Detection and Treatment of Tuberculosis in Correctional Facilities: Opportunities and Challenges

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June 26, 2013

No Disclosures

Primary Objective

The listener will gain an understanding of the unique opportunities and challenges surrounding detection and treatment of tuberculosis in correctional facilities.

Outline

Part I: Overview of tuberculosis (TB) in correctional facilities

Part II: Identification and containment of TB disease in correctional facilities

Part III: Treatment of latent TB infection (LTBI) in correctional facilities

Part I: Overview of TB in Correctional Facilities

TB in Correctional Facilities

- ~3% of all new TB cases are reported from correctional facilities[1]
- ~40% of all those in the US with active TB disease passed through a correctional facility in 1997[2]
- Jail inmates: 17x TB prevalence in the US population
- Prison inmates: 4x TB prevalence in the US population

1. CDC 2003.
2. Am J Public Health, 2002;92(11).
3. Hammett, NCCHC, 2002.

Infectious Disease Burden

Condition	Prevalence of Inmates (Jail and Prison)	Number of Inmates with Condition	Number of Releasees with Condition	US Population Total with Condition	Releasees/ US Population with Condition
HIV	1.45-2.03%	35,093-45,522	150,000-196,000	750,000	20.1-26.2%
AIDS	0.5%	9212	38,894	247, 032	15.7%
Hepatitis C	17-25%	303,507-446,338	1.3-1.9 million	4.5 million	29.4-43.2%
Active TB	**0.04% (P)** **0.17% (J)**	**1451**	**12,531**	**31,660**	**39.5%**

