Third Annual World TB Day Symposium: “Showcasing Clinical and Epidemiologic Studies on TB at the UW”

March 24, 2016
David Horne, MD, MPH
Jessica Matthews, MPH
Alexandra Molnar, MD
Masa Narita, MD
David Park, MD
TB Project ECHO® (Extension for Community Healthcare Outcomes) is a collaborative model, between the Washington State Department of Health, UW Telemedicine, and Firland Northwest Tuberculosis Center.

Medical education and care management for clinicians:

- Bi-monthly sessions
- TB specialists as mentors
- CME/CNE credits
Tribal TB Needs Assessment

Collaboration between Northwest Center for Public Health Practice (NWCPHP), FNWTBC, and Northwest Portland Area Indian Health Board (NPAIHB)

**Key findings:**
Through the needs assessment we identified the following TB training preferences:

<table>
<thead>
<tr>
<th>Top Training Needs</th>
<th>Key Factors in Selecting Trainings</th>
<th>Preferred Formats</th>
<th>Target Audiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pediatric TB</td>
<td>• Offered during work hours</td>
<td>• Online module (self-paced learning)</td>
<td>• Clinics (local &amp; county)</td>
</tr>
<tr>
<td>• Legal issues related to TB</td>
<td>• Reputation of trainer</td>
<td>• Live webinar</td>
<td>• Public health nurses</td>
</tr>
<tr>
<td>• LTBI in other special populations</td>
<td>• Using a case or problem-based learning approach</td>
<td>• Pre-recorded webinar</td>
<td>• Tribal health departments or corporations</td>
</tr>
</tbody>
</table>
Annual / Ongoing Activities

Seattle TB Intensive with Curry International Tuberculosis Center and WA Dept of Health : June

World TB Day : March

*World TB Day Evening Event, 5:30-7:45
Seattle Public Library Downtown
1000 4th Ave
Tonight!*

Publications :

- *Journal of AIDS* (1)
- *American Journal of Respiratory and Critical Care Medicine* (2)
Symposium Agenda

3:30 – 3:35 : Firland Northwest Tuberculosis Center Introduction


4:15 – 4:30 : Final Q&A

4:30 – 5:00 : Refreshments in R&T Lobby
Social Determinants of Health and TB

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Bijan Ghassemieh, MD
University of Washington
Division of Pulmonary and Critical Care Medicine
Senior Fellow
• **CDC**: “The complex, integrated, and overlapping social structures and economic systems that are responsible for most health inequities. These social structures and economic systems include the social environment, physical environment, health services, and structural and societal factors.”
HINCHE, HAITI
HINCHE, HAITI
WHO DOTS PROGRAM: 5 ELEMENTS

1.) Political commitment with increased and sustained financing

2.) Case detection through quality assured bacteriology

3.) Standardized treatment, with supervision and patient support

4.) An effective drug supply and management system

5.) Monitoring and evaluation system
IDEAS ABOUT SDH AND TB ARE NOT NEW

• Rudolph Virchow (1860): TB epidemics are related to “disturbances that exist in the development of our populations, disturbances which arise from political and social institutions, and are therefore preventable”

• Robert Koch (1905 Nobel prize speech): “One of the most powerful weapons, if not the most powerful, which we can bring into use against TB are social welfare centers”
TB MORTALITY: ENGLAND AND WALES


Cantwell, AJRCCM 1998
SELF REPORTED TB HISTORY IN INDIA 2006

Andrews, IJTL 2015
HOW DO SDH CAUSE TB?

