Regional Population Health Improvement Plan

Meharry Medical College
School of Graduate Studies and Research
Division of Public Health Practice

William Washington, D.P.A.
Diabetes Problem in the State of Tennessee

- Major concern within Tennessee
- Ranked 48th in having the highest rate of Diabetes when compared with other states
- Seventh leading cause of death in the state
- Accounts for less than 3% of the YPLLs before age 75
The Counties of Mid-Cumberland Region

**Urban Counties:** Davidson, Montgomery, Robertson, Rutherford, Sumner, Williamson, and Wilson

**Rural Counties:** Cheatham, Dickson, Houston, Humphreys, Stewart, and Trousdale
To compare prevalence, mortality, and associated risk factors for Diabetes in rural and urban counties of the Mid-Cumberland region of Tennessee.
**Study Methods and Data Source**

**Study Methods:**
Descriptive, exploratory, parametric, and nonparametric statistics were used to analyze the data.

**Data Source:**
Primarily utilized 2013 data provided by the Tennessee Department of Health (TDOH).
Quantitative Methods – Theoretical Framework

Social Ecological Model
Adult Obesity: Significant Risk Factors

Risk factors = 28, R squared value = 0.40, and RMSE = 1.77
Diabetes: Significant Risk Factors

Diabetes / Standardized Coefficients
(95% Confidence Interval)

Risk factors = 29, R squared value = 0.47, and RMSE = 0.75
Diabetes: Magnitude Effects

- In Tennessee, the Diabetes rate of rural areas is 0.4 higher than that of urban areas in 2013.

- As expected, the Diabetes rate is positively associated with adult obesity rate. A 2% increase in the Diabetes rate occurred for every 10% increment in the adult obesity rate.

- The Diabetes rate increased by 2% when adults over 65 years old increased by 10%.

- For every 10% increase of adults with some college education, the Diabetes rate increased by 0.5.

- For every 10% increase of adults with Bachelor’s degree or higher, the Diabetes rate decreased by 0.3.
Among 8 geographical regions of Tennessee, Mid-Cumberland had the lowest percent mean of Diabetes, and Northwest had the highest.

There was a statistically significant difference in the mean percent of Diabetes among the regions of Tennessee ($p = 0.007$).

Specifically, the mean Diabetes death for Mid-Cumberland was significantly different from Northeast ($p = 0.04$) and Northwest ($p = 0.005$).

Overall, adult obesity ($p < 0.001$), percentage of individuals aged 65+ ($p < 0.001$), and physical inactivity ($p = 0.06$) were the top predictors of the percent of Diabetes among all 95 counties in Tennessee.
Study Results

- Humphreys had the worst and Williamson had the best percent of population having symptoms of Diabetes.

- Houston had the worst and Stewart had the best record on gestational Diabetes.

- Humphreys had the worst and Williamson had the best record for White males with Diabetes.

- Humphreys had the worst record for White females with Diabetes, while Houston and Trousdale tied for the best record.

- Robertson and Stewart had the worst record for both males and female African Americans/Blacks with Diabetes.

- With respect to other races, the Mid-Cumberland counties were not significantly different from one another.
<table>
<thead>
<tr>
<th>Category</th>
<th>Worst Record</th>
<th>Best Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Populations Having Symptoms of Diabetes</td>
<td>Humphreys</td>
<td>Williamson</td>
</tr>
<tr>
<td>Gestational Diabetes</td>
<td>Houston</td>
<td>Stewart</td>
</tr>
<tr>
<td>White Males with Diabetes</td>
<td>Humphreys</td>
<td>Williamson</td>
</tr>
<tr>
<td>White Females with Diabetes</td>
<td>Humphreys</td>
<td>Houston &amp; Trousdale (tie)</td>
</tr>
<tr>
<td>Black Males with Diabetes</td>
<td>Robertson &amp; Stewart (tie)</td>
<td>Williamson</td>
</tr>
<tr>
<td>Black Females with Diabetes</td>
<td>Robertson &amp; Stewart (tie)</td>
<td>Williamson</td>
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</tbody>
</table>
Study Results

- No statistically significant difference in the mean percent of Diabetes found when comparing rural and urban counties of the Mid-Cumberland Region (p = 0.11)

- Among rural counties, for the percent of the population having symptoms of Diabetes, Humphreys had the worst record and Cheatham had the best record.

- Among urban counties, for the percent of the population having symptoms of Diabetes, Robertson had the worst record and Williamson had the best record.
Study Results

- Humphreys had the highest percent of population who died from symptoms of Diabetes, and Williamson had the lowest among the Mid-Cumberland counties.

- For adult obesity, Houston had the worst record, and Williamson had the best record.

- Davidson had the worst record for high school obesity, and Williamson had the best record.

- Trousdale had the worst record for physical activity, and Williamson had the best record.

- Stewart had the lowest number of primary care doctors per diabetic patient, and Williamson had the highest.

- Houston had the highest percentage of senior citizens, and Montgomery had the lowest.
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<tr>
<td>% of Deaths from Symptoms of Diabetes</td>
<td>Humphreys</td>
<td>Williamson</td>
</tr>
<tr>
<td>Adult Obesity</td>
<td>Houston</td>
<td>Williamson</td>
</tr>
<tr>
<td>High School Obesity</td>
<td>Davidson</td>
<td>Williamson</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Trousdale</td>
<td>Williamson</td>
</tr>
<tr>
<td># of Primary Care Doctors per Diabetic Patient</td>
<td>Stewart</td>
<td>Williamson</td>
</tr>
<tr>
<td>% of Senior Citizens</td>
<td>Houston (Highest %)</td>
<td>Montgomery (Lowest %)</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>Stewart</td>
<td>Williamson</td>
</tr>
</tbody>
</table>
Qualitative Methods – Theoretical Framework

- **Social Ecological Model:**
  - Individual Factors
  - Social/Cultural/Group Factors
  - Socioeconomic Factors
  - Political Factors
  - Environmental Factors

- **Focus group focus:** individual, interpersonal, and community factors related to Diabetes

- **Expert interview focus:** organizational and policy factors related to Diabetes
Preliminary Findings – Focus Groups

**Individual Factors:**

- Lack of Diabetes education provided by health care professionals
- Diabetes not viewed as a major health concern in comparison to HIV/AIDS, for example
- Diabetes is more accepted among individuals because of family history of disease
- Lack of routine physical examinations by individuals
- Difficulty adjusting to a new lifestyle that caters to diabetic needs
Expert Interviews – County Health Departments

- Davidson
- Dickson
- Houston
- Humphrey
- Montgomery
- Robertson
- Stewart
- Trousdale
- Wilson
Expert Job Titles

- Director, County Health Department
- Regional Consultant to Local Health Departments
- Director, Diabetes Support Group, Gateway Medical Center
- Program Director, Tennessee Department of Health
- Executive Director, Meharry-Vanderbilt Alliance
- Nutritionists
- Education and Service Director
- Program Health Coordinator
Preliminary Findings – Expert Interviews

- Diabetes affects all types of people
- Food deserts and non-food deserts
- Cost of fruits and vegetables
- Lack of Attendance
- Distances needed to travel to health care facilities
- Lack of transportation
Goals

Primary Prevention
• Increase diabetes prevention and education
• Emphasis on health information, community resources, and health food options

Secondary Prevention
• Adequate cultural competency training
• Accessibility to adequate health care and health information

Tertiary Prevention
• Trained professionals in the workforce
Recommendations

- Mid-Cumberland
- Urban
- Rural
Acknowledgements

- State of Tennessee Department of Public Health
- MSPH Faculty