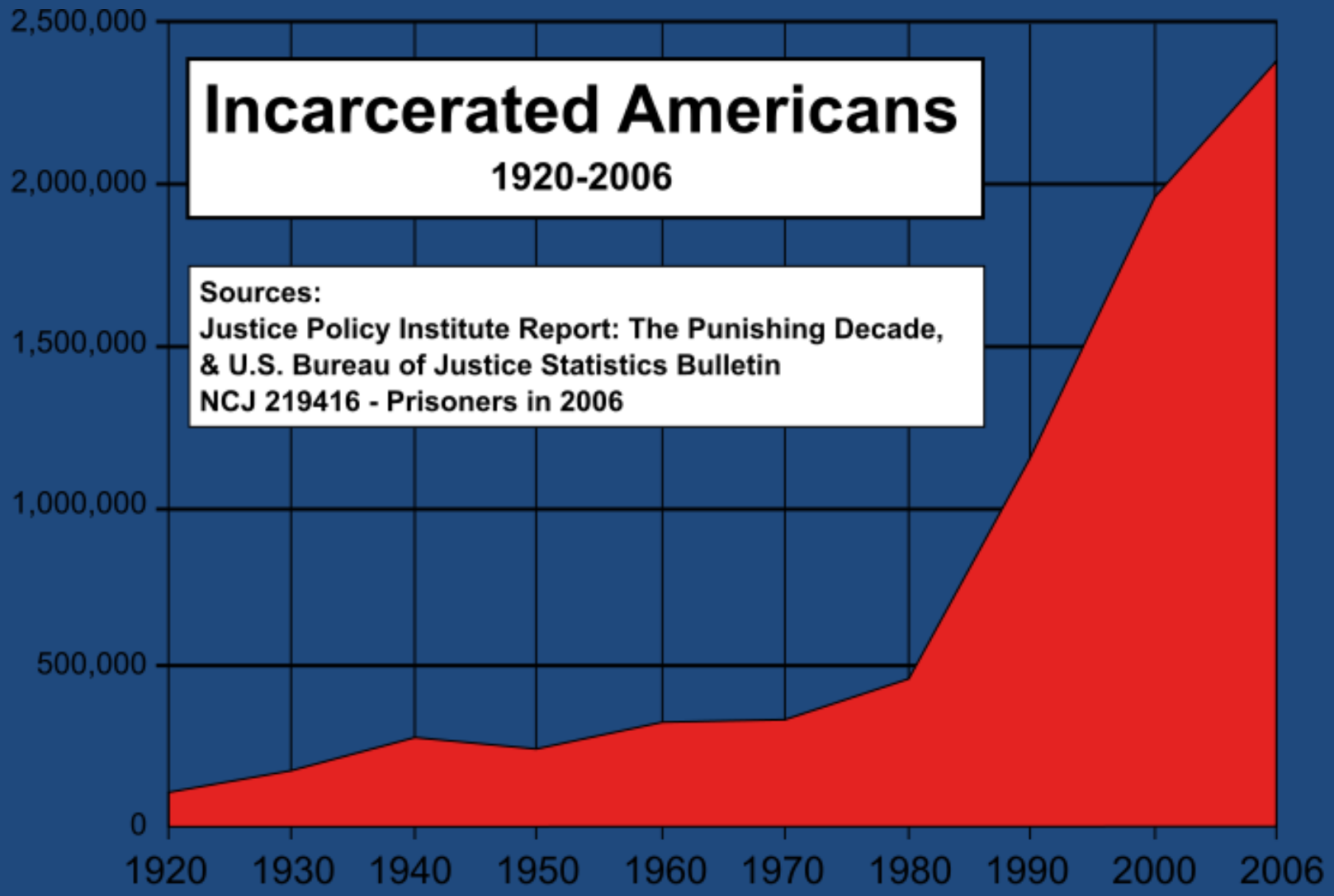
Am J Public Health, 2002;92:11

Why the high prevalence of TB?

- Inmate factors
  - Intravenous drug and alcohol use
  - Low socioeconomic status
  - HIV
  - Lack of medical care prior to incarceration
- Structural factors
  - Close living quarters
  - Poor ventilation[4]
  - Overcrowding
- Transient population = difficulty in controlling disease

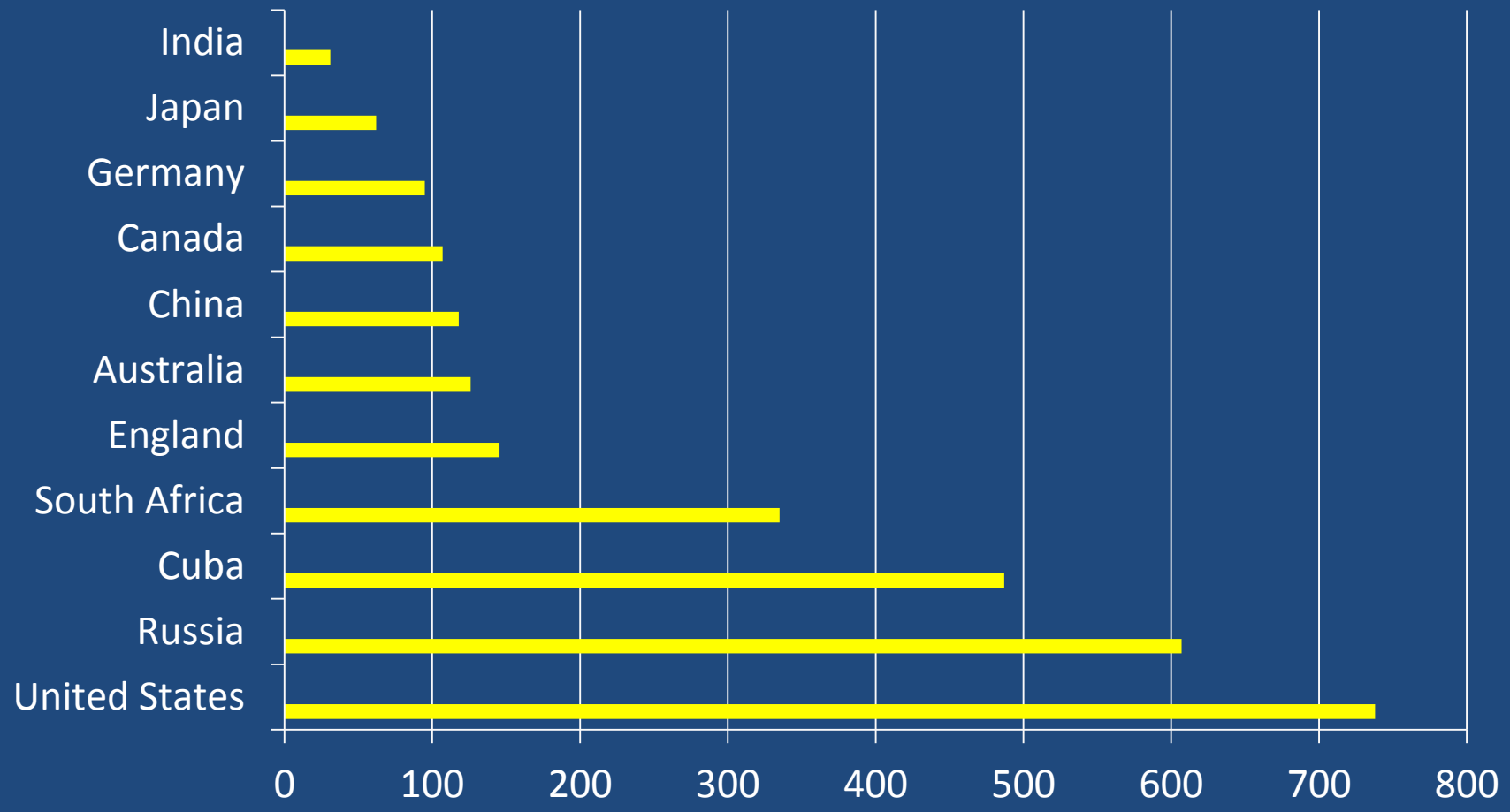
4. Am J Prev Med 2006;30(2)

