A Quality Improvement Project to Improve the Management of Type 2 Diabetes Mellitus at the Three Rivers Rural Health Clinic

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Objectives

1. Identify strategies for implementing an office-redesign to provide more systematic chronic care management.

2. Cite reasons why primary care providers struggle with chronic care management and how these can be better addressed.

3. Indicate methods that can be used to capture and analyze quality improvement project data.
Introduction

- Primary care providers provide more than 80% of diabetes care (Peterson, 2008)
- Leading cause of new blindness, end stage renal disease, and lower limb amputation (ADA, 2008)
- Better outcomes with better glycemic control and screening
- 2003 National Healthcare Quality Report showed that preventative diabetic care was being performed less than 65% of the time by primary care providers (Leininger, et al, 1996)
- Main reason= lack of systematic approach
• Important to set up a specific process for managing and reviewing information for optimal chronic disease management (CDC, 2011).
• A systematic approach to tracking diabetes (Adeleman & Harris, 1998).
• Clinic design issues- Diabetic registry, flow charts, self-management support, reminder system (Wagner et al., 2001, Renders et al, 2001b, & Nutting et al. ,2007).
• Pt. education & foot inspection reduce foot complications (Litzelman et al., 2009)
• Developing clear and concise practice guidelines & review of dashboards improve outcomes (Wagner et. al, 1998)
Comprehensive Diabetes Evaluation

- Medical History
- Physical Exam
  - BP, thyroid, skin, foot exam
- Labs
  - A1C- q 2-3 months
  - Annual
    - LFTs
    - Lipids
    - Creat/GFR
    - Urine microalbumin
    - TSH

ADA (2013)
Comprehensive Diabetes Evaluation

- Referrals
  - Annual dilated eye exam
  - Family planning for women of reproductive age
  - Dental exam every 6-12 months
  - DSME
  - Mental Health, if needed

ADA (2013)
Aim Statement

- To improve the management of diabetes in accordance with ADA guidelines in adult patients age 18+ with type 2 diabetes at the Three Rivers Rural Health Clinic by March 31, 2013.

  - Hemoglobin A1C ≤7.0 from 50% to 75%
  - Annual foot exams from 6% to 75%
  - Referral for a dilated eye exam from 5% to 100%
  - Completed an annual dilated eye exam from 12% to 50%
  - Annual urine Microalbumin lab screen from 9% to 75%
  - Use of ACE-I in those with a Microalbumin >30 μg/ml from 1.5% to 75%
Methods

- Oversight and approval through the College of Nursing DNP Capstone Bridge Committee
- Charts and paper tickler were stored in a locked file cabinet in the record room.
- Excel spreadsheet used for data analysis contained no personal identifying data
- Minimal risks
- Sample-
  - All patients age 18+ with type 2 diabetes
  - None excluded
  - Varied monthly
Methods (Cont.)

- Setting
  - Rural health clinic in Montana
  - Owned and operated by Nurse Practitioners
  - Team included secretary, med tech, office manager, and 2 NP providers

- Reliability & Validity of Methods Used
  - Methods based upon review of the literature...meta-analysis, systematic reviews, RCT
  - Data obtained by the lead QI
  - Interventions were adjusted based upon team feedback and monthly dashboard review
Methods (Cont.)

- Reliability & Validity of Methods Cont.
  - Data capture and interventions using ADA standards of practice
    - A1C to track blood sugars
    - Tuning fork and monofilament for foot exam
    - Urine Microalbumin screen for renal function
    - Annual dilated eye exam to screen for retinopathy
    - Ace Inhibitor use for urine Microalbumin >30 µg/ml
  