Lonnroth, WHO SDH Document 2010
## CONTRIBUTION OF INTERMEDIATE RISK FACTORS

<table>
<thead>
<tr>
<th>Risk factor (reference for relative risk and prevalence estimates respectively)</th>
<th>Relative risk for active TB disease (range)</th>
<th>Weighted prevalence, total population, 22 high TB burden countries</th>
<th>Population attributable fraction (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV infection (76, 132)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>26.7 (20.4–34.9)</td>
<td>0.9%</td>
<td>17.6% (13.7–22.1)</td>
</tr>
<tr>
<td>Malnutrition (121, 133)&lt;sup&gt;e&lt;/sup&gt;</td>
<td>4.0 (2.0–6.0)</td>
<td>17.2%</td>
<td>34.1% (14.7–46.3)</td>
</tr>
<tr>
<td>Diabetes (126, 134)</td>
<td>3.1 (2.3–4.3)</td>
<td>3.4%</td>
<td>6.6% (4.1–9.9)</td>
</tr>
<tr>
<td>Alcohol use &gt; 40g/day (123)&lt;sup&gt;f&lt;/sup&gt;</td>
<td>2.9 (1.9–4.6)</td>
<td>7.9%</td>
<td>13.1% (2.8–10.3)</td>
</tr>
<tr>
<td>Active smoking (124, 135)&lt;sup&gt;e&lt;/sup&gt;</td>
<td>2.6 (1.6–4.3)</td>
<td>18.2%</td>
<td>22.7% (9.9–37.4)</td>
</tr>
<tr>
<td>Indoor pollution (117, 118)&lt;sup&gt;h&lt;/sup&gt;</td>
<td>1.5 (1.2–3.2)</td>
<td>71.1%</td>
<td>26.2% (12.4–61.0)</td>
</tr>
</tbody>
</table>
## PILLARS AND COMPONENTS

<table>
<thead>
<tr>
<th>1. INTEGRATED, PATIENT-CENTRED CARE AND PREVENTION</th>
</tr>
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<tbody>
<tr>
<td>A. Early diagnosis of tuberculosis including universal drug-susceptibility testing, and systematic screening of contacts and high-risk groups</td>
</tr>
<tr>
<td>B. Treatment of all people with tuberculosis including drug-resistant tuberculosis, and patient support</td>
</tr>
<tr>
<td>C. Collaborative tuberculosis/HIV activities, and management of comorbidities</td>
</tr>
<tr>
<td>D. Preventive treatment of persons at high risk, and vaccination against tuberculosis</td>
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</table>

<table>
<thead>
<tr>
<th>2. BOLD POLICIES AND SUPPORTIVE SYSTEMS</th>
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<tbody>
<tr>
<td>A. Political commitment with adequate resources for tuberculosis care and prevention</td>
</tr>
<tr>
<td>B. Engagement of communities, civil society organizations, and public and private care providers</td>
</tr>
<tr>
<td>C. Universal health coverage policy, and regulatory frameworks for case notification, vital registration, quality and rational use of medicines, and infection control</td>
</tr>
<tr>
<td>D. Social protection, poverty alleviation and actions on other determinants of tuberculosis</td>
</tr>
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<thead>
<tr>
<th>3. INTENSIFIED RESEARCH AND INNOVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Discovery, development and rapid uptake of new tools, interventions and strategies</td>
</tr>
<tr>
<td>B. Research to optimize implementation and impact, and promote innovations</td>
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</table>
SO WHAT CAN WE DO?

• Politics and Advocacy:
  • “Health in all policies”
  • “Think Globally, Act Locally”
  • Example: Food Waste
SO WHAT CAN WE DO?

• **Research:**
  - Identify which SDH are impacting TB incidence, where they are impacting TB incidence, and how they are impacting TB incidence
  - Identify which intermediate risk factors are at play in different environments
  - Test interventions targeting SDH and intermediate risk factors
  - Evaluate cost-effectiveness of these interventions

