A Pilot Project for School-Based Screening and Treatment of Latent TB Infection Among Freshman Students

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Background and Significance

- 2017 Tuberculosis (TB) rate per 100,000 persons
  - United States – 2.8
  - California – 5.2
  - San Diego County – 7.1
- 80% of cases could have been prevented by treating latent TB infection (LTBI)
- California spent $78 million for treatment of active TB in 2018
- 5 cases of active TB in San Diego County public high schools during 2018 demonstrate the need for effective prevention interventions
- Children <5 and adolescents are at higher risk of progressing to active TB disease after exposure
Needs Assessment

In San Diego County (2017)
- 237 active TB cases
- 170,000 people with LTBI
  - 20% are aware of infection
  - 12% been treated
- AAP recommends TB risk assessment at 1, 6, & 12 month visits and yearly after that
- Adolescents have worse coverage and access to healthcare
- TB screening in San Diego County is only required for daycare but not for K-12 students
- Lower LTBI treatment compliance rates with longer regimens, especially among adolescents

Purpose/Aims

- To increase TB awareness & screening rates among high school students.
- To offer shorter regimens of LTBI treatment in the school setting to increase treatment compliance among adolescents.
Framework/EBP Model

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

Identify Triggering Issues/Opportunities
- Clinical or patient identified issue
- Organization, state, or national initiative
- Data/new evidence
- Accrediting agency requirements/regulations
- Philosophy of care

State the Question or Purpose

Is this topic a priority?
- No
- Consider another issue/opportunity
- Yes
  - Form a Team

Recruiting a Partner School

2 Local High Schools Warned About Tuberculosis Exposure

By R. Blockey
Published on Jan 26, 2018 at 10:23 AM/Updated at 10:31 AM PST on Jan 26, 2018

[Image of two high school campuses]
Partner School Characteristics

- In a district with a recent TB school exposure and large at-risk (foreign-born or binational) population
- Onsite clinic with TB test capability*
- Good working relationship between school district and public health
- Chose a single school with a principal/administration who is welcoming and committed to:
  - Health promotion / prevention-oriented
  - Believes TB is an important health issue for students

Framework/EBP Model
Synopsis of the Evidence

CDC Update of Recommendation for isoniazid-rifapentin (3HP) 2018
- Systematic Review – 3HP for treatment of LTBI in children >2 yo

Adherence to LTBI Treatment
- Liu et al 2018 – 54 study Systematic Review
  - Main barriers: Fear of adverse events, long duration of tx, financial barriers, lack of transportation to clinic, insufficient resources for LTBI control
  - Positive interventions: Peer counseling, incentives, culturally specific case management
- Cruz & Starke 2012 – 289 LTBI kids from TB Clinic in Houston
  - Only DOT was positively associated with therapy completion (OR 7.2)

School-Based Directly Observed Therapy (DOT)
- Hatzenbuehler et al 2016 – 2 public high school, 925 students
  - Provided TB education, TB risk questionnaire, IGRA testing, 3HP treatment
  - 73% submitted risk questionnaire
  - 415 (86%) tested – 16 had LTBI, ALL COMPLETED TX

Project Plan Process

1) TB Risk Assessment Distribution
- School Registration
- TB education intervention for Freshman students with pre/post-test

2) TB Risk Self-Assessment Returned with Consent
- Incentives – Raffle items including wireless headphones and movie tickets

3) Confidential Package Sent Home

4) Phone Call Follow-Up at 2 Weeks
- Tested? - Students to bring results to school nurse
- Incentives – Raffle items including wireless headphones and movie tickets
- Results checked in SDIR after access was granted

5) LTBI Treatment
- 3HP to be given via DOT at school; RIF and INH to be given at home
- Incentives – $50 Walmart Gift Card for treatment completion (at home or school)
Project Timeline

- Lit review (March)
- SD County TB elimination meeting (April)
- TB Ed in ESL & English classes (September)
- Follow-up contact (October)
- TB result deadline (November)
- SD County project meetings (May)
- IRB approvals (May)
- SD County project meetings (June)
- Lincoln HS meeting (July)
- IRB modifications (July)
- Lincoln HS project meeting (August)
- IRB approvals (August)
- Lincoln HS project meeting (September)
- IRB modifications (September)
- Lincoln HS project meeting (October)
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- Lincoln HS project meeting (November)
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- Lincoln HS project meeting (December)
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- Lincoln HS project meeting (January)
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- Lincoln HS project meeting (February)
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- Lincoln HS project meeting (March)
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- Lincoln HS project meeting (April)
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- Lincoln HS project meeting (November)
- IRB modifications (November)
- Lincoln HS project meeting (December)
- IRB approvals (December)

