“I like to be validated in what I do... since hypertensives are not my typical patient... The little hint for the labs, the immunizations, and the appointments are pros”

“... There are many different pieces to this sort of package that we’re implementing here and it’s just all these things together plus paying more attention to hypertension”

“... the process we went through forced me to do it in a much more methodical way... On this project, I took a lot more input from other people and got a lot better buy-in... Also the teaching was more thorough and certainly documented better”

“I find [the template] awkward to ask questions in the way they’re formatted there and it takes me more time”

“... CDS sometimes interferes with workflow; if I’m busy, the questions can be too long. If the patient has multiple problems, [it asks for] too many details...”

“... The implementation probably was a little bit too specific and maybe was a little overdrawn”
Critical Success Factors

✓ Culture of Quality Improvement, Learning, and Change

✓ Multi-faceted intervention
  ▪ something for everyone
  ▪ flexibility
  ▪ creates heightened awareness to HTN

✓ Fit with workflow

✓ System stability and reliability
This project was funded by grant number R18 HS17167 from the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services. The opinions expressed in this document are those of the authors and do not reflect the official position of AHRQ or the U.S. Department of Health and Human Services.
Using Health IT for Chronic Disease Management – A Cluster Trial followed by Region-wide Applications

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The Robert Wood Johnson Foundation

I do not have any relevant financial relationships with any commercial interests to disclose.
Objectives of Presentation

• To describe how an AHRQ-funded trial (AHRQ: “DIG-IT”) led to a region-wide EMR-catalyzed quality improvement program in chronic disease (RWJF: “Better Health Greater Cleveland”)

  – To describe how EMRs were used to design the DIG-IT trial and provide decision support for diabetes
  – To summarize DIG-IT results and lessons learned
  – To describe how EMRs are used in Better Health to publicly report and improve region-wide care and outcomes for diabetes, hypertension, and heart failure
  – To describe the EMR quality difference in the context of the regional collaborative.
Goals of AHRQ DIG-IT Trial: 2005-08

- To determine the effect of an EMR-based Clinical Decision Support (CDS) system on care and outcomes in adult diabetes in two health care systems
  - Care (5 ADA measures)
  - Outcomes (5 measures)
  - Cluster Randomized Trial (CRT)
- To compare CDS to usual care:
  - By insurance
  - Among established vs new-to-system patients
Study Design: Identifying Patients

Using EMRs to Identify Similar Patients
Adult Diabetic Patients N~20,000
And their PCPs (N~200)
and Practices (N=24)
in Two Organizations
Study Design: Identifying Practice Characteristics to Balance Groups Before Randomization

Baseline variation in achieving standards of diabetes care
- 30 practices in Greater Cleveland

<table>
<thead>
<tr>
<th>Practice Name and System</th>
<th>Summary Outcome Standard (%)</th>
<th>Good Blood Sugar Control (%)</th>
<th>Good Blood Pressure Control (%)</th>
<th>Cholesterol in Good Control (%)</th>
<th>Weight in Good Control (%)</th>
<th>Not Smoking (%)</th>
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</thead>
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<tr>
<td>REGION - ALL 30 EMR PRACTICES</td>
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<td>49</td>
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www.betterhealthcleveland.org
## Baseline Characteristics of Practices after Balancing

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A</th>
<th>Group B</th>
<th>ICC</th>
<th>P-Value</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>% A-A</td>
<td>48.7</td>
<td>49.1</td>
<td>&lt;0.001</td>
<td>0.830</td>
</tr>
<tr>
<td>% Smoker</td>
<td>25.2</td>
<td>22.6</td>
<td>0.001</td>
<td>0.049</td>
</tr>
<tr>
<td>Ave Syst BP</td>
<td>136.1</td>
<td>136.2</td>
<td>&lt;0.001</td>
<td>0.859</td>
</tr>
<tr>
<td>% A1c&gt;9</td>
<td>18.7</td>
<td>16.9</td>
<td>0.001</td>
<td>0.138</td>
</tr>
<tr>
<td>% on Insulin</td>
<td>18.5</td>
<td>19.6</td>
<td>&lt;0.001</td>
<td>0.392</td>
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<tr>
<td>Slope A1c</td>
<td>-0.66</td>
<td>-0.57</td>
<td>&lt;0.001</td>
<td>0.228</td>
</tr>
</tbody>
</table>
10 Practices Assigned Randomly to CDS for Diabetes Mellitus (DM²) or to Usual *Epic* Care