Overcrowding



U.S. Bureau of Justice Statistics, 2009.

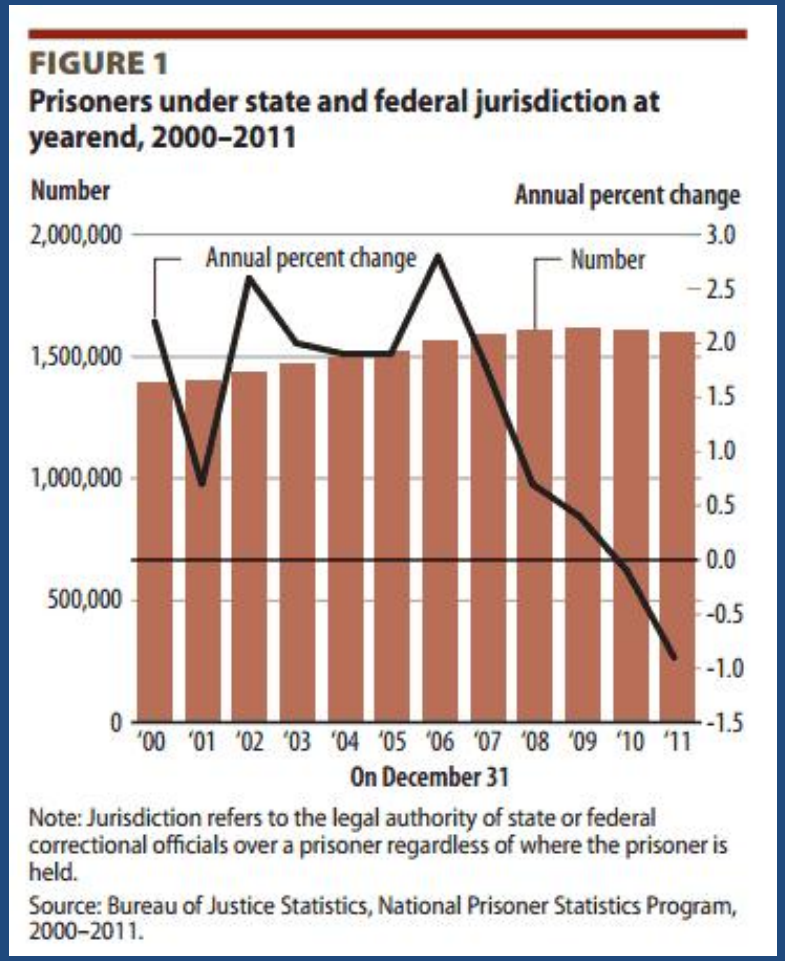
Rates of Incarceration/100,000 Worldwide



Public Health Behind Bars, 2007.

Response to Crisis

- US Supreme Court 2009: California must operate at 137.5% of capacity (~110K)
- 0.9% annual decline in state and federal inmate population, from 1,614,000 to 1,599,000 (70% due to CA realignment)[5]
- Reduction in sentence/compassionate release