• Essentially, provide data for policy makers to understand where resource allocation outside of the health sector is most likely to have an impact on TB incidence
### Table 1. Association between proximate risk factors and Tuberculosis.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Univariate OR and 95% CI (DHS)</th>
<th>Multivariate Odds Ratio (aOR) and 95% CI (DHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking Cigarettes</td>
<td>1.49 (1.16–1.90)</td>
<td>0.77 (0.56–1.06)</td>
</tr>
<tr>
<td>Chewing Tobacco</td>
<td>2.12 (1.66–2.72)</td>
<td>1.38 (1.03–1.86)</td>
</tr>
<tr>
<td>Indoor Air Pollution (IAP)</td>
<td>3.07 (2.36–4.01)</td>
<td>2.00 (1.35–2.98)</td>
</tr>
<tr>
<td>Low Body Mass Index (BMI)</td>
<td>2.90 (2.39–3.51)</td>
<td>3.71 (2.84–4.83)</td>
</tr>
<tr>
<td>Alcohol Use- Daily</td>
<td>1.98 (1.16–3.37)</td>
<td>1.36 (0.73–2.55)</td>
</tr>
<tr>
<td>HIV Sero-prevalence</td>
<td>5.75 (2.46–13.43)</td>
<td>4.72 (2.0–11.20)</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>2.77 (1.67–4.59)</td>
<td>4.89 (2.73–8.76)</td>
</tr>
<tr>
<td>Age (per year)</td>
<td>1.04 (1.03–1.05)</td>
<td>1.06 (1.04–1.07)</td>
</tr>
<tr>
<td>Male Gender</td>
<td>1.72 (1.43–2.05)</td>
<td>1.83 (1.37–2.4)</td>
</tr>
<tr>
<td>Household density (rooms for sleeping/ people sleeping)</td>
<td>1.11 (1.07–1.15)</td>
<td>1.08 (1.03–1.14)</td>
</tr>
<tr>
<td>Family member with health insurance</td>
<td>0.46 (0.27–0.77)</td>
<td>0.59 (0.29–1.23)</td>
</tr>
<tr>
<td>Rural dwelling</td>
<td>1.86 (1.50–2.30)</td>
<td>0.91 (0.68–1.21)</td>
</tr>
</tbody>
</table>
TB incidence over time with different scenarios of reducing under-nutrition

- Scenario 1
- Scenario 2
- Scenario 3
- Scenario 4
- Scenario 5

Oxlade, PLoS One 2015
SO WHAT CAN WE DO?

- **Public Health:**
  - Encourage inclusion of SDH variables in TB monitoring/evaluation programs
  - Encourage TB partnerships with other sectors (similar to partnerships for TB/HIV and TB/tobacco cessation partnerships)
  - Develop novel methods to target interventions towards groups with certain SDH
    - Seattle-King County TB Program example of spatial methods
TARGETTING INTERVENTIONS TOWARDS SDH

KING COUNTY TB CASES OVER TIME

TARGETTING INTERVENTIONS TOWARDS SDH

PERCENT FOREIGN BORN 2008-2012

Source: ACS
Produced by: APDE
TARGETTING INTERVENTIONS TOWARDS SDH

PERCENT IN POVERTY 2008-2012

Source: ACS
Produced by: APDE
TARGETTING INTERVENTIONS TOWARDS SDH

PERCENT DIABETIC 2009-2013

Source: BRFSS
Produced by: APDE
ELIMINATING TB WILL REQUIRE ADDRESSING SDH

• The White Plague: Tuberculosis, Man, and Society (Renes Dubos 1952):

“TB is a social disease.....its understanding demands that the impact of social and economic factors on the individual be considered as much as the mechanisms by which the tubercle bacilli cause damage to the human body.”
Latent Tuberculosis Infection and Treatment in Vulnerable Populations in Seattle

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Adelaide McClintock, MD
on behalf of the LTBI Study Group
University of Washington
Acting Instructor, General Internal Medicine
Nothing to Disclose
Treatment Choices

Choices

- INH x 9 months
- Rifampin x 4 months
- Weekly INH+ Rifapentine
LTBI Adherence Study