- **5 Groups**
  - **Epic Only**
  - **DM²**
  - 2 Clusters of 10 Practices
  - ~100 PCPs
  - ~8000 Patients

- **5 Groups**
EMR-Based CDS Intervention

• Illustrative components:
  – Filtered Alerts/linked orders
  – Weekly performance feedback
Encounter-based Alerts: Filtered to Minimize FPs

What do we know about this patient?

- She has diabetes and is visiting her PCP
- Her kidneys are leaking protein.
- She has no other contraindications (K, Cr)
- She is not on an ACE inhibitor or ARB and has no documented allergies to them.
- There are several alternative drugs/doses
Comparative Performance Reports: Weekly

How are My Diabetic Patients Doing? (PCP=

<table>
<thead>
<tr>
<th></th>
<th># of DM Patients</th>
<th>Female, %</th>
<th>Age, mean (range)</th>
<th>Race, % Caucasian</th>
<th>A1c, mean (range)</th>
<th>LDL, mean (range)</th>
<th>Br, mean (range)</th>
<th>BMI, median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY Diabetic Patients</td>
<td>101</td>
<td>46</td>
<td>60 (32-89)</td>
<td>81</td>
<td>7.1 (5-11)</td>
<td>114 (27-244)</td>
<td>135 (88-199)</td>
<td>34 (20-73)</td>
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<tr>
<td>All MHS Adult Diabetics</td>
<td>6211</td>
<td>63</td>
<td>56 (18-97)</td>
<td>39</td>
<td>7.5 (4-18)</td>
<td>115 (4-391)</td>
<td>136 (66-258)</td>
<td>33 (13-81)</td>
</tr>
</tbody>
</table>

Percent of Diabetics Meeting ADA Criteria:

- A1c<=7.0: 60
- LDL<=100.0: 39
- Non-Smoker: 41
- Proteinuria & on ACE/ARB: 74
- Eye Visit Within 1 Year: 96
- Systolic BP<130: 30

“My panel” vs. Comparator
CDS > Control for Care but not Outcomes; Effect Larger for New Patients
Lessons Learned

• In a CRT, it is difficult to control other organizational interests in order to maintain CRT study integrity
  – Two system study ->> One system study
    • Tethered PHR in system #2 (additive to CDS) could not be confined to study sites

• Conventional CDS is a tool for providers
  – Effect is greater for care than outcomes (which require patient engagement as well)
  – Providers overwhelmingly desired to maintain CDS, now for 3 years after trial ended

• Cross-institutional studies require trust
  – “Trust trumps technology”
Building on Our DIG-IT Experience

- To region-wide EMR-catalyzed collaborative in QI for chronic conditions
  - New conditions (DM + HBP + HF)
- Twice-yearly records-based public reporting
  - Not using insurance claims
- Sharing best practices in EMR adoption and Meaningful Use
  - Learning Collaborative Summits
  - Practice Coaching
Part of a National Network

Aligning Forces for Quality Communities
Supported by the Robert Wood Johnson Foundation
Partner Practices in the Region
### Diversity in Partners (2010)

