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**Electronic Communication Systems: Energizing the Patient with Diabetes to Engage in Their Own Health Care**

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Electronic communication systems: energizing the patient with diabetes to engage in their own health care.

Michael Thompson MD
Chief, Adult Diabetes Clinical Research
Disclosure

I have no conflict of interest in relation to this program/presentation.

Michael Thompson MD
Diabetes in the UMMHC Catchment Area.

- Worcester County pop. 813,475 (2014)
  - ~prevalence diabetes over 8%
  - >65,000 with diabetes

- >22,000 UMMHC outpatients with diabetes
- >6000 DCOE patients (Pedi and Adult)
Problems with Current Care Model

Diabetes is unique to the extent that patients are required to participate in their own care.

We provide intermittent medical care while diabetes is 24/7.

• Data intensive.
• Poor care for the disengaged.
Patients and Providers Need Help Managing Blood Sugars

**Patients**
- Inconvenient/uncomfortable
- Lack of understanding of BG results
- Lack of motivation
- Lack of symptoms
- Cost

**Providers**
- Lack of time
- Difficulty analyzing the data
- Lack of accurate data from patient
- Treat the A1c result
Connecting Patients and Providers

- Web base patient portal for home use.
- Downloads over 40 meters.
- Data analysis tools.
- Secure Messaging.
- Fully integrated into DCOE electronic chart workflow.
MyCareTeam In Allscripts EMR
Dear Eileen,

Your blood sugars are looking good overall but I notice that your before lunch sugars can be pretty high. Can you keep notes on that for a few days and tell me why you think these are happening?

Dr Thompson
Getting Patients Connected

Home Glucose Downloading

- Teaching in clinic or remotely.
- 1440 DCOE Patients have used Home Glucose Download service.
- About 9% of clinic download from home.

Likelihood of using is provider and patient specific.

- Promote home meter downloading for ~390 HPHC members at DCOE and 3 large primary care practices.

- Anticipated e-Visits might decrease need for clinic based care.

- Provider able to bill e-Visit (equivalent to level 1 charge).
Harvard Pilgrim / UMMHC Diabetes Pilot Phase 1

• Workflow:
  – Engagement and training of PCP practices.
  – Patient enrollment.
    • Letters sent.
    • Re-approached in clinic at visits.
  – Tracked home-downloads and e-visits.

• Patient participation lower than expected.
  ~ 30% agreed to download.
  ~ 10% used program.
## MCT Participation Survey

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological Difficulties</td>
<td></td>
</tr>
<tr>
<td>Difficulty logging on</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty uploading meter</td>
<td>6</td>
</tr>
<tr>
<td>Windows not compatible with the version MCT uses</td>
<td>3</td>
</tr>
<tr>
<td>Inaccessibility of Technological Devices</td>
<td></td>
</tr>
<tr>
<td>Don’t have USB cable (solved)</td>
<td>40</td>
</tr>
<tr>
<td>No computer access / Don’t use the computer</td>
<td>71</td>
</tr>
<tr>
<td>Don't have an email account</td>
<td>1</td>
</tr>
<tr>
<td>Macintosh computer not compatible with meter</td>
<td>3</td>
</tr>
<tr>
<td>Meter can't be downloaded.</td>
<td>7</td>
</tr>
<tr>
<td>Perceived Difficulty</td>
<td></td>
</tr>
<tr>
<td>Program seems difficult / seems like a hassle</td>
<td>15</td>
</tr>
<tr>
<td>Need written instructions to bring home</td>
<td>17</td>
</tr>
<tr>
<td>Lack of Incentive / Motivation</td>
<td></td>
</tr>
<tr>
<td>Already track meter readings on paper or through pump</td>
<td>6</td>
</tr>
<tr>
<td>No interest</td>
<td>27</td>
</tr>
<tr>
<td>Haven't been using meter</td>
<td>2</td>
</tr>
<tr>
<td># of Patients who Reported No Barriers</td>
<td>38</td>
</tr>
<tr>
<td>Total # of Patients Encountered</td>
<td>309</td>
</tr>
</tbody>
</table>

### Examples:
- No computer access.
- Trouble logging on or uploading.
- Don’t have a cable.
- Macintosh compatibility issues.
- Meter can't be downloaded.
- Program seems difficult / seems like a hassle.
- Already track meter readings on paper or through pump.
- No interest.
- Not testing.
Lessons Learned: Online Banking and the Future of Telehealth Services.