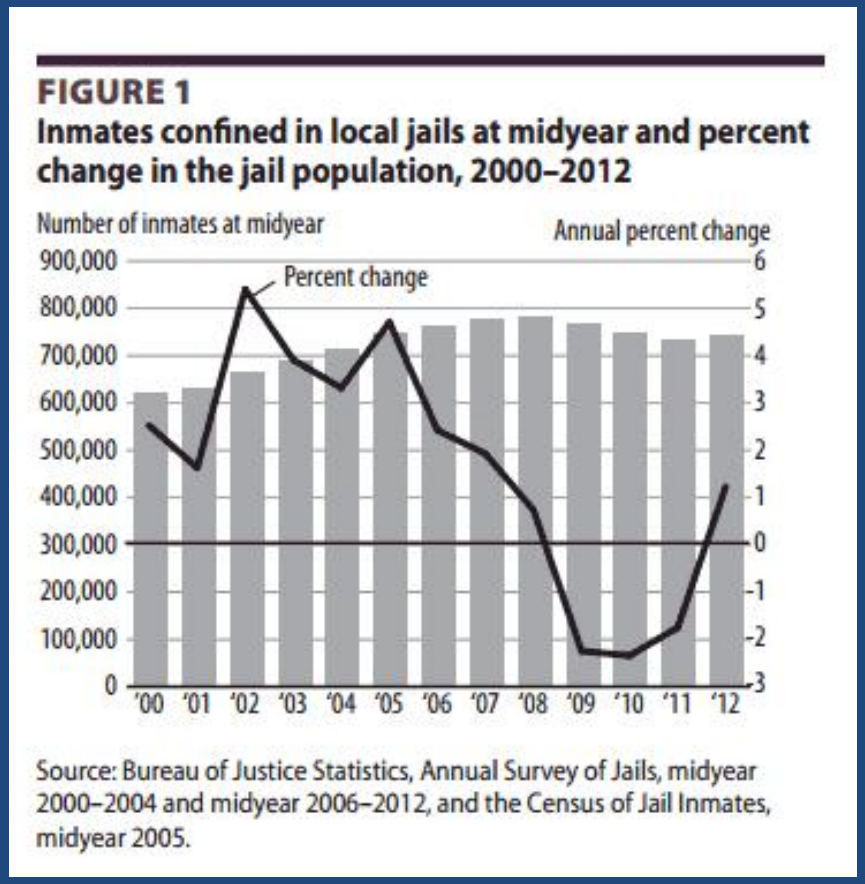


5. BJS, 2011.

Is the pendulum swinging?

Public Health Opportunities and Challenges: Focus on Jails

- Prevalence of active TB in jails 4x prevalence in prisons (0.17% vs. 0.04%)
- Population increasing in jails, currently ~745K (1.2% annual increase)
- Approximately 11.6 million persons were admitted to jails in 2012 (~2.5% of US population)
- Length of stay measured in hours to days



BJS, 2012.

Summary: Part I (Overview)

- Prevalence of TB disease is 0.04% in prisons and 0.17% in jails
- Prevalence of TB disease in correctional facilities 4-17x the prevalence in US population
- Inmate factors, environmental factors, and frequent movement and short length of stay of inmates contributes to TB prevalence and containment challenges
- Recent decline in prison population and increase in jail population emphasizes important focus areas

Part II: Identification and Containment of TB Disease in Correctional Facilities

Defining Facility's TB Risk

Minimal risk:

- No cases of infectious TB in the last year
- Facility does not house substantial numbers of inmates with risk factors for TB
- Facility does not house substantial numbers of new immigrants from areas with high rates of TB
- Employees at the facility are not otherwise at risk of TB

CDC, 2006.

Screening for TB

Primary goal: Identify inmates who are likely to have infectious TB before integration into general population

Secondary goal: Identify inmates with latent TB infection (LTBI)

- History and symptom assessment
- Mantoux tuberculin skin test (TST)
- Interferon Gamma Release Assays
- Chest Radiograph Screening

History and Symptom Assessment

- Most rapid screening test
- Easy to administer
- Staff should be trained on procedures for isolation
- Not adequate alone, except in minimal risk facilities
- Often fails to detect pulmonary TB; LTBI only detected by history

Mantoux TST Screening

- TST plus symptom assessment most common method of screening for TB
- Sensitivity ranges from 75-90%; highly nonspecific
- Need for reading after 48-72 hours of placement especially problematic in jails
- Inmates with positive TSTs should have a chest X-ray performed within 72 hours of reading
- Two-step testing may not be practical in jails

CDC, 2006.

How Do Jails Perform?

1986 internal Cook County Jail audit:

- For 49% of inmates with a positive TST, medical personnel took 50 days or more to follow up
- 43% of inmates with positive TSTs were discharged prior to skin test being read
- Mean time to isolation: 17.6 days

Public Health Reports 1996(111)

How Do Jails Perform?