#### TABLE 1. CHARACTERISTICS OF PATIENTS INCLUDED IN THIS REPORT

<table>
<thead>
<tr>
<th></th>
<th>Diabetes</th>
<th>High Blood Pressure</th>
<th>Heart Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28,997</td>
<td>108,608</td>
<td>5,251</td>
</tr>
<tr>
<td># of Patients</td>
<td>48 (8 health systems)</td>
<td>48 (8 health systems)</td>
<td>34 (3 health systems)</td>
</tr>
<tr>
<td># of Primary Care Practices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>35.0</td>
<td>0 – 48</td>
<td>43.2</td>
</tr>
<tr>
<td>Commercial</td>
<td>43.3</td>
<td>0 – 74</td>
<td>41.4</td>
</tr>
<tr>
<td>Medicaid</td>
<td>8.9</td>
<td>0 – 39</td>
<td>6.3</td>
</tr>
<tr>
<td>Uninsured</td>
<td>12.8</td>
<td>0 – 100</td>
<td>9.1</td>
</tr>
<tr>
<td>Medicaid + Uninsured</td>
<td>21.7</td>
<td>0 – 100</td>
<td>15.4</td>
</tr>
<tr>
<td>Race/Ethnicity (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>52.6</td>
<td>2 – 96</td>
<td>60.8</td>
</tr>
<tr>
<td>African-American</td>
<td>39.6</td>
<td>1 – 97</td>
<td>34.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4.6</td>
<td>0 – 64</td>
<td>2.2</td>
</tr>
<tr>
<td>Other</td>
<td>3.2</td>
<td>1 – 64</td>
<td>2.5</td>
</tr>
<tr>
<td>Non-White</td>
<td>47.4</td>
<td>4 – 98</td>
<td>39.2</td>
</tr>
<tr>
<td>Preferred Language (%)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>English</td>
<td>95.9</td>
<td>35 – 100</td>
<td>97.1</td>
</tr>
<tr>
<td>Spanish</td>
<td>2.2</td>
<td>0 – 57</td>
<td>1.1</td>
</tr>
<tr>
<td>Other Languages</td>
<td>1.9</td>
<td>0 – 63</td>
<td>1.8</td>
</tr>
<tr>
<td>Average Age</td>
<td>57.7</td>
<td>50 – 62</td>
<td>62.0</td>
</tr>
<tr>
<td>% Female</td>
<td>53.7</td>
<td>35 – 75</td>
<td>57.4</td>
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<td>Median Household Income ($)</td>
<td>41,200</td>
<td>25,500 – 68,000</td>
<td>44,300</td>
</tr>
<tr>
<td>High School Graduation Rate (%)</td>
<td>79.6</td>
<td>64 – 90</td>
<td>81.7</td>
</tr>
<tr>
<td>Average Body Mass Index</td>
<td>34.1</td>
<td>29 – 36</td>
<td>31.7</td>
</tr>
<tr>
<td>% Not Smoking</td>
<td>79.7</td>
<td>42 – 92</td>
<td>82.0</td>
</tr>
</tbody>
</table>
Learning Collaborative Summit
March 5, 2010

“Be part of this picture!”
Sharing the experience of new adoption
### TABLE 2. BETTER HEALTH’S INDIVIDUAL AND COMPOSITE STANDARDS FOR DIABETES

**Care**
- 4 standards for good routine care
  - Blood Sugar Control Test done
  - Screening for or Treatment of Kidney Problems
  - Annual Eye Examination
  - Pneumonia Vaccine given

**Outcomes**
- 5 standards of good control
  - Blood Sugar Controlled (Hemoglobin A1c < 8%)
  - Blood Pressure Controlled (BP < 140/80)
  - LDL (“Bad”) Cholesterol < 100 or Statin Prescription
  - Weight Controlled (Body Mass Index < 30)
  - Documented Non-Smoker

### TABLE 3. BETTER HEALTH’S INDIVIDUAL AND COMPOSITE STANDARDS FOR HEART FAILURE

**Evaluation Standards**
- 4 Standards of Good Assessment
  - Heart Function Test Done
    - (“Echo” to see how well the heart is pumping)
  - Blood Test Done Each Year
    - (Basic Metabolic Panel to check blood chemistry)
  - Weight Checked Regularly
    - (Look for fluid retention to monitor heart function)
  - Blood Pressure Checked Regularly
    - (High Blood Pressure can signal serious heart problems)

**Treatment Standards**
- 2 Types of Evidence-Based Medications
  - ACE/ARB Medication
    - (Improves heart and kidney function and lowers blood pressure)
  - Beta-Blocker Treatment
    - (Blocks stress hormones, which make the heart work harder)

**Evaluation Composite:** Percent of patients who meet all 4 standards

**Treatment Composite:** Percent of patients with moderate or severe heart failure who received at least one of the medications
EMR vs Paper Achievement: 2010

