Faculty Disclosures

• Relevant Financial Relationships: None
• Off-Label/Investigational Uses: None
Objectives

• Review the epidemiology of TB in correctional facilities.

• Identify public health challenges and opportunities related to TB prevention and control in correctional facilities.

• Discuss advantages of the 12-week isoniazid-rifapentine LTBI treatment for correctional facilities.
Incarceration in the U.S
Total state and federal prison populations, 1978–2013

Number of state prisoners
- 1,500,000
- 1,200,000
- 900,000
- 600,000
- 300,000

Number of federal prisoners
- 250,000
- 200,000
- 150,000
- 100,000
- 50,000

State prison population

Federal prison population

Note: Counts based on all prisoners under the jurisdiction of state and federal correctional authorities.
Incarceration Rates by Country per 100,000 persons

<table>
<thead>
<tr>
<th>Country</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>707</td>
</tr>
<tr>
<td>Virgin Is. (USA)</td>
<td>535</td>
</tr>
<tr>
<td>Rwanda</td>
<td>492</td>
</tr>
<tr>
<td>Russia</td>
<td>470</td>
</tr>
<tr>
<td>Virgin Isl. (UK)</td>
<td>425</td>
</tr>
<tr>
<td>England/Wales</td>
<td>148</td>
</tr>
<tr>
<td>Canada</td>
<td>118</td>
</tr>
<tr>
<td>Germany</td>
<td>78</td>
</tr>
</tbody>
</table>

International Centre for Prison Studies, October 2012
Correctional Facilities

- Jails/Detention Centers
  - Usually managed by local law enforcement
  - Incarcerates
    - pretrial inmates
    - inmates with < 1 year sentence
- State prisons: Sentenced inmates
- Federal prisons
  - Pretrial & sentenced inmates related to federal crimes
- Private Prisons: federal, state & local governments contract with for-profit companies to run prisons
  - In 2010, 12.7% of federal inmates and 7.5% state inmates were housed in privately run facilities
State & Local Prison Incarceration Rates by State, 2012
(does not include local jails)

Number of Prisoners per 100,000 residents
INCARCERATION RATES BY RACE & ETHNICITY, 2010
(Number of people incarcerated per 100,000 people in that group)

Overcrowding
TB & Incarceration in the U.S
Counts of TB Cases among Residents of Correctional Facilities Compared to All TB cases, 1993–2014*

*Persons aged 15 years or older
TB Cases among Residents of Correctional Facilities, Percentage of all Reported TB Cases per year, 1993–2014*

*Persons aged 15 years or older
Number of TB Cases in U.S.-born vs. Foreign-born Persons, United States, 1993–2014*

*Updated as of June 5, 2015.
Number of TB Cases among U.S.-born and Foreign-born persons in Correctional Facilities, 1993–2014*

*Persons aged 15 years or older
Percentage of TB Cases by Treatment Completion Status and Correctional Facility Status, 2008–2012*

- All TB Cases in Correctional Facilities: 87%
- All TB Cases: 71%

NOTE: Data for “Adverse Treatment Event accounted for <0.3% of outcomes and is not shown.”

* 2012 is the most recent year that treatment completion data are available. Persons aged 15 years or older and alive at time of diagnosis.
TB/Corrections Resources
Prevention and Control of Tuberculosis in Correctional and Detention Facilities: Recommendations from CDC

- Screening: Intake/Annual
- Isolation
- Active TB Treatment
- Contact Investigation
- LTBI Treatment

- Collaboration with public health
- Management of airborne infection isolation rooms
- Education staff & inmates
Corrections Resources

TB can be particularly problematic in correctional and detention facilities, where persons from diverse backgrounds and communities are in close proximity for varying periods. Inmates with undiagnosed TB disease place other inmates and correctional staff at risk for TB, and when released, they can infect persons living in surrounding communities.

More...

SNTC provides these tools to assist corrections staff and public health TB programs who work with their correctional facilities in TB control efforts. These tools may be downloaded and modified to meet the specific needs of each site. NEED HELP? SNTC also offers one-on-one technical assistance and guidance with these tools. Email Ellen Murray or call her at 352-273-7682 for assistance. Consider a mini-fellowship focused on controlling TB behind bars.
CorrectTB

Resources for TB in correctional facilities are listed below by topic.