- Pewinternet.org/Reports/2013/Online-banking
- Consumers and Mobile Financial Services 2015 Federal Reserve March 2015

Federal Reserve Mar 2015 Report
- Online Banking 74%
- Mobile Banking 35%
- No Internet Access 15%
Harvard Pilgrim / UMMHC Diabetes Pilot Provider Experience

<table>
<thead>
<tr>
<th></th>
<th>Benedict</th>
<th>Tri-River</th>
<th>Westborough</th>
<th>DCOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients Total</strong></td>
<td>21,500</td>
<td>12,500</td>
<td>5,300</td>
<td>5,200</td>
</tr>
<tr>
<td><strong>HPHC Member</strong></td>
<td>1170</td>
<td>1278</td>
<td>498</td>
<td>188</td>
</tr>
<tr>
<td><strong>HPHC Member with DM</strong></td>
<td>113</td>
<td>92</td>
<td>34</td>
<td>183</td>
</tr>
</tbody>
</table>

- e-Visit billing was rare.
  - HPHC 5-10% of panel so when to bill.
  - Developed Diabetes Champion roll at each site.
- Felt like extra work despite being “usual care” for our clinic.
- Primary care using A1c to manage.
Lessons learned: Why our patients and providers avoid telehealth.

• Milder cases with diet or monotherapy may not need or want to connect between visit.

• Those most in need may be disengaged. 38% had no scheduled clinic visit

• Not part of our usual care model.

• Process of connecting remotely still too complex for many.
Cellular Connected Device
• No need to plug in a cable
• Records healthcare data, trends and messages

Smart Cloud
• Analyzes data and provides instant automated feedback.

Live Care Team
• Reach out to patient if readings require clinical attention.
Livongo System

- Instant upload of glucose recordings to web using a cellular meter.
- Logs for medication, diet, and physical activity.
- Reminder messages and alarms, diabetes management tips.
- 24/7 monitoring by CDE coach.
- Data flows to My Care Team.
Get In Touch Trial

• 12 month Randomized, controlled crossover trial
• Sample Population:
  – 120 adults with suboptimal T2D (A1c ≥8.5% twice in previous 12 months)

Aim 1. **Acceptability**: feedback from participants

Aim 2. **Clinical Efficacy**: changes in clinical outcomes including hemoglobin A1c

Aim 3. **Patient-Reported Efficacy**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Intervention N=60</th>
<th>Control N=60</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean(SD)</td>
<td>56.1 (11.1)</td>
<td>57.4 (12.1)</td>
<td>0.72</td>
</tr>
<tr>
<td>Gender, female N(%)</td>
<td>34 (56.7)</td>
<td>29 (48.3)</td>
<td>0.36</td>
</tr>
<tr>
<td>Race, N(%)</td>
<td></td>
<td></td>
<td>0.75</td>
</tr>
<tr>
<td>White</td>
<td>37 (66.6)</td>
<td>43 (71.7)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>6 (10.0)</td>
<td>3 (5.0)</td>
<td></td>
</tr>
<tr>
<td>Hispanic Latino</td>
<td>11 (18.3)</td>
<td>9 (15.00)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>6 (10)</td>
<td>5 (8.3)</td>
<td></td>
</tr>
<tr>
<td>Internet Access, N(%)</td>
<td></td>
<td></td>
<td>0.73</td>
</tr>
<tr>
<td>No</td>
<td>9 (15.0)</td>
<td>11 (18.3)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50 (83.3)</td>
<td>47 (78.3)</td>
<td></td>
</tr>
<tr>
<td>Not Reported</td>
<td>1 (1.7)</td>
<td>2 (3.3)</td>
<td></td>
</tr>
<tr>
<td>Internet Use Frequency</td>
<td></td>
<td></td>
<td>0.84</td>
</tr>
<tr>
<td>Once per week or less</td>
<td>17 (28.3)</td>
<td>20 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Several times per week</td>
<td>41 (68.3)</td>
<td>38 (63.3)</td>
<td></td>
</tr>
<tr>
<td>Not Reported</td>
<td>2 (3.3)</td>
<td>2 (3.3)</td>
<td></td>
</tr>
<tr>
<td>A1c %, mean (SD)</td>
<td>10.3 (1.4)</td>
<td>10.0 (1.4)</td>
<td>0.10</td>
</tr>
</tbody>
</table>
Livongo MCT

