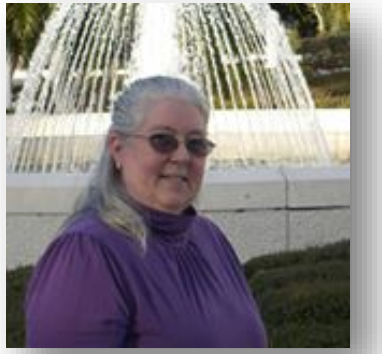


TB/HIV in Corrections: A Time Bomb Awaits!

Ellen R. Murray, PhD, BSN, RN

Nurse Consultant/Training Specialist

Southeastern National TB Center

Objectives

At the end of this presentation, participants will be able to:

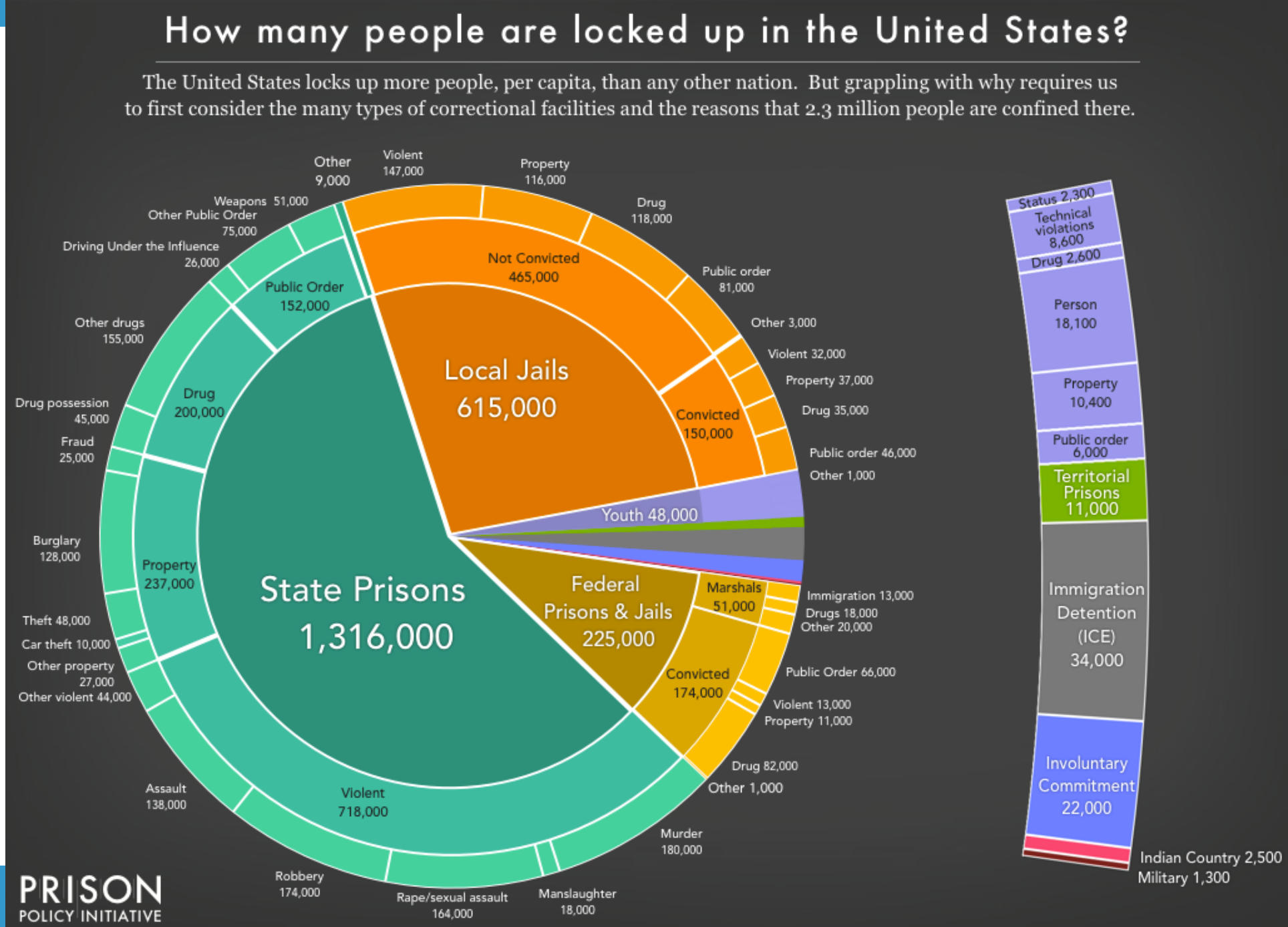
- Describe the prevalence of HIV and TB both globally and in corrections to apply to correctional facility epidemiology
- List inmates' risk factors for TB/HIV to inform the initiation and completion of treatment for LTBI
- Recognize and implement treatment for incarcerated patients suspected of having TB and HIV to halt the spread of the disease
- Discuss the need for continuity of care in high-priority patients suspected or having active or latent TB and HIV to ensure completion of treatment


HIV +
IV Drug Use
Low Socio-Economic
Non-IV Drug Use
Homeless
Alcohol
Co-morbidities (Diabetes)
Environmental Factors

2016

655 incarcerated/ 100,000 population

2.2 million incarcerated



Incarcerated Persons in the U.S.

- Over 7 million people were on probation, in jail or prison, or on parole at year-end 2010
  - 3.2% of all U.S. adult residents
  - 1 in every 32 adults.
- Disproportionately high percentage of TB cases occur among the jail and prison population

Bureau of Justice Statistics Report

489 (3.5% of all TB cases nationwide) occurred among residents of correctional facilities in 2016

Centers for Disease Control and Prevention

Estimated Prevalence HIV

- Globally
  - 36.9 million
- In Corrections
  - 1% - 7% of incarcerated persons are HIV+

36.9 MILLION

people worldwide are currently living with HIV/AIDS.

- 2016 - estimated 1.1 million people aged 13 and older
  - estimated 162,500 (14%) people whose infections had not been diagnosed.