- TB Prevention and Control
- Epidemiology
- Screening
- Contact Investigation
- Infection Control
- Release Planning
- Cultural Factors

NTCA/NTNC Corrections Committee members reviewed and compiled useful resources for TB in correctional settings. When using a resource, please review and edit to comply with state and local regulations or your program needs. To submit additional resources for this page please email the Corrections Committee at nta@tbcontrollers.org with the subject line CorrectTB Resource(s). For additional information about the NTCA/NTNC Corrections Committee please review its web page.

http://www.tbcontrollers.org/
Management of Tuberculosis

Federal Bureau of Prisons
Clinical Practice Guidelines

OCTOBER 2015

Includes:
--TB Case Management Checklist
--TB Contact Investigation Checklist
--Case Interview Form

https://www.bop.gov/resources/pdfs/TB_CPG.pdf
TB & Incarceration in the U.S

RESEARCH GAPS

• No recent published data on TB case rates or trends
• No studies of demographic or clinical characteristics in US in past 10 years
• Few recent reports on TB outbreaks in prison
• Minimal data on the extent to which incarceration history is associated with TB disease
• Role of IGRAs in TB screening correctional facilities
Incarceration history


- Retrospective analysis of 2011 Georgia TB cases
- 106 US-born adults with prevalent TB
  - 46% documented history of incarceration
  - 16% incarcerated during the year before diagnosis.
Federal Bureau of Prisons
Federal Bureau of Prisons

- 26-46 TB Cases per year (last 5 years)
- Rate per Average Daily Population:
  - 15-26/100,000
- 70-80% Foreign Born
  - > 90% Mexico
- HIV infected: 10-20% each year
- INH resistant: >10% each year
- 1-2 cases per year → highly infectious → large Cis → substantial transmission
TB Control in the Federal Bureau of Prisons: Six Observations
OBSERVATION #1

Widespread TB transmission in U.S. correctional facilities still occurs.
U.S. Correctional TB Outbreak Literature

Transmission of Tuberculosis in a Jail
Timothy F. Jones, MD; Allen S. Craig, MD; Sarah E. Valway, DMD, MPH; Charles L. Woodley, PhD; and William Schaffner, MD
American Jour Mal Infec Dis. 2000;131:547-552

Tuberculosis outbreaks in prison housing units for HIV-infected inmates—California, 1995-1996
Centers for Disease Control and Prevention (CDC).

Evaluation of an extensive tuberculosis contact investigation in an urban community and jail
G. Maltas,† R. McClain,‡ W. A. Cronin,* N. G. Baruch,§ L. F. Barker, W. Benjamin,* and T. R. Sterling‡

Outbreak of tuberculosis in a correctional facility: consequences of missed opportunities
L. E. Sosa,*† M. N. Lobato,‡ T. Condren,* M. N. Williams,* and J. L. Hadler*
INT J TUBERC LUNG DIS 12(8):689-691

Unrecognised transmission of tuberculosis in prisons
C.R. MacIntyre, N. Kendig, L. Kummer, S. Birago, N.M.H. Graham and A.J. Plant

Probable Transmission of Multidrug-Resistant Tuberculosis in Correctional Facility—California
Centers for Disease Control and Prevention
MMWR. 1998;48:51

• 57 year old Tijuana taxi driver picked up crossing Mexico border into U.S. – Type 2 DM
• Intake: Portable chest x-ray (CXR) read as “negative”. No TB symptoms. Prior TST Pos. Prior LTBI tx x 9 mos
• Three months after intake TB diagnosed
  • Cavitary CXR, AFB smear positive
  • Cough x 6 weeks with hemoptysis
  • Two months later: Susceptibility Results \( \rightarrow \) RIF/INH/PZA/SM
  • Re-read of initial CXR: “subtle evidence of upper lobe disease”

- Index case housed on 120 bed unit during infectious period:
  - total of 131 days
    - including 41 days after returning from initial hospitalization on standard 4-drug therapy. No symptom improvement.