Diabetes Achievement

- Care: 51% of 29,000 patients
- Outcomes: 44% of 16,000 patients

High Blood Pressure Achievement

- Care: 82% of 109,000 patients
- Control: 72% of 55,000 patients
Regional Improvement in DM: Care > Outcomes

% of Patients Meeting Standard

2007  |  2008  |  2009  |  2010
---- | ---- | ---- | ----
27   | 39   | 41   | 47

Diabetes Care

Diabetes Outcomes
Better Care, Better Outcomes

Diabetes Trends 2007-2009
Do practices using EMRs do better, improve faster, for all patients?
Presentation for Academy Health meeting 6-13-11

Quality of Care and Electronic Medical Records: Implications of Increased Adoption and Meaningful Use.

RD Cebul¹,⁴, TE Love¹,⁴, AK Jain²,⁴, CJ Hebert³,⁴
MetroHealth Medical Center at Case Western Reserve University¹, Cleveland Clinic², Kaiser Permanente Ohio³, Better Health Greater Cleveland⁴
Supported in part by the Robert Wood Johnson Foundation
EMR Effects on Quality and Cost

• Incentives for EMR adoption anticipate a quality-related ROI

• Data are mixed re: both QI and cost savings of EMRs
  – Positive results (eg, Group Health, Geisinger) did not have paper-based comparators
  – Widely cited negative studies use inadequate and dated survey data

• Data are scarce re: EMR adoption among “priority primary care providers”
  – For whom EMR adoption is supported by HIT Regional Extension Centers (RECs)
Objectives

• To compare achievement and trends in care and outcomes of EMR- and paper-based practices for adult patients with diabetes
  – Overall, and stratified by insurance type
  – For Composite standards for Care and Outcomes as well as individual metrics
Methods

• **Setting**: Cuyahoga County/Cleveland

• **Subjects**:
  – For *Achievement* (2009-10):
    • 27,207 diabetic patients (18-75 years old, ≥ 2 visits)
    • 569 PCPs in 46 practices of 7 HC systems
  – For *Trends* in Achievement (2007-2010)
    • ~26,000 patients; 36 sites reporting all periods
Methods

• **Dependent Variables:**
  – % of patients meeting composite standards for Care (4 stds: measured as all-or-none) and Outcomes (5 stds: measured as ≥4)

• **Analyses:**
  – **Weighted GEE within insurance strata (Medicare, commercial, Medicaid, uninsured) to estimate the differences in percentages of EMR vs. paper-based systems meeting standards**
    – Adjusting for age, sex, race/ethnicity, income, education, and language preference, accounting for clustering
    – Trend models include baseline value as a covariate, omit language preference
  
  – **Secondary analysis restricted to safety net practices only: more likely to consist of Priority Primary Care Providers**
EMR Effect is Large, Larger in Care than Outcomes, and Similar in SNP Sample

- **Care Composite**: 41.9
- **Outcome Composite**: 25.9
- **All Patients**: 35.1, 29.8
- **Safety Net**: 35.7, 24.0
- **All Patients**: 15.2, 9.7
- **Safety Net**: 25.9, 16.1

Better Health Greater Cleveland
An Alliance for Improved Health Care

Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov
Patients in EMR Sites Achieve Better Across All Payers (2009-10)
EMR Sites Achieve Better on 8 of 9 Quality Standards
EMR Sites Also Improve Faster: Differences in Improvement/Year by Payer
Summary

• EMRs were associated with:
  – Better achievement
  – Faster improvement
  – Across payers
  – Across all care standards and most outcome standards
  – For adults with diabetes
  – In the context of a Regional Health Improvement Collaborative
Comments

1. This report raises cause for optimism that incentives for EMR adoption and Meaningful Use, at least in the context of a Regional Health Improvement Collaborative, can improve quality.