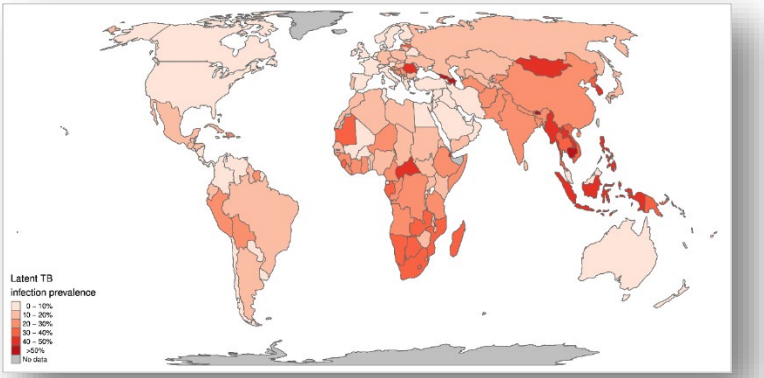
CDC. Estimated HIV incidence and prevalence in the United States, 2010-2016 *HIV Surveillance Supplemental Report* 2019;24(1)

https://www.hiv.gov/hiv-basics/overview/data-and-trends/global-statistics

Golrokhi, R. et al (2018). HIV Prevalence and Correlations in Prisons in Different Regions of the World: A Review Article; Open Aids J., 12:81-92. doi: 10.2174/1874613601812010081

Estimated Prevalence Latent TB Infection (LTBI)

- Globally (estimation): 1.7 billion people with LTBI
  - Slightly <1/4 of the global population



"Addressing the latent TB infection reservoir is critical to achieving TB elimination"

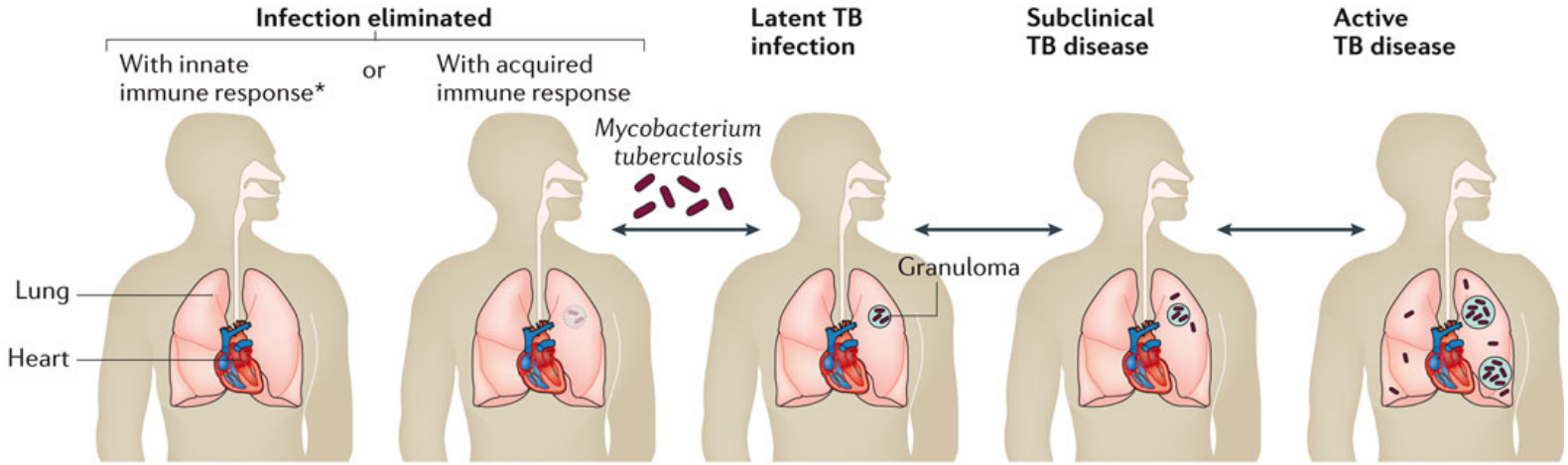
Houben, RMGJ, Dodd, PJ (2016). The Global Burden of Latent Tuberculosis Infection: A Re-estimation Using Mathematical Modelling. PlOS/Medicine; online at https://doi.org/10.1371/journal.pmed.1002152

(Latent) TB infection vs TB Disease

Person with LTBI (Infected)	Person with TB Disease (Infectious)
Small amount of TB bacteria in his/her body are alive, but inactive	Large amount of active TB bacteria in his/her body
Cannot spread TB bacteria to others	May spread TB bacteria to others
Does **not** feel sick, but may become sick if the bacteria become active in his/her body	May feel sick and may have symptoms such as a cough, fever, and/or weight loss
Usually has positive TB skin test or IGRA (TB blood test) indicating TB infection	Usually has positive TB skin test or TB blood test indicating TB infection
Radiograph is typically normal	Radiograph may be abnormal
Sputum smears and cultures are negative	Sputum smears and cultures may be positive
Consider LTBI treatment to prevent TB disease	Needs treatment for TB disease
Does **not** require respiratory isolation	May require respiratory isolation
Not a TB “case”	Report as a patient suspected of having TB

The spectrum of TB

Mycobacterium tuberculosis infection to active (pulmonary) TB disease



TST	Negative	Positive	Positive	Positive	Usually positive
IGRA	Negative	Positive	Positive	Positive	Usually positive
Culture	Negative	Negative	Negative	Intermittently positive	Positive
Sputum smear	Negative	Negative	Negative	Usually negative	Positive or negative
Infectious	No	No	No	Sporadically	Yes
Symptoms	None	None	None	Mild or none	Mild to severe
Preferred treatment	None	None	Preventive therapy	Multidrug therapy	Multidrug therapy