5 Clinics
- populations
- protocols

3 Treatments
- protocols
- adherence

LTBI
- Tools
- Tips

N= 393
Participating Clinics

Harborview

- King County TB
- International medicine
- Infectious Diseases
- Employee Health
- Pioneer Square
Choices

- INH x9 months
- Rifampin x 4 months
- Weekly INH+ Rifapentina
Percent Completing Therapy

- ALL: 66.2%
- INH + RPT: 85.1%
- RIF: 85.4%
- INH only: 51.8%

N=393
Percent completing therapy in each clinic

Adjusted for type of monitoring and type of treatment
Type of Monitoring

- Weekly DOT / phone calls: 84.9%
- Monthly clinic visits: 72.7%
- Less often: 51.2%
Reasons for non-completion

N=132 Participants who did not complete therapy
Reasons for non-completion

N=132 Participants who did not complete therapy

- LFT abnormality
- Other Lab abnormal

- INH+Rifapentine
- Rifampin only
- INH only
N=132 Participants who did not complete therapy
Reasons for non-completion

N=132 Participants who did not complete therapy
Reasons for non-completion

N=132 Participants who did not complete therapy
Percent of participants reporting side effects

- Any side effect
- Nausea/Vomiting
- Abdominal pain
- Neuropathic pain
- Rash
- Other

Bar graph showing the percentage of participants reporting side effects for different conditions and treatments:

- INH+ Rifapentine
- Rifampin only
- INH only
Percent of participants reporting side effects

N=131

INH+ Rifapentine  Rifampin only  INH only

INH+ Rifapentine
Rifampin only
INH only

Nausea/Vomiting  Abdominal pain
Percent of participants reporting side effects

N=131

INH+ Rifapentine  Rifampin only  INH only

Neuropathic pain
Percent of participants reporting side effects

N=131

Rash

INH+ Rifapentine  Rifampin only  INH only

Any side effect: Nausea/Vomiting, Abdominal pain, Neuropathic pain, Rash, Other.
Percent of participants reporting side effects

N=131

- INH+ Rifapentine
- Rifampin only
- INH only

Other
Rifampin alone has as good of completion rates as INH+Rifapentine

**MAJOR cost differences!**
Type of treatment offered was a strong predictor of treatment completion

• monitoring type was not
King County TB clinic does a great job of treating LTBI
Strategies to improve compliance

- Shorter therapy courses
- “Creative” DOT
- Incentive programs (homeless incentives)
Strategies to Improve Compliance

- Focused visits
- Engage your team (outreach, RNs)
- Monthly clinic visits when able
Choosing for your patient

- INH x 9 months
- Rifampin x 4 months
- Weekly INH+Rifapentine x 3 mo
Choosing for your patient

- INH x 9 months
- Rifampin x 4 months
- Weekly INH+ Rifapentine x 3 mo

Cost:
- Ø
- $
- $$$
Choosing for your patient

INH x 9 months

Rifampin x 4 months

Weekly INH + Rifapentenine x 3 mo

SLOW

Medium

FAST
Choosing for your patient

INH x 9 months

Rifampin x 4 months

Weekly INH+ Rifapentine x 3 mo

Few interactions

Multiple interactions

Multiple interactions
Choosing for your patient

INH x 9 months

Rifampin x 4 months

Weekly INH+ Rifapentine x 3 mo

1 pill

2 pills

9 pills*
Thank you

- Patients
- Clinic Colleagues
- LTBI Study Group*
- Dept of Public Health – TB clinic staff
- Curry Center

- Questions: amolnar@uw.edu or ahearst@uw.edu

* Alex Molnar, MD, McKenna Eastment, MD, Addie McClintock, MD, Christy McKinney, PhD, MPH, Masa Narita, MD, Shireesha Dhanireddy, MD, David Park, MD, John Lynch, MD, MPH, Caroline Pitney, PharmD
END TB
WORLD TB DAY  MARCH 24

FIRLAND NORTHWEST TUBERCULOSIS CENTER
UNIVERSITY of WASHINGTON