2. This investigation does not:
   - Address cost reductions
   - Demonstrate year-over-year changes in the same organizations After EMRs have been adopted and used meaningfully
What we’re Learning

• Providers, Employers and Health Plans recognize the value of EMRs
• Practice-based measurement and reporting is granular, timely, actionable
  – Focusing on high achievement and improvement can engage even disadvantaged practices
  – “Share ideas, compete on execution”
  – Stratifying results by SES is supported by practices, so far
• Trust Still Trumps Technology
Accelerating Improvement, Reducing Disparities In Diabetic Eye Exams

Graph showing the percentage of diabetes patients with eye examination over years:
- All Other Organizations:
  - 2007: 57%
  - 2008: 60%
  - 2009: 63%
  - 2010: 63%

- FQHCs:
  - 2007: 28%
  - 2008: 42%
  - 2009: 33%
  - 2010: 59%

Arrow indicating "FQHCs Transition to EMRs"
Thank you

www. Betterhealthcleveland.org
<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>Estimated Adult Prevalence</th>
<th>Intervention for dentist and patients to reduce risk of problems</th>
<th>Goal of Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>7%</td>
<td>• Review diabetes treatment and status at visit</td>
<td>• Reduce periodontal, caries, and oral infection risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Daily oral hygiene and visits every 6 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Monitor oral hygiene status</td>
<td></td>
</tr>
<tr>
<td>Xerostomia</td>
<td>10%, with 24% in &gt;65 years of age</td>
<td>• Review saliva production at each visit</td>
<td>• Reduce periodontal, caries, and oral infection risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prescription for saliva substitute/fluoride at each visit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Daily oral hygiene and visits every six months</td>
<td></td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>2%-3%</td>
<td>• Measures to reduce cardiac strain while receiving dental care (e.g., short visits, upright position, less stress)</td>
<td>• Reduce risk of cardiac problems at dental visit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Daily oral hygiene and visits every six months</td>
<td>• Reduce periodontal, caries, and oral infection risk</td>
</tr>
<tr>
<td>Chronic Obstructive pulmonary disease (COPD)</td>
<td>4%-5%</td>
<td>• Review history of concurrent heart disease</td>
<td>• Reduce risk of compromised air flow and pneumonia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoid use of barbiturates, narcotics, and anticholinergics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoid nitrous oxide-oxygen inhalation sedation with severe COPD and emphysema</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Daily oral hygiene and visits every six months</td>
<td>• Reduce periodontal, caries, and oral infection risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improved oral hygiene self-care</td>
<td></td>
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</table>
Table 2. Characteristics of the study population in each group (n=10,890 out of 59,147) (18.4% of dental patients were included)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Provider Activation</th>
<th>Patient Activation</th>
<th>Usual Care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinics</strong></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Providers</strong></td>
<td>31</td>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td><strong>Types of Providers (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dentist</td>
<td>13 (42%)</td>
<td>13 (39%)</td>
<td>14 (37%)</td>
</tr>
<tr>
<td>Hygienist</td>
<td>18 (58%)</td>
<td>20 (61%)</td>
<td>24 (63%)</td>
</tr>
<tr>
<td><strong>Number of patients seen with condition (%) during the 18-month study period</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>3,536 (18%)</td>
<td>2,979 (16%)</td>
<td>4,375 (20%)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1,444 (8%)</td>
<td>1,271 (7%)</td>
<td>1,727 (8%)</td>
</tr>
<tr>
<td>Xerostomia</td>
<td>2,256 (12%)</td>
<td>1,872 (10%)</td>
<td>2,800 (13%)</td>
</tr>
<tr>
<td>COPD</td>
<td>466 (2%)</td>
<td>383 (2%)</td>
<td>635 (3%)</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>258 (1%)</td>
<td>200 (1%)</td>
<td>396 (2%)</td>
</tr>
</tbody>
</table>

*one provider served during the intervention in both the patient activation and usual care groups

**Patients were counted multiple times when seen at different dental clinics.
Table 1. Characteristics of Patients Included in this Report