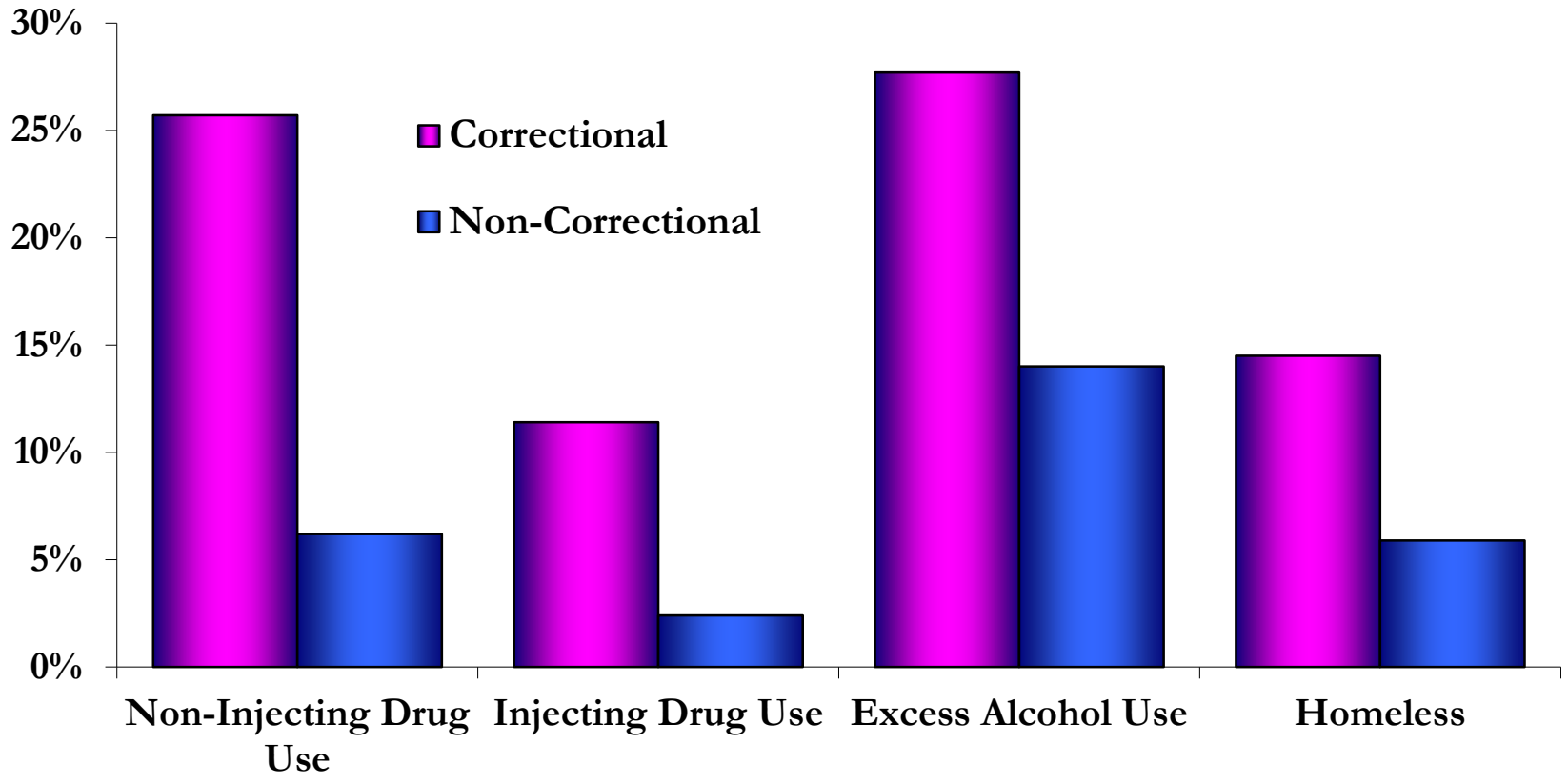
Nature Reviews | Disease Primers

Pai, M. *et al.* (2016) Tuberculosis. *Nat. Rev. Dis. Primers* doi:10.1038/nrdp.2016.76

Who is at Risk for Progression to Active TB

- **HIV**
- Contacts
- Other Immune-suppressed
- Homeless
- Low Socio-economic
- Patients with co-morbidities (i.e. uncontrolled diabetes, CRF, etc.)
- Alcohol & substance abuse
- High TB-endemic countries

U.S. TB Cases by Correctional Status and TB Risk Factors*



**History of risk factor in year prior to diagnosis*

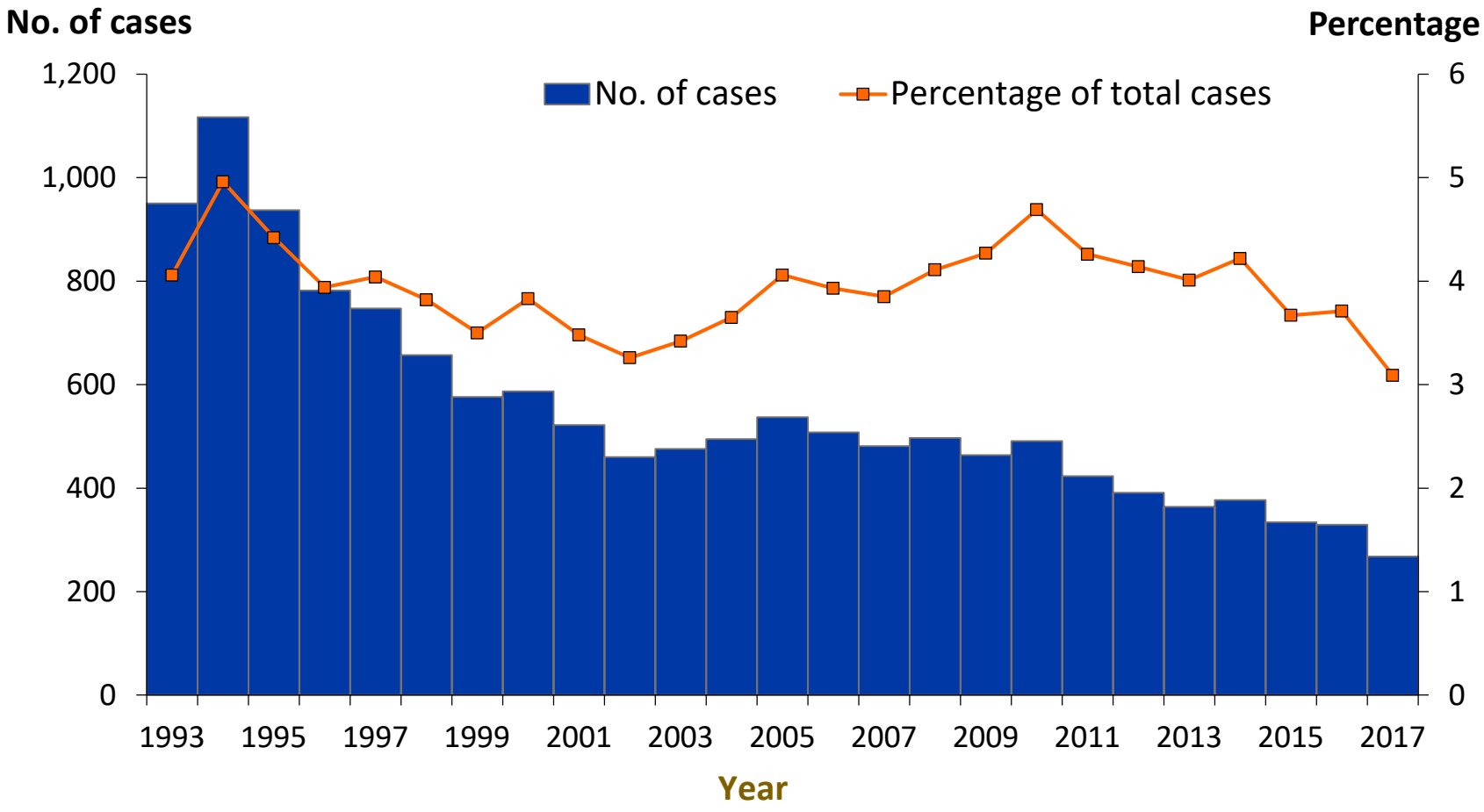
[1] Includes response of "unknown."

