Innovative Strategies for Rural Diabetes Care

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Estimated Worldwide Prevalence of Diabetes

2007

World Prevalence ~ 194 Million

2025

World Prevalence ~ 333 Million

Prevalence estimates of diabetes, 2007

World Prevalence ~ 194 Million

Prevalence estimates of diabetes, 2025

World Prevalence ~ 333 Million
Diabetes: Statistics for the U.S.

• 23.6 million people (~ 8%) have diabetes
• 43 million people have pre-diabetes
• 1.6 million new cases of diabetes are currently diagnosed each year
• 1 out of every 3 children born after 2000 will develop type 2 diabetes during their lifetime
County-level Estimates of Diagnosed Diabetes for Adults aged ≥ 20 years: United States 2007
2007 Estimated Diabetes Prevalence in Rural vs. Urban

P < 0.01
Diabetes Prevalence in NC

And......More Diabetes to Come

Adults: Percent Obese in 2008:
- NC = 29%
- ENC White = 29%
- ENC Af Amer = 46%

Kids in ENC in 2006:
- 40-50% OW or Obese
- 25% getting no activity
- Diet: sugar, fat, fast food
2004-2008 NC Diabetes Mortality and Disparity by Ethnicity

DM Mortality/100K

- White Male
- Minority Male
- White Female
- Minority Female
Diabetes Mortality

Unadjusted

Figure 6.5 i. Diabetes Mellitus: Trends in mortality rates for ENC29, RNC71, and NC, 1999-2007 with projections to 2020

ENC29 9-yr trendline
R² = 0.00
y = 0.03x + 33.14

RNC71 9-yr trendline
R² = 0.54
y = -0.35x + 26.72

NC 9-yr trendline
R² = 0.45
y = -0.31x + 27.77

Increasing regional disparity in burden

1999 ENC29 rate is 24% greater than RNC71
2007 ENC29 rate is 39% greater than RNC71

Comparison of Fitted Rates in 1999

<table>
<thead>
<tr>
<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
</tr>
</thead>
<tbody>
<tr>
<td>19% LT</td>
<td>16% LT</td>
<td>ENC29</td>
</tr>
<tr>
<td>24% GT</td>
<td>4% GT</td>
<td>RNC71</td>
</tr>
<tr>
<td>19% GT</td>
<td>4% LT</td>
<td>NC</td>
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Comparison of Fitted Rates in 2007

<table>
<thead>
<tr>
<th>ENC29</th>
<th>RNC71</th>
<th>NC</th>
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<tbody>
<tr>
<td>28% LT</td>
<td>24% LT</td>
<td>ENC29</td>
</tr>
<tr>
<td>39% GT</td>
<td>8% GT</td>
<td>RNC71</td>
</tr>
<tr>
<td>32% GT</td>
<td>5% LT</td>
<td>NC</td>
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DIABETES: AT THE CENTER OF COMPLICATIONS

- Diabetes can damage nerves and cause neuropathy.
- Kidney disease:
  - granular surface
  - decreased function
  - smaller size
  - high urine protein
- Retinopathy:
  - Hemorrhage
  - Aneurysms
- Blood vessel damage in the feet may cause tissue damage.
Convergence of Socio-economic Factors & Diabetes in Rural NC
Strategy: Bi-Modal Intervention plus Policy Advocacy

Provider’s Office AND Community Setting
Re-engineering Healthcare Resources

• Current health care delivery system is broken; rural minority patients suffer the consequences
• Innovative systems can be developed
• Preliminary evidence suggests that these diminish barriers in care delivery and improve outcomes
Delivery System(Re)Design

- Education with coaching (E&C) by skilled non-physician = primary tool to facilitate pt self-management
- Define roles and distribute tasks among team members.
- Use planned interactions to support evidence-based care.
- Provide clinical case management services.
- Ensure regular follow-up.

- Give care that patients understand and that fits their culture
New Models: RWJ-funded work in AA Diabetic Pts in Eastern NC

- Murfreesboro Clinic
- Ahoskie Clinic
- Bertie Memorial Hosp Clinic and Coord Center
- Washington Co Hosp Clinic
- Brody School of Medicine, East Carolina University
- Kinston Community Health Center
- Mt. Olive Community Health Center

Circuit-rider
Intervention

- Nurse Care Manager
- PharmD Care Manager
- Dietitian Care Manager

Intervention sites
Control sites
## BASELINE DATA ON AA DIABETIC PATIENTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control N=278</th>
<th>Intervention N=362</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>59.9 ± 12.3</td>
<td>59.3 ± 12.1</td>
</tr>
<tr>
<td>Gender (% female)</td>
<td>63%</td>
<td>66%</td>
</tr>
<tr>
<td>HbA1C</td>
<td>8.1 ± 2.2</td>
<td>8.2 ± 2.3</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>141 ± 22</td>
<td>135 ± 18</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>82 ± 13</td>
<td>78 ± 11</td>
</tr>
<tr>
<td>LDL cholesterol</td>
<td>100 ± 37</td>
<td>101 ± 34</td>
</tr>
</tbody>
</table>
OUTCOMES OF INTEREST…
Stay Tuned

**Outcome Measures:** HbA1c, BP, LDL cholesterol

**Control Measures:** age, gender, baseline values, co-morbid conditions, health insurance, practice attended, # visits, # hours contact with a care manager, # self-management goals set, treatment intensification, and medication compliance.

**Process Measure:** Patient Assessment of Chronic Illness Care (PACIC)

**Business Sustainability modeling:** total cost of intervention; cost allocation, cost-sharing, and enhanced practice revenue
Patient Provider Telehealth Network

- Patient Centered Medical Home Model
- Driven by the PCP and the patient
- Technology placed in homes and the community
Remote Monitoring and Chronic Care Management

- Daily monitoring and care management by RN
- PCP responds to critical indicators
Hospital and ER Charges

n=64

Hospital Charges

6 mos. prior to Telehealth = $1.2 million
During 6 mos. Telehealth = $365 k  71% decrease
6-30 mos. post Telehealth = $438 k  66% decrease

ER Charges

6 mos. prior to Telehealth = $64 k
During 6 mos. Telehealth = $16 k  74% decrease
6-30 mos. post Telehealth = $44 k  30% decrease
Community-based Self-management Support

- Emphasize the patient's central role.
- Use effective culturally relevant self-management support strategies that include assessment, goal-setting, action planning, problem-solving and follow-up.
- Organize resources to provide support
Barriers to Self-Management

Office: DMSE via Medicare
• Certification
• Limited hours reimbursed
• Transportation/distance
• Staffing
• Poverty
• Low reimbursement

Patient Issues
• Healthy eating in rural areas
• Safe exercise locations
• Monitoring
• Cost of meds/supplies
• Daily behavior changes
• Stress/depression

New Community-based Models Needed