<table>
<thead>
<tr>
<th></th>
<th>Diabetes</th>
<th>High Blood Pressure</th>
<th>Heart Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># of Patients</strong></td>
<td>28,997</td>
<td>108,608</td>
<td>5.251</td>
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<tr>
<td><strong># of Primary Care Practices</strong></td>
<td>48 (8 health systems)</td>
<td>48 (8 health centers)</td>
<td>34 (3 health systems)</td>
</tr>
<tr>
<td>Better Health Population</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range of Values Across Sites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insurance (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>35.0</td>
<td>43.2</td>
<td>72.5</td>
</tr>
<tr>
<td>Commercial</td>
<td>43.3</td>
<td>41.4</td>
<td>19.2</td>
</tr>
<tr>
<td>Medicaid</td>
<td>8.9</td>
<td>6.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Uninsured</td>
<td>12.8</td>
<td>9.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Medicaid +Uninsured</td>
<td>21.7</td>
<td>15.4</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Range of Values Across Sites</strong></td>
<td>0-48</td>
<td>0-74</td>
<td>18-85</td>
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<tr>
<td><strong>Race/Ethnicity (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>52.6%</td>
<td>60.8</td>
<td>64.6</td>
</tr>
<tr>
<td>African American</td>
<td>39.6%</td>
<td>34.5</td>
<td>32.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4.6</td>
<td>2.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Other</td>
<td>3.2%</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Non-white</td>
<td>47.4%</td>
<td>39.2</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Range of Values Across Sites</strong></td>
<td>2-96</td>
<td>0-97</td>
<td>3-97</td>
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<tr>
<td><strong>Preferred Language (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>95.9</td>
<td>97.1</td>
<td>96.2</td>
</tr>
<tr>
<td>Spanish</td>
<td>2.2</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Other Languages</td>
<td>1.9</td>
<td>1.8</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Range of Values Across Sites</strong></td>
<td>35-100</td>
<td>42-100</td>
<td>53-100</td>
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<tr>
<td><strong>Average Age</strong></td>
<td>57.7</td>
<td>62.0</td>
<td>70.7</td>
</tr>
<tr>
<td><strong>% Female</strong></td>
<td>53.7</td>
<td>57.4</td>
<td>50.2</td>
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<tr>
<td><strong>Median Household Income ($)</strong></td>
<td>41,200</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>% Not Smoking</strong></td>
<td>79.7</td>
<td>82.0</td>
<td></td>
</tr>
<tr>
<td><strong>% Not Reported</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Better Health’s Individual and Composite Standards for Diabetes

<table>
<thead>
<tr>
<th>Care 4 standards for good routine care</th>
<th>Outcomes 5 standards of good control</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Blood Sugar Control Test done</td>
<td>• Blood Sugar Controlled (Hemoglobin A1c&lt;8%)</td>
</tr>
<tr>
<td>• Screening for or Treatment of Kidney Problems</td>
<td>• Blood Pressure Controlled (BP&lt; 140/80)</td>
</tr>
<tr>
<td>• Annual Eye Examination</td>
<td>• LDL (“Bad”) Cholesterol &lt; 100 or statin prescription</td>
</tr>
<tr>
<td>• Pneumonia Vaccine Given</td>
<td>• Weight Controlled (Body Mass Index &lt;30)</td>
</tr>
<tr>
<td></td>
<td>• Documented Non-Smoker</td>
</tr>
</tbody>
</table>

Table 3. Better Health’s Individual and Composite Standards for Heart Failure

<table>
<thead>
<tr>
<th>Evaluation Standards 4 Standards of Good Assessment</th>
<th>Treatment Standards 2 Types of Evidence-Based Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Heart Function Test done (“Echo” to see how well the heart is pumping)</td>
<td>• ACE/ARB Medication (Improves heart and kidney function and lowers blood pressure)</td>
</tr>
<tr>
<td>• Blood Test done each year (Basic Metabolic Panel to check blood chemistry)</td>
<td>• Beta-Blocker Treatment (Blocks stress hormones, which make the heart work harder)</td>
</tr>
<tr>
<td>• Weight Checked Regularly (Look for fluid retention to monitor heart function)</td>
<td></td>
</tr>
<tr>
<td>• Blood Pressure checked regularly (High Blood pressure can signal serious heart problems)</td>
<td></td>
</tr>
</tbody>
</table>

Evaluation Composite: Percent of patients meet all 4 standards

Treatment Composite: Percent of patients with moderate or severe heart failure who received at least one of the medications