Tuberculosis

	GLOBAL	USA
Active Cases	14 million/year	~ 10,000/year
Infected Persons (Latent TB Infection)	1.7 billion (33% population)	10-15 million (4% population)
Deaths	~1.8 million/year	**>500/year**
Multidrug Resistant TB	up to 28.3%*	< 1%

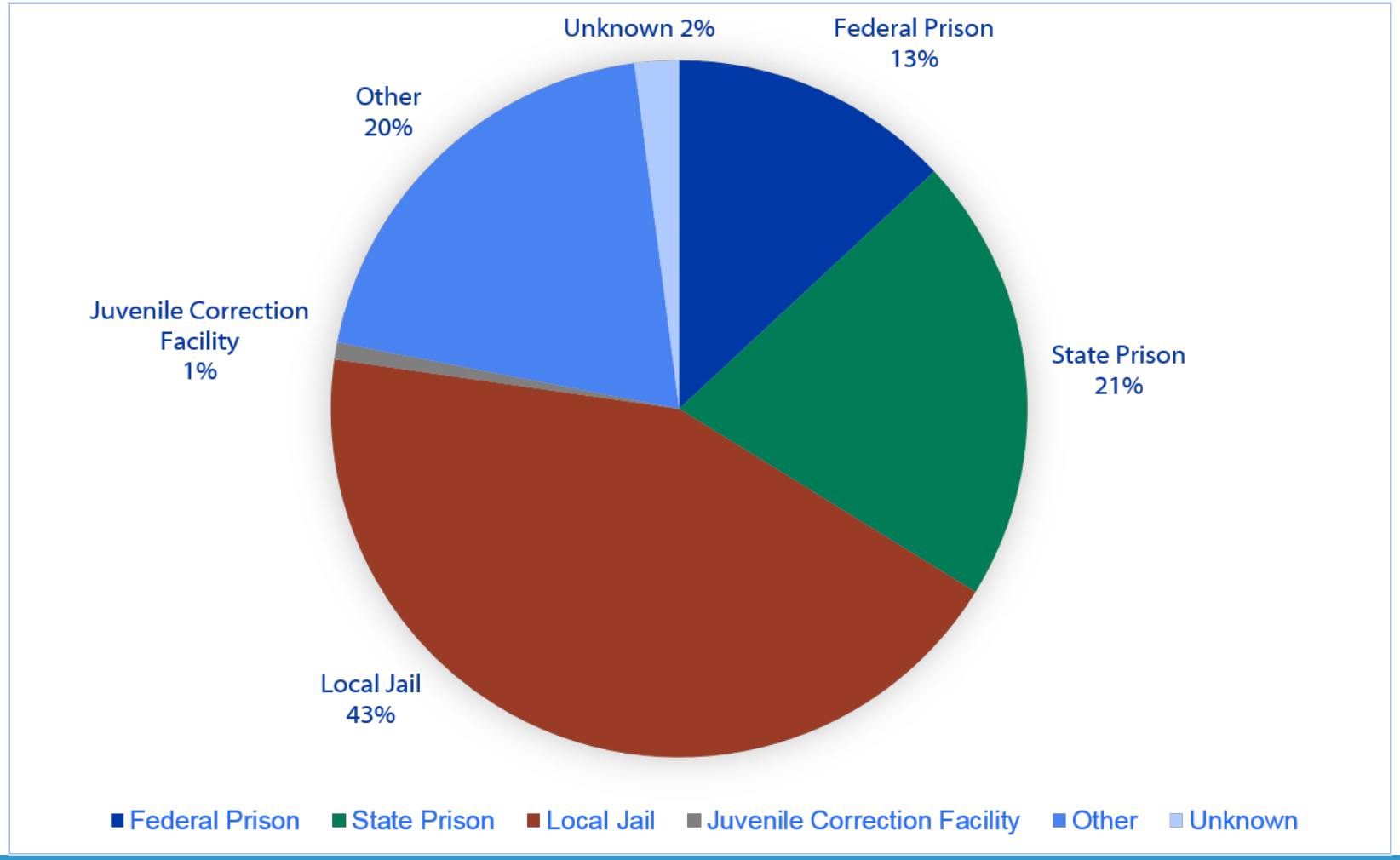
- *2017 Data - WHO* - http://who.int
- *2017 Data – CDC – http://www.cdc.gov/tb*