- 152 Invited at clinic visits.
- 123 Accepted (3 never enrolled).
- 96 Active at six month (47 Livongo, 49 UC).

**Group 1 (Livongo meter).**
- 13 had downloaded to MCT before study.
- 23 were contacted by CDE for high or low BG.
- 11 Had CDE coaching.

**Group 2 (usual care).**
- 7 had downloaded to MCT before study.
- 2 downloaded from home during UC.
Preliminary look at Get in Touch A1c’s

Group 1 = study meter month 0-6, usual care month 6-12
Group 2 = usual care month 0-6, study meter month 6-12
Nine and twelve month data set incomplete.
<table>
<thead>
<tr>
<th>Baseline Values</th>
<th>Intervention group</th>
<th>Control group</th>
<th>p (IV vs Control)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline n=59 mean (SD)</td>
<td>Individual Change n=44 mean (SD)</td>
<td>Baseline n=60 mean (SD)</td>
</tr>
<tr>
<td>Overall Diabetes Treatment Satisfaction</td>
<td>29.6 (5.5)</td>
<td>+12.9 (5.6)</td>
<td>28.4 (5.3)</td>
</tr>
<tr>
<td>Satisfaction with current treatment</td>
<td>4.7 (1.5)</td>
<td>+2.2 (1.1)</td>
<td>4.8 (1.1)</td>
</tr>
<tr>
<td>How convenient treatment is</td>
<td>4.8 (1.2)</td>
<td>+2.2 (0.8)</td>
<td>4.3 (1.4)</td>
</tr>
<tr>
<td>How flexible treatment is</td>
<td>4.9 (1.1)</td>
<td>+2.0 (1.3)</td>
<td>4.3 (1.2)</td>
</tr>
<tr>
<td>How satisfied with understanding of diabetes</td>
<td>4.9 (1.3)</td>
<td>+2.3 (1.0)</td>
<td>4.8 (1.2)</td>
</tr>
<tr>
<td>How likely to recommend treatment</td>
<td>5.3 (0.9)</td>
<td>+2.1 (1.3)</td>
<td>5.1 (1.2)</td>
</tr>
<tr>
<td>How satisfied to continue with present form of treatment</td>
<td>5.0 (1.2)</td>
<td>+2.2 (1.2)</td>
<td>4.9 (1.2)</td>
</tr>
<tr>
<td>Reading</td>
<td>Feel</td>
<td>Meal</td>
<td>Issue</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>--------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>577</td>
<td>Light Headed</td>
<td>No Meal</td>
<td>Illness related;</td>
</tr>
<tr>
<td>34</td>
<td>Feel Fine</td>
<td>Before Breakfast</td>
<td>Missed meals;</td>
</tr>
</tbody>
</table>
Diabetes Communications Goals

- Effortless connectivity is possible.
  - Cellular / WiFi / Bluetooth

- Diabetes self-management tools should live here.
  - All devices should ideally interface.

- Able to interface with multiple Diabetes Management Applications.
  - All data from the DM App copied here.

- Single sign on access to diabetes data.
  - Remote care needs to be supported as part of usual care.