An Investigation of Tuberculosis in Austin/Travis County, Texas in 2004 and 2005

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Introduction
History of Tuberculosis

- Robert Koch (1882)
- Developed versus Developing Countries
- Why does TB continue to be a problem?
  - Homelessness/Nursing Homes/Correctional Facilities
  - AIDS
  - Multi Drug Resistant – TB (MDR – TB)
Microbiology of Tuberculosis

- *M. tuberculosis*
  - Unique Cell Wall
  - Intracellular Pathogens
  - Acid Fast Bacillus
  - Grow Very Slowly
Tuberculosis Disease and LTBI

- Tuberculosis Disease
  - Symptomatic and infectious
    - Pulmonary Disease
    - Extrapulmonary Disease
- Latent Tuberculosis Infection (LTBI)
  - Asymptomatic and noninfectious
How do we diagnose TB?

- Medical History
- Physical Examination
- Mantoux Tuberculin Skin Test
- Chest Radiograph
- Bacteriology and Histology
  - Smear Positive/Smear Negative
  - Culture Positive/Culture Negative
How do we treat Tuberculosis?

- **TB Disease**
  - Isoniazid: (INH)
  - Pyrazinamide: (PZA)
  - Ethambutol: (ETH)
  - Rifampin: (RIF)

- **LTBI**
  - Isoniazid: (INH) and sometimes others
TB is a Global Epidemic

Global Prevalence of Tuberculosis Disease Worldwide in 2004

[Image of a world map showing the prevalence of tuberculosis in different countries, with color codes indicating the number of cases per 100,000 population.]
Tuberculosis in the United States

FIGURE 1. Rate* of tuberculosis cases, by state — United States, 2005†

* Per 100,000 population.
† Data for 2005 are provisional.

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5511a3.htm
Tuberculosis in the United States

FIGURE 2. Number and rate* of persons with tuberculosis (TB), by origin of birth and year — United States, 1993–2005†

* Per 100,000 population.
† Data for 2005 are provisional.

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5511a3.htm
Tuberculosis in Texas

TB Case Rates in Texas 2005

Top 10 High Morbidity Counties | Cases
--- | ---
Harris | 380
Dallas | 224
Tarrant | 129
Hidalgo | 92
Bexar | 74
Cameron | 68
El Paso | 49
Travis | 48
Webb | 42
Fort Bend | 34

Source: Texas Department of State Health Services - Tuberculosis Statistics
Purpose of Research

- Acquire basic epidemiological data on Tuberculosis in Austin/Travis County 2004 and 2005
- Determine the treatment completion rate of LTBI contacts of smear positive cavitary cases in Austin/Travis County in 2004 and 2005
Methods
Overview

Define Patient Population

Create Abstraction Tool

Abstract Data from Medical Records

Analyze Results
Patient Population

- TB Disease Source Cases
  - Pulmonary Disease
  - Cavitary Disease
  - Smear Positive

- LTBI Contacts to Smear Positive Cavitary Cases
  - Advised to take medication
Creation of Abstraction Tool

- Abstraction Tool
  - Cases (ATB 101)
- Abstraction Tool
  - Contacts (ATB 102)
Database Creation and Analysis

- Database of Cases and Contacts
  - Microsoft Excel
- Analysis of Cases and Contacts
  - Microsoft Excel
  - ArcGIS
Source of Information

- Communicable Disease Charting Information System (CDCIS)
  - Electronic Charting Program used at ATCHHSD
- Medical Record Paper Charts
Results
What I found out?

- Cases
  - Demographics
  - Risk Factors
  - Treatment Plan and Completion Rate
# The Cases

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TB Disease</strong></td>
<td>64</td>
<td>48</td>
<td>112</td>
</tr>
<tr>
<td><strong>Pulmonary Disease</strong></td>
<td>41</td>
<td>31</td>
<td>72</td>
</tr>
<tr>
<td><strong>Smear Positive</strong></td>
<td>22</td>
<td>17</td>
<td>39</td>
</tr>
<tr>
<td><strong>Cavitary</strong></td>
<td>19</td>
<td>12</td>
<td>41</td>
</tr>
<tr>
<td><strong>Smear Positive and Cavitary</strong></td>
<td>10</td>
<td>16</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>(15.6%)</td>
<td>(33.3%)</td>
<td>(23.2%)</td>
</tr>
</tbody>
</table>
Demographic Analysis of Smear Positive Cavitary Cases