TB Cases are decreasing – yet # diagnosed in corrections remains steady

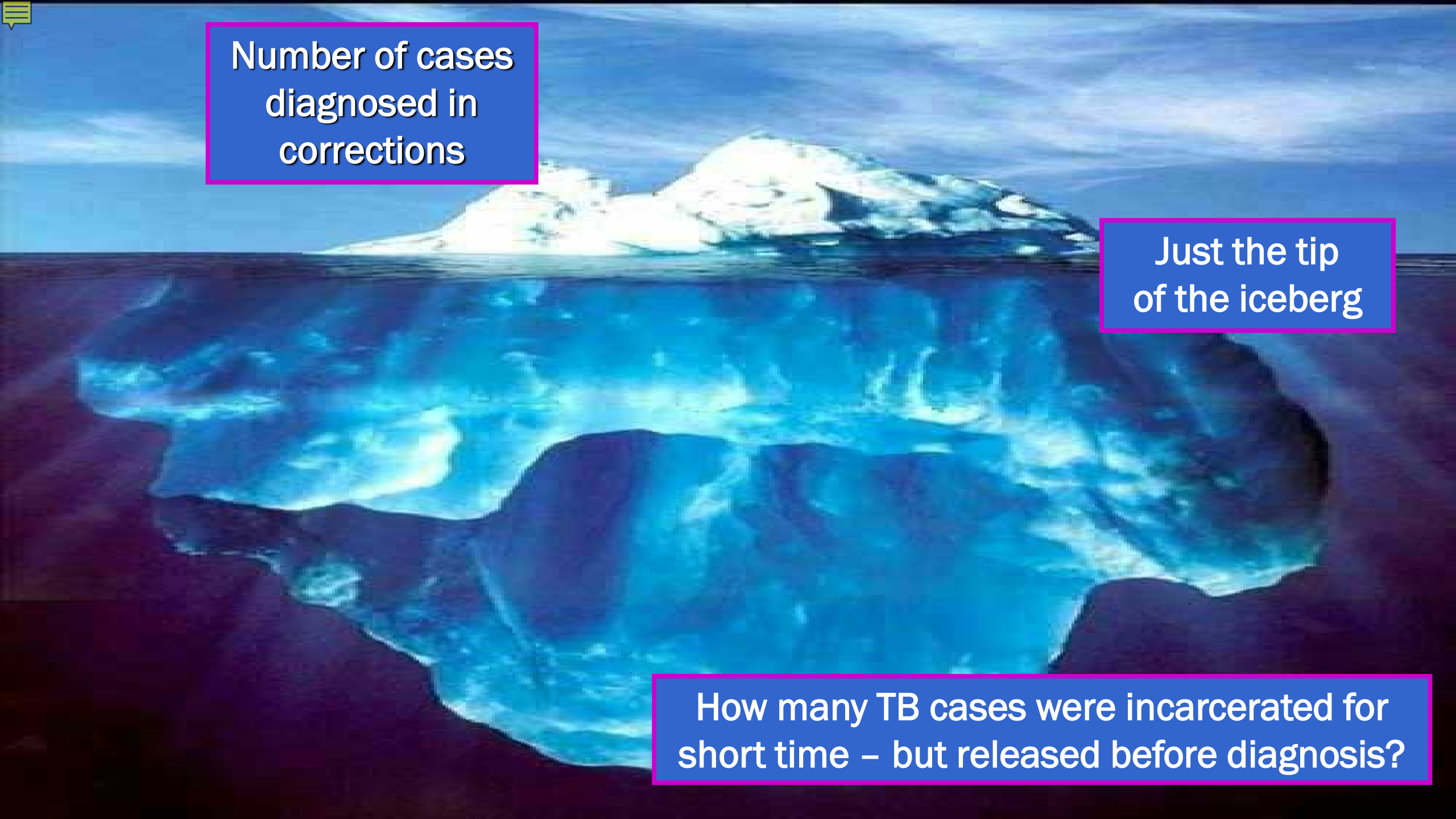


TB Cases Among Persons Aged ≥15 Years Residing in Correctional Facilities, United States, 1993–2017*

Percentage of TB Cases among Residents of Correctional Facilities by Type of Facility, 2010–2017*



*Persons aged 15 years or older


Number of cases diagnosed in corrections
Just the tip of the iceberg
How many TB cases were incarcerated for short time – but released before diagnosis?

Higher TB Rates in Incarcerated Populations

- At least 5-10 times higher than the general population
  - 2010 - study reported incidence rates (both active and latent TB)
    - 20 times higher in incarcerated populations compared to rates in general population, worldwide

Baussano, et. al., PLoS

  - Ten-year study - federal and state U.S. TB prison rates
    - 29.4 and 24.2/100,000 in prison
    - 6.7 per 100,000 in the general population
    - Inmates were more likely to have TB risk factors.

MacNeil, et al., (2005). AJPH

Factors Contributing to the High Rate of Tuberculosis within Correctional Facilities

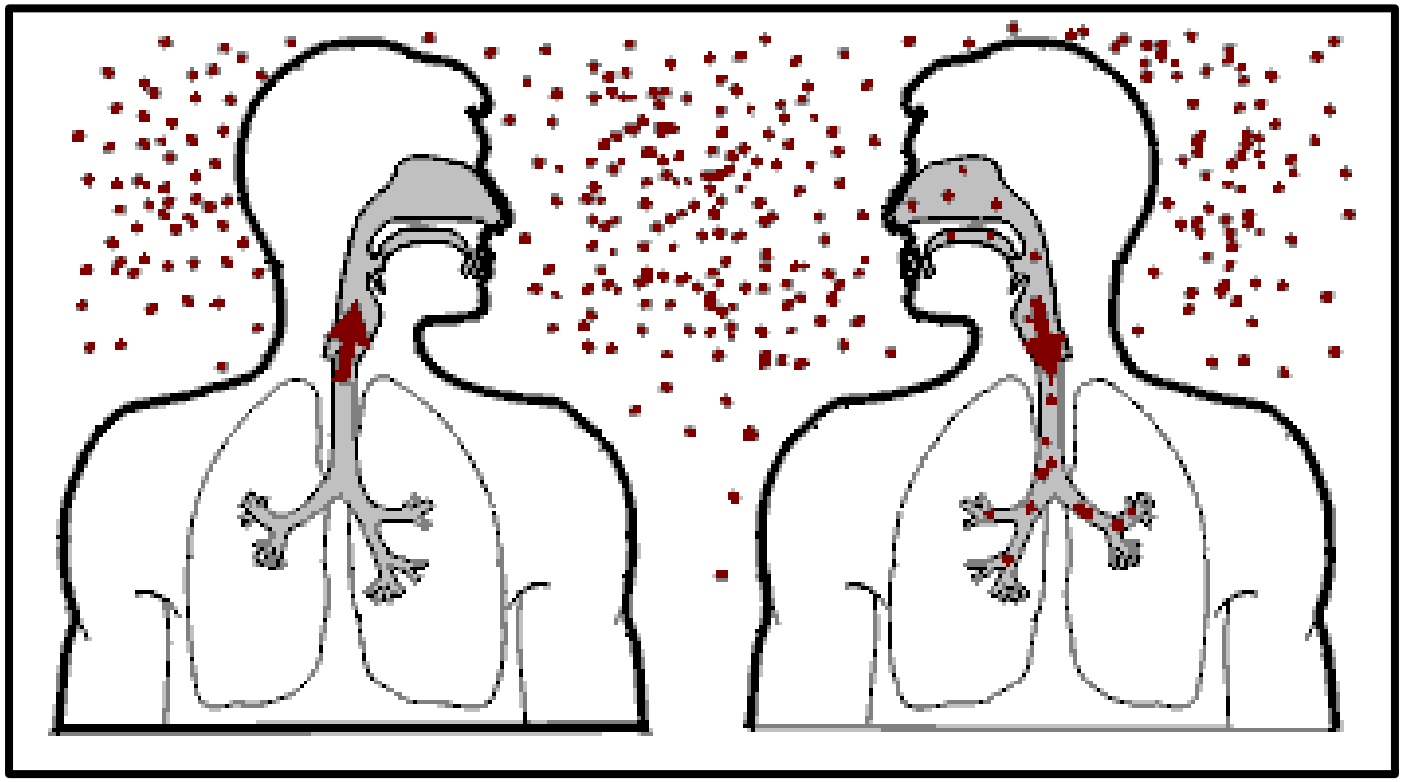
Pre-incarceration factors

- HIV
  - LTBI very important – identify as high-priority; may be next active TB case
- Increase in immigration from high TB prevalence countries
  - Latent (and active) TB infection with drug-resistant TB