- Very high turnover

- Never left unit – meals/recreation occur on unit –except for insulin line

- 388 inmate contacts identified
  - Prior Positive TST: 155/384 = 40%
  - Inmate TST conversions: 29 /158 (18%)
    - 9/66 (14%) U.S. Born
    - 20/92 (22%) Foreign Born
    - 17/69 (25%) Housed in same Quarter
  - Staff TST conversions: 4/87 (4.6%)
- One clinical case of lymphatic TB – HIV infected inmate- clinical diagnosis
MDR-TB Contact Investigation: Dispersal of 388 Inmate Contacts 12 Weeks into the Investigation, 2010

Dispersal of Inmate Contacts
(n=388)
as of 12/11/10

Deported
n=102→
foreign communities
(90→Mexico)

Other FBOP Facilities
n=101
(43 facilities)

Remained incarcerated at FPF
n=84

Released - California community
n=38

USMS "In-Transit"
 n=63
(5 contract facilities)

Location of Inmate Contacts
- Other FBOP facility
- USMS contract facility
- California community
- Foreign community
March 15, 2013: 25 yo female intake – TST negative, denies TB symptoms, HIV neg

May 10, 2013: Clinic visit: “back pain”

• cough x 16 weeks (had never been to Health Services regarding cough)
• 10 # wt loss in 16 weeks
• CXR: Severe lung disease LUL and superior RLL with multiple large cavitary lesions
• AFB smear pos numerous x 3
• PCR positive – MTB complex
Infectious Period

- **Begin infectious period**: July 1
- **Cough Started**: Oct 1
- **End infectious period**: May 10
- **Hospitalized**: Mar 6
- **Nevada Detention Center**: Mar 15
- **Housing Unit A-1**: Intake Prison A

- **Tijuana**: AZ Private Prison
- **UNICOR**: Housing Unit A-1

Mayo Clinic Center for Tuberculosis
## Contact Type

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>TST Pos</th>
<th>Tested</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing A</td>
<td>33</td>
<td>149</td>
<td>22%</td>
</tr>
<tr>
<td>Housing B</td>
<td>7</td>
<td>55</td>
<td>13%</td>
</tr>
<tr>
<td>Work</td>
<td>14</td>
<td>105</td>
<td>13%</td>
</tr>
<tr>
<td>Other Prisons</td>
<td>5</td>
<td>27</td>
<td>19%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>59</strong></td>
<td><strong>336</strong></td>
<td><strong>18%</strong></td>
</tr>
</tbody>
</table>
- Contact investigations in correctional facilities very challenging.
- Require expertise.
- Require access to correctional data.
- Close collaboration with public health.
- Data collection challenge
- It is virtually impossible to find inmates who have been released.
Observation #2

Widespread TB transmission is ALWAYS associated with diagnostic delay
Reasons for Delay

- **Provider error:**
  - failure to recognize or suspect TB

- **Health care system error**
  - e.g., abnormal radiology result not received or CXR not available

- **Correctional error:**
  - symptomatic person does not report symptoms and correctional staff who observe symptoms fail to report them to staff
Observation #3

Declining TB clinical expertise is a major challenge for correctional facilities.
Reported TB Cases
United States, 1982–2014*

2014 Case Rate
= 2.9/100,000

Declining TB
Expertise

Rate in correctional facilities 2-6 times greater than general population
Declining TB Expertise

- Correctional facilities are high incidence settings often located in low incidence communities -- that lack TB expertise
- Local infectious disease and pulmonology “experts” – often are not experts
- Correctional facility clinicians often lack TB experience and expertise
Case Example 1

• 29 y.o. Honduran male inmate - HIV negative
• Housed in rural Pennsylvania prison
• 10/2013: PPD 0 mm / Asymptomatic
• CXR – obtained due to hypertension
  10-23-13: Positive. bilateral upper lobe consolidation with upper lobe volume loss. Cannot exclude active TB
• Clinician decided that TB was not in differential because inmate was asymptomatic and negative TST
One year later….

• 10/4/2014 (1 year later): reported to sick call with cough and hemoptysis

• Sent to local hospital

• Bronch performed: BAL: AFB smear negative

• Started on levoquin for community acquired pneumonia

• 10/13/14 (Friday evening) returned – local pulmonologist states: “TB ruled out – diagnosis pneumonia – clinically improved”

• Inmate admitted to general population
Situation discovered.....