- Dorothea Orem's Self-Care Theory
- Chronic Care Model
Run Chart

May 2012 Baseline data

July- Sept. 2013 PDSA 4-7

Nov. 2012- January 2013 PDSA 8-15

June 2012 PDSA 1-3

Oct. 2012 Post intervention Data Review

March 2013 Data Analysis
## Interventions

<table>
<thead>
<tr>
<th>Phase</th>
<th>Date Complete</th>
<th>QI Team</th>
<th>Lead QI</th>
</tr>
</thead>
</table>
| 1     | Spring 2012   | •Identify problem  
•Est. benchmarks  
•Analyze tasks  
•Assign tasks | •Form QI team, identify problem, develop plan  
•Est. benchmarks  
•Obtain baseline data  
•Literature review |
<table>
<thead>
<tr>
<th>Phase</th>
<th>Date Complete</th>
<th>Providers</th>
<th>Reception</th>
<th>QI Team</th>
<th>Lead QI</th>
</tr>
</thead>
</table>
| 2     | Summer 2012  | • Test flow sheet  
• Test updated flow sheet  
• Implement flow sheet  
• Staff training of ADA guidelines and microvascular complications | • Test tickler  
• Re-design tickler  
• Implement tickler  
• Phone calls/mailers to patients | • Review monthly dashboards  
• Brainstorm ideas | • Implement existing flow sheet  
• Redesign flow sheet  
• Worked with providers to implement standardized ADA care  
• Design Excel tickler  
• Design paper tickler  
• Redesign paper ticklers  
• Finalize tickler  
• Research and obtain patient education materials  
• Implement chart identifier (neon dot)  
• Design & Implement Excel tracking  
• Design referral log |
# Diabetes Care Patient Flow Sheet

Designed for the Three Rivers Clinic

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Frequency</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History and Physical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Every Visit</td>
<td>&lt;130/80</td>
</tr>
<tr>
<td>Weight</td>
<td>Every Visit</td>
<td>Individualize</td>
</tr>
<tr>
<td>BMI</td>
<td>Every Visit</td>
<td>Individualize</td>
</tr>
<tr>
<td><strong>Dilated Retinal Exam</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral</td>
<td>Annually</td>
<td>Retinopathy Prevention</td>
</tr>
<tr>
<td>Complete</td>
<td>Annually</td>
<td>Retinopathy Prevention</td>
</tr>
<tr>
<td><strong>Monofilament and peripheral pulses foot</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annually</td>
<td>Lower extremity amputation prevent</td>
</tr>
<tr>
<td><strong>Laboratory Analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1C</td>
<td>Every 3-6 months</td>
<td>&lt;7.0%</td>
</tr>
<tr>
<td>Fasting Lipid profile</td>
<td>Annually</td>
<td>&lt;100mg/dL</td>
</tr>
<tr>
<td>LDL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triglycerides</td>
<td></td>
<td>&lt;150mg/dL</td>
</tr>
<tr>
<td>HDL</td>
<td></td>
<td>&gt;40mg/dL in men; &gt;50mg/dL in women</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>&lt;200mg/dL</td>
</tr>
<tr>
<td>Urine albumin-to-creatinine ratio (spot)</td>
<td>Annually</td>
<td>&lt;30 mg/dL</td>
</tr>
<tr>
<td>Vaccinations</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>Annually</td>
<td></td>
</tr>
<tr>
<td>Pneumococcus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counseling and Risk Reduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking/Tobacco status</td>
<td>Never</td>
<td></td>
</tr>
<tr>
<td>Aspirin Therapy (81-325mg/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACE Inhibition/ARB: Treatment for HTN or microalbuminuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental care (every 6-12 months referral)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression Screening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual functioning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Date Complete</td>
<td>Providers</td>
</tr>
<tr>
<td>-------</td>
<td>---------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Fall 2012</td>
<td>• Continue implementing flow sheet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Standardize lab notations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disseminate patient education materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spring 2013</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Outcomes Reviewed

• Microalbumin screening up to date?
• + Microalbumin (>30) treated with ACE-I?
• Foot exam up to date?
• Eye exam up to date?
• Eye referral made?
• Hemoglobin A1C > or < 6.9