- Age
- Gender
- Residence by Zip Code
Age Distribution of Smear Positive Cavitary Tuberculosis Source Cases in Austin/Travis County in 2004 and 2005
Gender

Gender Distribution of Smear Positive Cavitary Tuberculosis Source Cases in Austin/Travis County in 2004 and 2005
Zip Code

- Must do with Ella
Risk Factor Analysis of Smear Positive Cavitary Cases

- Diabetes
- Alcohol Abuse
- Intravenous Drug Use
- Homelessness
Diabetes Status of Smear Positive Cavitary Tuberculosis Source Cases in Austin/Travis County in 2004 and 2005

Number of Cases

Diabetics

Non Diabetics
Alcohol Abuse

Alcohol Abuse of Smear Positive Cavitary Tuberculosis Source Cases in Austin/Travis County, 2004 and 2005
Intravenous Drug Use of Smear Positive Cavitary Tuberculosis Source Cases in Austin/Travis County in 2004 and 2005
Homelessness of Smear Positive Cavitary Tuberculosis Source Cases in Austin/Travis County in 2004 and 2005
What I found out?

- Contacts
  - Demographics
  - Treatment Plan
  - Completion Rates
### The Contacts

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Number of Contacts</strong></td>
<td>237</td>
<td>325</td>
<td>362</td>
</tr>
<tr>
<td><strong>Total Recommended for Treatment</strong></td>
<td>48</td>
<td>47</td>
<td>96</td>
</tr>
<tr>
<td><strong>Total Started on Treatment</strong></td>
<td><strong>28</strong></td>
<td><strong>40</strong></td>
<td><strong>68</strong></td>
</tr>
<tr>
<td><strong>Total Not Started on Treatment</strong></td>
<td>20</td>
<td>7</td>
<td>27</td>
</tr>
</tbody>
</table>
Demographic Analysis of Smear Positive Cavitary Case Contacts

- Age
- Gender
- Residence by Zip Code
Age

Age Distribution of LTBI Contact to Smear Positive Cases in Austin/Travis County, 2004 and 2005
Gender Distribution of Patients who Started Treatment for LTBI in Austin/Travis County, 2004 and 2005
Zip Code

- Have to wait to talk to Ella about
Treatment Plan

- Basic treatment for LTBI
  - 300 mg of INH
  - QD
  - 6-9 months

- Treatment if INH-Resistant
  - Rifampin
Completion of Treatment

- Who is most likely to refuse treatment?
- What percentage of patients who start treatment complete the 6-9 month course?
- What are the main reasons that patients discontinue treatment?
- How long, on average, do patients who start treatment stay on treatment for?
Are women or men more likely to refuse treatment?

![Bar chart showing the number of cases for women and men in 2004 and 2005. The chart indicates that men have a higher number of cases compared to women.]
What percentage of patients who start treatment complete the course?

Who starts?

72%

28%

Who finishes?

72%

28%
What are the main reasons that patients discontinue treatment?
How long on average do patients who start treatment stay on treatment?

![Bar chart showing the number of cases for different treatment durations.](chart)

- <1 month: 10 cases
- 1-2 months: 25 cases
- 2-3 months: 15 cases
- 3-4 months: 10 cases
- 4-5 months: 5 cases
- 5-6 months: 5 cases
Conclusions
Conclusions

- Complete treatment for more than 28% of the LTBI patients.
- Target the LTBI patients at the second month of treatment to remain in treatment until completion.
- Further analysis of tuberculosis data
Future Studies

- Conduct medical record review of all Culture Positive Cases
- Compare characteristics of Smear Positive and Smear Negative Cases
- Compare characteristics of Cavitary Disease to Non-Cavitary disease
- Collect and Analyze Genotyping Data from M. tuberculosis isolates
Acknowledgements

- **Austin/Travis County Health and Human Services Department**
  - Dr. Linda Dooley, Mr. John Harborth, Ms. Ella de Leon, Ms. Janet Pichette, Ms. Anne Harrell, Ms. Rachel Munoz, Mr. Phil Krotzer, Ms. Raiza Ruiz, Ms. Angela Wiggins, Mr. Don Kidd, Mr. Tan Nguyen

- **Texas Department of State Health Services**
  - Ms. Smita Chatterjee

- **The University of Texas at Austin**
  - Dr. Leanne Field, Ms. Nancy Elder
Thank You

- **Special Thanks to...**
  - The University of Texas at Austin School of Biological Sciences
  - Austin/Travis County Health and Human Services Department
  - Centers for Disease Control and Prevention, Epidemiology and Laboratory Capacity for Infectious Diseases Program