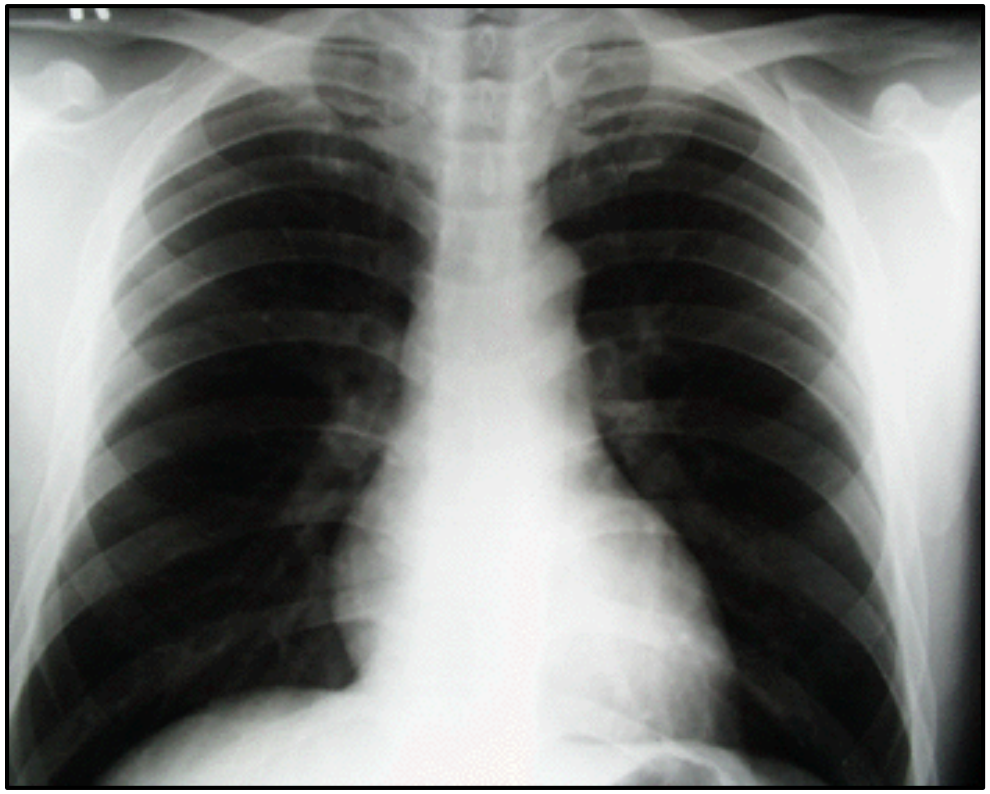
Incarceration factors

- Transmission of TB in congregate settings
  - Physical structure of facilities
  - Movement of inmates

Transmission



TB Diagnosis



30% CXRs in HIV-positive patients may be atypical;

5% read as normal even though the patient is smear (+)

Important info: HCW needs to know if patient has HIV infection!

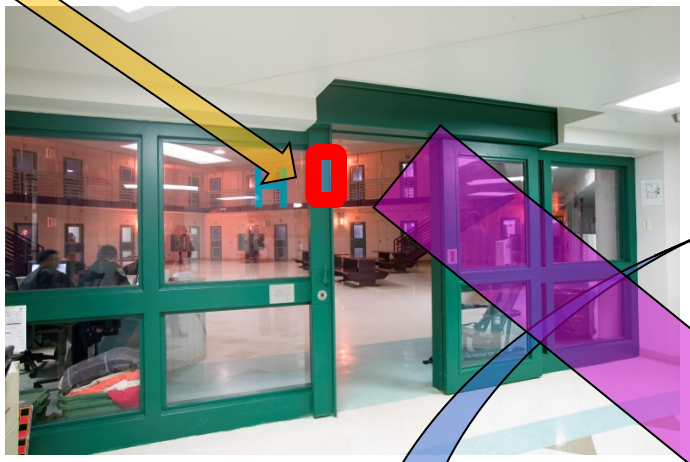
Every Case of TB

was once a contact!

TB Patient

37 man cell
2+ TSTs

Pod A



16 man cell
2+ TSTs but Ø conversions

Pod B

Pod C

17 man cell
Ø Conversions

Gaming Table

Pod D

39 man cell
22+ TSTs
56% conversions

Treatment of LTBI in HIV

- **Rifampin (rifabutin) monotherapy x4 mo. (BIII)**
  - Rifampin 600 mg PO daily x 4 months, or
  - Rifabutin x 4 months PO daily (dose adjusted based on ART meds)*

- Tables 18a through 18e to assess the potential for interactions among different antiretroviral (ARV) drugs and the rifamycins.

Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents
Download at http://aidsinfo.nih.gov/guidelines
*Sterling et al. AIDS. 2016 Jun 19;30(10):1607-15.

TB Treatment in HIV

- **For patients on ART**, initial and continuation phases same as for patients without HIV (6 mo total)
  - Initial 2 mos. rifamycin (RIF or Rifabutin), INH, PZA, EMB
  - Continuation 4 mos. with INH/Rifamycin, if susceptible
- Treatment duration extended:
  - 9 months if culture (+) at 2 mo. and cavity on CXR
  - 9-12 months if bone/joint/spine TB
  - 12 months if CNS TB
  - ➢ some experts extend therapy if cavity or prolonged positive cultures or slow clinical response
- **If not on ART**, 7 mo continuation phase (9 mo total)