- A 2006 study of 20 large U.S. jail systems:
  - 95% (19/20) had policies for screening inmates on intake
  - 85% (17/20) asked inmates about a cough; policies for other symptoms varied
  - 85% (17/20) had policies for universal screening within 14 days; 71% (12/17) had policies for TST placement within 24 hours
  - One jail system with voluntary TSTs: 13% placement rate

Am J Prev Med 2006;30(2)

Interferon Gamma Release Assay

Advantages

- Higher specificity and at least as sensitive as TSTs for detection of TB disease[6]
- Only single visit required
- Result unaffected by previous BCG vaccination result
- No boosting effect

Limitations

- Need for phlebotomy
- Lab process time of 8-30 hours[7]
- Higher direct cost per test
- Lack of clinical experience in interpreting results
- Negative test does not exclude possibility of TB infection

6. Exp Rev Mol Diag 2006, 6(3).
7. CDC, 2011.

Chest Radiograph Screening

- Can increase TB case-finding rate
- Enables quicker isolation of suspected TB cases[8]
- Cost-effective[9]
- Cook County Chest-X-ray screening compared to TST (1992-94):[10]
  - 43 vs. 26 cases of active TB/year
  - Time to isolation reduced from 17.2 to 2.3 days
- Bureau of Prisons study: no change in disease detection in foreign-born inmates, but 8-fold increase in isolation and diagnostic work-up[11]

8. Am J Pub Hlth 1997(87).
9. Am J Respir Crit Care Med, 2001(164).
10. Pub Hlth Rep, 1996(111).
11. Pub Hlth Rep, 2001(116)

Summary: Part II (Screening)

- First step: Identify facility's risk of TB transmission
- Two goals:
  - Identify cases suspected of TB disease
  - Identify LTBI
- Symptom assessment and TST most common method of screening
- Universal CXR, IGRAs may be considered in high-risk and/or short-term facilities

Part III: Treatment of LTBI in Correctional Facilities

Table 2. **Latent TB Infection Treatment Regimens**

Drugs	Duration	Interval	Minimum doses
Isoniazid	9 months	Daily	270
		Twice weekly*	76
Isoniazid	6 months	Daily	180
		Twice weekly*	52
Isoniazid & Rifapentine	3 months	Once weekly*	12
Rifampin	4 months	Daily	120

**Use Directly Observed Therapy (DOT).*

CDC, 2011.

Jails vs. Prisons

Table 4. Evaluation and treatment outcomes in jails versus prisons among inmates who had positive tuberculin skin test

Outcome	Jails (%)	Prisons (%)
Incomplete tuberculosis evaluation	17.1	0.4
Prior adequate therapy	3.2	27.4
Treatment completed	33.6	57.7
Lost before treatment completed[a]	53.9	17.0

[a]Lost includes patients who moved, were parolled, or were transferred from the facility.

Am J Prev Med 2003;24(3)

Why bother treating LTBI in jails?

- Low medication adherence rates upon release[12]
- Poor follow-up[13]
- Bandyopadhyay et al (2002)[14]:
  - 82/168 (49%) releasees presented to clinic
  - 33/82 (40%) had to be restarted on therapy
  - 35/82 (55%) completed adequate course
  - 2.68 reactive TB cases prevented
  - Projected cost savings of $9,277/4.5 years

12. Am J Respir Crit Care Med 1997;155.
13. Am J Public Health 1988;88.
14. Chest, 2002;121.

Isoniazid/Rifapentine

- Shorter regimen (3 vs. 4, 6 or 9 months)
- Directly observed INH/RPT as efficacious as self-administered INH with higher completion rate[14]
- Cost-effective in general population[15, 16]
- Not to be used in patients with HIV/AIDS on anti-retrovirals or in pregnant patients
- Should not be used in facilities with INH- or RIF-resistant *M. tuberculosis* strains

14. N Engl J Med. 2011, 365(23)
15. Am J Respir Crit Care Med, 2009;179.
16. PLoS ONE, 2011 6(7).

Summary: Part III (LTBI)

- Treatment of LTBI in jails challenging but potentially cost-effective and beneficial to public health
- INH/rifapentine promising regimen, particularly for short stays

Conclusion

- Significant representation of both TB disease and LTBI in correctional facilities makes for great public health opportunity
- TB in correctional facilities affects the general community
- Transient jail population makes screening and treatment particularly challenging
- Coordinated efforts with local public health authorities extremely important

Questions?