• Fisher’s Exact Test
### Screening for Secondary Microvascular Complications

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Timing</th>
<th>n/total</th>
<th>%</th>
<th>OR</th>
<th>CI*</th>
<th>p value</th>
<th>z score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urine micro. up to date</strong></td>
<td>Pre</td>
<td>6/65</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid</td>
<td>36/61</td>
<td>59</td>
<td>14.16</td>
<td>5.30-37.83</td>
<td>&lt;.0001</td>
<td>5.85</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>41/61</td>
<td>67</td>
<td>20.16</td>
<td>7.45-54.56</td>
<td>&lt;.0001</td>
<td>6.79</td>
</tr>
<tr>
<td><strong>Foot screen up to date</strong></td>
<td>Pre</td>
<td>4/65</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid</td>
<td>24/61</td>
<td>39</td>
<td>9.89</td>
<td>3.18-30.76</td>
<td>&lt;.0001</td>
<td>3.09</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>34/61</td>
<td>56</td>
<td>19.20</td>
<td>6.20-59.49</td>
<td>&lt;.0001</td>
<td>6.14</td>
</tr>
<tr>
<td><strong>Eye referral completed</strong></td>
<td>Pre</td>
<td>5/57</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid</td>
<td>13/44</td>
<td>30</td>
<td>7.55</td>
<td>1.99-28.56</td>
<td>&lt;.0001</td>
<td>3.09</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>14/40</td>
<td>35</td>
<td>9.69</td>
<td>2.56-36.71</td>
<td>&lt;.0001</td>
<td>2.88</td>
</tr>
<tr>
<td><strong>Eye exam completed</strong></td>
<td>Pre</td>
<td>8/65</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid</td>
<td>17/61</td>
<td>28</td>
<td>2.75</td>
<td>1.09-6.96</td>
<td>0.02</td>
<td>2.81</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>21/61</td>
<td>34</td>
<td>3.74</td>
<td>1.51-9.29</td>
<td>0.002</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Key: Pre-May 2012, Mid-Oct 2012, Post-Feb 2013, OR- Odds Ratio, CI-Confidence Interval, *CI at 95% level of confidence using Fishers Exact test
## Hemoglobin A1C Values

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Timing</th>
<th>n/total</th>
<th>%</th>
<th>OR</th>
<th>CI*</th>
<th>p value</th>
<th>z score</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1C ≤ 6.9</td>
<td>Pre</td>
<td>33/65</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid</td>
<td>40/61</td>
<td>66</td>
<td>1.85</td>
<td>0.90-3.97</td>
<td>0.07</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>40/61</td>
<td>66</td>
<td>1.85</td>
<td>0.90-3.79</td>
<td>0.07</td>
<td>1.50</td>
</tr>
<tr>
<td>HbA1C ≥ 7.0</td>
<td>Pre</td>
<td>32/65</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mid</td>
<td>21/64</td>
<td>34</td>
<td>1.85</td>
<td>0.90-3.97</td>
<td>0.07</td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>21/61</td>
<td>34</td>
<td>1.85</td>
<td>0.90-3.79</td>
<td>0.07</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Key: Pre-May 2012, Mid-Oct 2012, Post-Feb 2013, OR- Odds Ratio, CI-Confidence Interval, *CI at 95% level of confidence using Fishers Exact test
Foot Exams Up to Date

Pre-Intervention

Post-Intervention
Microalbumin Screen Up to Date
Annual Eye Exam Up To Date

Pre-Intervention

Post-Intervention
Eye Exam Referral Made

Pre-Intervention

Post-Intervention
A1C Percentage, Goal 75% < 7.0

Pre-Intervention

Post-Intervention
Urine Microalbumin >30 µg/ml

Pre-Intervention

Post-Intervention

# treated with ACE-I/ARB
Discussion

- Positive impact:
  - Flow sheets and provider education (Litzelman et al., 2009)
  - Chart identifier (neon dot), flow sheets, tickler, and pt. education (Wagner et al. 1998)
  - Reminder system and tickler file (Renders et al., 2001b)
Limitations

• Generalizability
  o Rural Setting QIP
• No comparison group
• Small sample size
• Benchmarks were initially set too high
Implications for Practice

- Advanced Practice Registered Nurses can successfully design and lead quality improvement projects in the management of chronic care conditions.
- Closer to meeting ADA practice guidelines:
  - Increased prevention of secondary microvascular complications.
- New staff will be trained to maintain the tickler, reminder system, and flow sheet.
- Current staff will receive quarterly reminders and be encouraged to continue using flow sheets.
- Tickler reviewed by secretary on a weekly basis and new patients with diabetes will be added.
Future Plans

• Management of other chronic conditions
• Preventative screening
• End of life discussions, POLST implementation
Conclusion

• Chronic care can be addressed even during acute care visits
• Successful chronic care management requires a systematic practice design and approach
• ADA practice guidelines can be successfully addressed and implanted within the primary care setting
• Advanced Practice Family Nurse Practitioners can design, implement, and successfully complete quality improvement projects that have significant positive impact on patient care
Any Questions

I have no funding to disclose
References


• American Diabetes Association (2013). Standards of Medical Care in Diabetes-2013. *Diabetes Care, 36*(1), S11-S66. doi: 10.2337/dc13-S011,