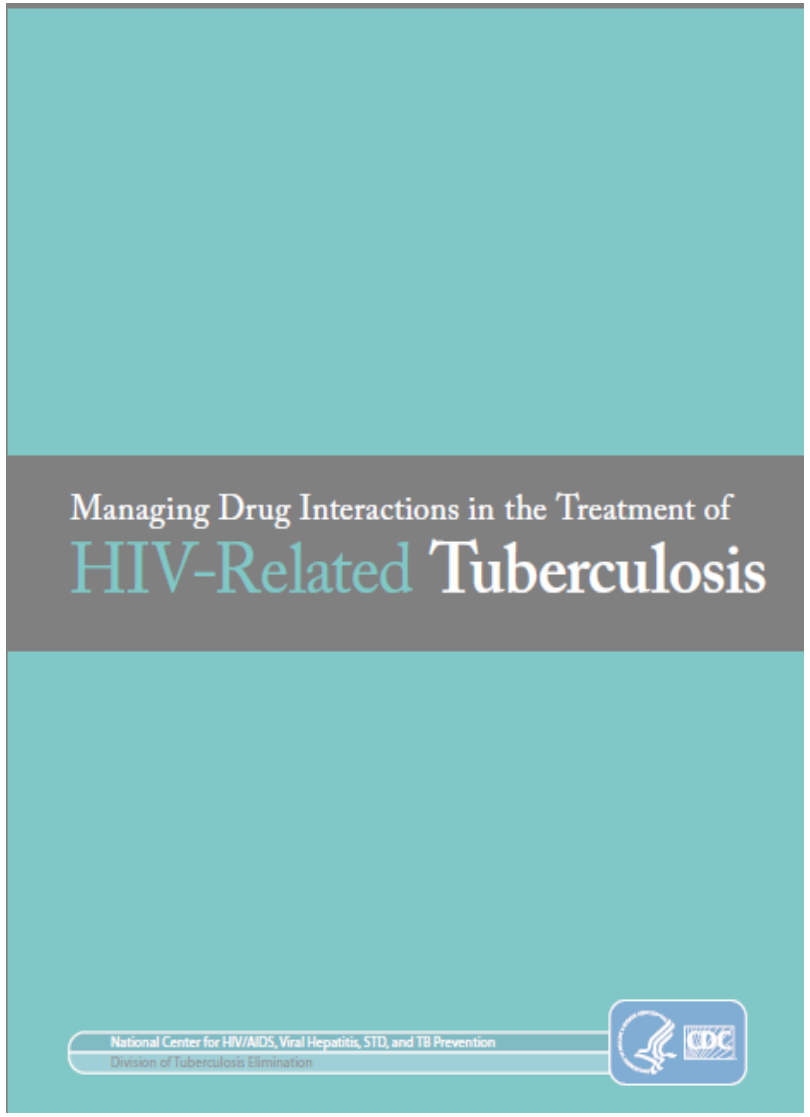
Treatment of Drug-Susceptible TB. Clin Infect Dis. 2016 Oct 1;63(7):853-67
Guidelines for the prevention and treatment of opportunistic infections in HIV-infected adults and adolescents: Available at http://aidsinfo.nih.gov/contentfiles/lvguidelines/adult_oi.pdf (Accessed 3/4/2016)

All Patients with HIV/TB Should be Treated with ART

- Reduces mortality rates significantly
- Decreases risk of developing AIDS-related conditions
- ART can be safely given during TB treatment

- Don’t hold ART until TB therapy completed

Official ATS/CDC/IDSA Clinical Practice Guidelines: Treatment of Drug-Susceptible Tuberculosis Clin Infect Dis. 2016 Oct 1;63(7):853-67
Guidelines for the prevention and treatment of opportunistic infections in HIV-infected adults and adolescents: Available at http://aidsinfo.nih.gov/contentfiles/lvguidelines/adult_oi.pdf (Accessed 3/4/2016)



http://www.cdc.gov/tb/publications/guidelines/tb_hiv_drugs/pdf/tbhiv.pdf

Treatment of Tuberculosis (TB) in Adults with HIV Infection

AETC AIDS Education & Training Center Program Southeast

June 2019

Southeastern National Tuberculosis Center

Editors:
Connie Haley, MD, MPH
L. Beth Gadkowski, MD, MPH, MS
Joanne Urban, PharmD, AAHIVP

This resource is intended to assist clinicians in managing patients with HIV and latent tuberculosis infection (LTBI), and drug-susceptible active pulmonary tuberculosis (TB). This guide summarizes the guidelines for the diagnosis and treatment of LTBI and TB and includes clinical signs and symptoms, adult dosing, available dosage forms, drug-drug interactions, side effects, and important patient counseling points.

https://sntc.medicine.ufl.edu/Files/Products/TB-HIV%20pocket%20card%205-2016.pdf

TB/HIV Summary

- HIV markedly increases risk of TB infection and disease
- Tx LTBI in HIV(+) decreases progression to TB
- Diagnosis of TB in HIV (+) patients can be challenging
- TB treatment in HIV (+) similar to HIV (-), more complicated
  - Polypharmacy (pill burden)
  - Tolerability/compliance challenges
  - Drug-drug interactions likely
  - Malabsorption of medications
  - Risk for paradoxical reactions (IRIS)
  - Compliance critical to prevent resistance/treatment failure
- TB treatment usually given with ART; both interventions reduce morbidity and mortality

Patient Scenario

- 40 y old
- HIV-infected male - born in South Africa
- Immigrated 3 months ago
- Worked in gold mines for years
- CD4 - 12 cells/mm^3,
  - HIV VL >750,000 copies/mL

Patient Scenario (cont'd.)

- **How do you screen for TB?**
  - High risk patient, likely had BCG, advanced immunosuppression = IGRA preferred
    - T-spot is indeterminate
- **What should you do next?**
  - Repeat T-spot or get QFT; TST less helpful if BCG
  - Can repeat testing after immune recovery on ART
    - CXR "normal" and repeated T-spot indeterminate
- **What else do you need to know?**
  - Denies all symptoms
  - Denies known TB exposure, prior TB/LTBI treatment
  - Ask about prior incarcerations – YES! In S. Africa prior to America

Patient Scenario (cont'd.)

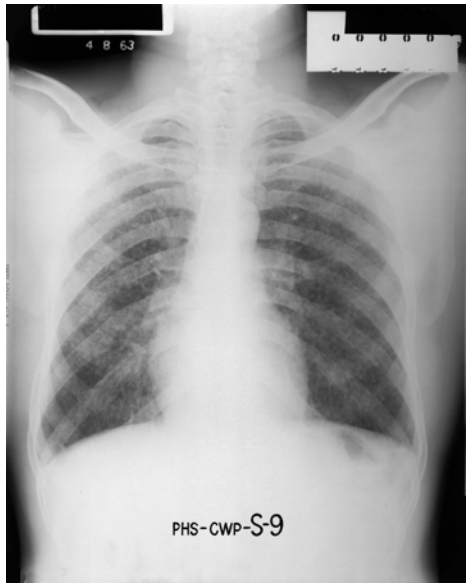
- Is patient likely infected with TB?
  - Yes: Immunosuppressed, S. Africa, high risk occupation, prior incarceration
- Is there any evidence of active TB?
  - No symptoms, signs, CXR "normal"
  - Consider sputum C&S before LTBI tx with ↑↑risk & HIV
- Do benefits of treatment outweigh the risk?
  - Yes - consider LTBI tx regardless of test result if no TB disease
  - Could also retest after ART to see if TST/IGRA (+)
- Which regimen most effective and least risk?
- Is patient going to take treatment if recommended?