• 10/15/14 – situation “discovered” → sent to facility with All room to isolate and start RIPE

• 11/15/14: AFB culture positive → MTB
Take Home Points

- Negative TST does not rule out TB
- Negative AFB smear on bronch does not rule out TB
- Fluoroquinolones are poor choice for an antibiotic if TB is in differential
  - cannot determine if clinical improvement is due to improvement of TB or other infectious process
Case Example 2

- 26 yo US born inmate
- TST = 0 mm 12/10/15
- HIV negative 2012
- Cough x 3 weeks
- CXR: subtle reticular nodular densities in RUL. Active TB process cannot be excluded
- Sent to ER – and returned with diagnosis of pneumonia & Azithromycin prescription
Discharge Summary

“Case is discussed with Dr. L, Infectious Disease. She recommends that the patient is safe to discharge back to the prison and is to wear a mask when he is around other prisoners until the PPD is read as negative ….as this is unlikely TB. “
Follow-Up

- **TB not ruled out**
  - No sputums
  - Radiographically it is impossible to distinguish pneumonia caused by TB vs. CAP
  - Negative TST does not rule out TB
- Inmate moved to another BOP facility with All room
- **Follow-Up**
  - Symptomatic improvement on azithromycin
  - Negative smears
  - Community acquired pneumonia diagnosis
  - Inmate sent back to originating facility
TB
A needle in a haystack problem
Challenge

How to educate correctional clinicians
AND
maintain competence on a complex disease of public health importance that is rarely encountered.
Observation #4

Public health / corrections collaboration is key to TB prevention & control in correctional facilities.
Examples of Deliverables

Public Health
- Consultation
  - TB diagnosis & treatment of cases
- Release Planning
- Contact Investigation
- Policies/Procedures
- TB education

Correctional Facilities
- Case Detection
- Case Reporting
- Active TB Treatment
- Release Planning
- Contact Investigation
- Treatment of Latent TB Infection
Public health professionals must come to respect and know the “culture of corrections”.
Observation #5

Release planning for inmates with active TB is a critical aspect of TB control in correctional facilities.
Referral Agencies

- State Health Departments
- CURE-TB
- TB-NET
Observation #6

LTBI Treatment with 12-week, 12-dose INH-Rifapentine in corrections offers a significant opportunity for TB control
Federal Bureau of Prisons
12-week, 12 dose INH-RPT Regimen Pilot

- Seven BOP facilities
- Inmates were given medications via call-out procedure with broadcasted reminders, separate from the standard medication pill-line.
- DOT visits, weekly symptom screenings, monthly liver function tests, and demographic, behavioral, and medical risk factors were collected for inmates treated during July 2012–February 2015.
Demographics

- Median age: 36 years (range: 20–71 years)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number of Inmates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 29 Years</td>
<td>102 (22%)</td>
</tr>
<tr>
<td>30 to 39 Years</td>
<td>193 (42%)</td>
</tr>
<tr>
<td>40 to 49 Years</td>
<td>112 (24%)</td>
</tr>
<tr>
<td>50 Years and Older</td>
<td>56 (12%)</td>
</tr>
</tbody>
</table>

- 70% male
- 67% foreign-born
- 20% contacts to a known TB case
Treatment outcome of inmates treated with INH-RPT
July 2012-February 2015

463 patients started INH-RPT

424 (91.6%) successfully completed

39 discontinued

17 (3.7%) adverse event
9 (1.9%) lost to follow-up or transferred
8 (1.7%) patient refused to continue
5 (1.1%) provider error
Conclusions

- Tolerability and high treatment completions rates suggest that INH-RPT is superior to INH in the prison setting.
- Although half of inmates reported symptom complaints during the course of treatment, few experienced symptoms severe enough to result in discontinuation of treatment.
- Treatment completion is high even for patients with comorbidities or concomitant medications, however providers may need to more closely monitor inmates with diabetes and mental health conditions.
77/91 (85%) inmates initiating regimen completed it
- 18% INH

2/91 (2%) discontinued due to adverse effects
Summary

- INH-RPT has significant practical advantages in the correctional setting:
  - Shorter treatment duration for short stay or transient inmates
  - Reduced costs for fewer liver function tests
  - Reduced staff time for DOT: 12 vs. 76 DOT doses
  - High treatment completion rates
  - Health Services staff enthusiastic about the simpler new regimen!
Observations

1) Widespread TB transmission in U.S. correctional facilities still occurs.

2) Widespread TB transmission is ALWAYS associated with diagnostic delay.

3) Declining TB clinical expertise is a major challenge for correctional facilities.

4) Public health / corrections collaboration is key to TB control in correctional facilities.

5) Release planning is critical.

6) LTBI treatment with INH-RPT offers a significant public health opportunity.