Results – TB EDUCATION

Average Scores on TB Knowledge

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>60.5</td>
<td>84.7</td>
</tr>
<tr>
<td>Difference</td>
<td>24.57</td>
<td>(95% CI: 21.14-28.01)</td>
</tr>
</tbody>
</table>

Would Agree to TB Testing

<table>
<thead>
<tr>
<th></th>
<th>Agree completely</th>
<th>Agree somewhat</th>
<th>Neutral</th>
<th>Disagree somewhat</th>
<th>Disagree completely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>135</td>
<td>43</td>
<td>26</td>
<td>33</td>
<td>18</td>
</tr>
<tr>
<td>Positive Change</td>
<td>&gt; Neutral – 14%</td>
<td></td>
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<td></td>
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<tr>
<td>Negative Change</td>
<td>&lt; Neutral – 3.5%</td>
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</tbody>
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Positive Change > Neutral – 14%
Negative Change < Neutral – 3.5%
Results – TB EDUCATION

Would Agree to be Treated for LTBI

Improved Knowledge About TB

Results – IDENTIFIED TB RISK FACTORS

<table>
<thead>
<tr>
<th>TB Risk Factor (n=25)</th>
<th>n (%)</th>
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<tbody>
<tr>
<td>1. Been around someone who had TB</td>
<td>0 (0)</td>
</tr>
<tr>
<td>2. History of positive TB test (self/family)</td>
<td>7 (28)</td>
</tr>
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<td>3. Born in a high-risk country outside the US</td>
<td>7 (28)</td>
</tr>
<tr>
<td>4. Been to a high-risk country for &gt; 3 weeks</td>
<td>4 (16)</td>
</tr>
<tr>
<td>5. Goes to Mexico frequently</td>
<td>8 (32)</td>
</tr>
<tr>
<td>6. Ever eaten queso fresco or unpasteurized dairy</td>
<td>9 (36)</td>
</tr>
<tr>
<td>7. Been around someone who is homeless, used drugs, or was recently in jail?</td>
<td>4 (16)</td>
</tr>
<tr>
<td>8. Takes Prednisone or other medicines that lower the immune system</td>
<td>2 (8)</td>
</tr>
<tr>
<td>9a. Ever taken medicine for a positive TB test</td>
<td>1 (4)</td>
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<tr>
<td>9b. Completed treatment</td>
<td>1 (4)</td>
</tr>
</tbody>
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Note: 10 (40%) of students had >2 risk factors

*Student who completed LTBI treatment was excluded from at-risk group.
*Questions 3 and 4 were changed after registration to include name of country.
*Questions adapted from SD County TB Risk Assessment and recommendations from the SD Pediatric TB Task Force.
Program Results

- **Freshman Students** $n = 294$
- Returned TB Risk Assessment: 56 (19%)
- TB Risk Positive: 24 (43%)
- Recent TB Test: 3 (12.5%)
  - Tested AFTER Program: 4 (16.7%)
  - Tested >8 yrs ago: 7 (29.2%)
  - NEVER Tested: 10 (41.7%)
- Testing Current - All Negative: 7 (29.2%)
- Testing NOT Current: 17 (70.8%)

Cost-Benefit Analysis

- Total cost of materials for this project = $1000
- Education and outreach = 20 hours
- Nurse case management = 40 hours
- Treatment cost of active TB = $34,000/case
- Treatment cost of drug resistant TB = $110,000/case
- Testing 1000 students after exposure = $40,000
- Its low cost and the use of existent processes & resources makes it beneficial and replicable among other schools.
TB screening among adolescents at risk for TB is low

Brief education session at registration process or in class curriculum increases TB awareness and knowledge of parents and kids

Low return of TB risk assessments but a high percentage of students at risk for TB

Access to TB results in San Diego Immunization Registry (SDIR) was granted to the school nurse as a result of this project, improved health exchange data

School-based risk assessment and treatment was incorporated into San Diego County TB Elimination Initiative and approved by the Health Services Advisory Board on February 5, 2019

Framework/EBP Model
Lessons Learned and Future Directions

- Parent must be physically present for child to have TB test done
- Self-assessment must be carefully worded to get accurate data

Future:
- Add TB risk assessment to admissions package to improve program participation
- Find ways to engage with kids when parents are present
- Next phase of the pilot will offer 3HP via DOT
- Validation of self-assessment may be warranted

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References