Patients with HIV and High Risk of TB Exposure

- Risk of false-negative results increases for both TST and IGRA with advancing immunodeficiency
  - **Dual testing** can increase sensitivity, both may be false (-)
  - Many experts would treat for infection if advanced immunosuppression and high risk of infection
  - Be CERTAIN TB disease not present before LTBI therapy
  - If moderate-high suspicion for active TB despite negative TST/IGRA, treat as TB while awaiting further diagnostic test results

Patient Scenario (cont'd.)

What if he had a CXR like one of these?



1. Silicosis: widespread nodules 2-5mm, esp. in middle and UL zones

2. Silicosis: progressive massive fibrosis; large, conglomerate nodules in mid and UL zones.

3. Miliary TB

1 and 2. http://emedicine.medscape.com/article/361778-overview
3.. Case courtesy of Dr M Osama Yonso, Radiopaedia.org, rID: 22782

"No-Lose Solution"

When initially unclear if TB vs. LTBI in a patient at high risk of TB:

1. Start 4 drugs (RIPE), even if smears/cultures (-)
2. Obtain CXR, clinical exam at 2 months
3. If no improvement, 2 months RIPE is effective for LTBI therapy and preventing TB
   - Contains RIF/PZA which is effective for LTBI therapy, though no longer recommended due to severe toxicity

Diagnosis & Treatment Benefits

- CDC/IDSA/ATS and USPSTF Recommendations
  - Target high-risk individuals
  - “Should be part of primary care settings for LTBI”
  - Need for shorter, better tolerated regimens

- Challenge
  - Inability to predict risk for progression to active disease

Blumberg, H.M. and Ernst, J.D. (2016). The Challenge of Latent TB Infection; Jama; 316(9): 931-933. doi:10.1001/jama.2016.11021

Drug Interactions

- TB medications have interactions with HIV and other medications
- HIV medications have interactions with TB and other medications
- Consult the experts

For TB: 1-800-4TB-INFO

Treatment of LTBI in HIV

Several regimens available

- **3HP – shorter duration (Preferred within corrections setting)**
  - Greater potential for completion
  - Interactions can be managed

Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents
Downloaded from http://aidsinfo.nih.gov/guidelines
*Sterling et al. AIDS. 2016 Jun 19;30(10):1607-15.

Treatment for LTBI in HIV (continued)

- **INH 9 months (9H):**
  - Any ART regimen can be used
  - INH 300 mg + B6 25-50 mg PO daily x 9 months **(AII)**, or
  - INH 900 mg PO BIW (by DOT) + pyridoxine 25-50 mg PO daily x 9 months **(BII)**.
  - Review HIV OI Gls Tables 18-19e for drug interactions

- **4 months Rifampin**
  - Increased bleeding
  - Consider only pre-transplant – must complete prior to transplant

- All regimens – monitor labs and clinically to ensure no treatment failure

The Need for Continuity of Care

- *"More than 650,000 ex-offenders are released from prison every year, and studies show that approximately two-thirds will likely be rearrested within three years of release.*
- *The high volume of returnees is a reflection on the tremendous growth in the U.S. prison population during the past 30 years.*
- *For the communities to which most former prisoners return (communities which are often impoverished and disenfranchised neighborhoods with few social supports and persistently high crime rates), the release of ex-offenders represents a variety of challenges."*

- One Solution: Health Department should be part of a Release Plan

https://www.justice.gov/archive/fbci/progmenu_reentry.html

Opportunities to Impact Patient Outcomes

- Think TB!
- Treat TB if HIV infected
- During risk assessments, ask patients about prior incarceration
- Work collaboratively with state/local Health Department TB program (and correctional facility staff)
- Provide patient education
  - Signs and symptoms of active TB
  - Treatment completion
- Consult the TB experts when needed! 1-800-4TB-INFO

Every Case of TB

was once a contact!

TB/HIV Resources

- TB/HIV Pocket card: https://sntc.medicine.ufl.edu/home/index#/products
- 2016 Treatment of Drug-Susceptible TB. Clin Infect Dis available at: http://cid.oxfordjournals.org/content/early/2016/07/20/cid.ciw376.full
- Guidelines for the prevention and treatment of opportunistic infections in HIV-infected adults and adolescents: Available at http://aidsinfo.nih.gov/contentfiles/lvguidelines/adult_oi.pdf
- CDC. Managing Drug Interactions in the Treatment of HIV-Related Tuberculosis. 2014. Available from URL: http://www.cdc.gov/tb/publications/guidelines/tb_hiv_drugs/pdf/tbhiv.pdf
- TB Prevention in the HIV-infected Patient: Screening, Testing, and Treatment of Latent TB Infection (2011), http://www.currytbcenter.ucsf.edu/products/view/tb-prevention-hiv-infected-patientscreening-testing-and-treatment-latent-tb-infection

TB/HIV Resources

- Limiting Liver Toxicity in the HIV-Positive Patient with LTBI http://www.heartlandntbc.org/assets/products/limiting_liver_toxicity_in_the_HIV_positive_patient_with_ltbi.pdf
- Special Considerations for Treatment of TB Disease in Persons Infected with HIV http://www.cdc.gov/tb/publications/factsheets/treatment/treatmenthivpositive.htm
- TB and HIV/AIDS, http://www.cdc.gov/tb/publications/factseries/tbandhiv_eng.htm
- Recommendations for HIV Screening in Tuberculosis (TB) Clinics http://www.cdc.gov/tb/publications/factsheets/testing/hivscreening.htm
- Treatment of Drug-Susceptible TB Disease in HIV-Infected Persons, http://www.cdc.gov/tb/publications/factsheets/treatment/treatmenthivpositive.htm
- Prevention and Control of Tuberculosis in Correctional and Detention Facilities (2006). https://www.cdc.gov/mmwr/PDF/rr/rr4508.pdf

Questions & Answers