TB in the Correctional Setting
Collinsville, Illinois
April 22, 2009

Tuberculosis, HIV, and Corrections
James B. McAuley, MD, MPH
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James B. McAuley, MD MPH
Rush University
U.S. Correctional System

- In February 2000 the US reached a benchmark of 2 MILLION individuals in its prisons and jails. By year end 2007 – 2,318,904
- Approximately 10 million people are booked into the 3,365 US jails over the course of the year.
- In 2007 7.3 million people in jail, prison, or on parole at year end – 3.2% of US population (1 in 31 adults)
- 1 in 198 Americans were sentenced for greater than one year in 2007.

Data from Bureau of Justice Statistics

Adult Incarceration Rate US
Definitions

- Police Lock Ups
- Jails (detention)
- Prisons – Federal, State, Military, ICE

Importance of Corrections in Public Health

- Jail may be primary source of health care for detainees (public medicine)
- Population admitted to jails and prisons at high risk for many health problems (disadvantaged)
- Jail-based interventions can have high public health impact (research needed)
- Jails and prisons may serve as amplifiers of important infectious diseases (research needed)
Primary Source of Medical Care
Female Detainees CCJ - 1997

Infectious Disease Burden among Released Inmates, United States, 1996

<table>
<thead>
<tr>
<th>Infection/Disease</th>
<th>Infected US Population</th>
<th>Infected Inmates Released</th>
<th>% of Total Infected Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>229,000</td>
<td>39,000</td>
<td>17</td>
</tr>
<tr>
<td>HIV</td>
<td>750,000</td>
<td>98 –145,000</td>
<td>13-19</td>
</tr>
<tr>
<td>HBV (chronic)</td>
<td>1.0-1.25 million</td>
<td>155,000</td>
<td>12-15</td>
</tr>
<tr>
<td>HCV</td>
<td>4.5 million</td>
<td>1.3-1.4 million</td>
<td>29-32</td>
</tr>
<tr>
<td>TB</td>
<td>34,000</td>
<td>12,000</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: NCCHC, Hammel, Greifinger et al. unpublished data
Prison populations: Convergence of risk groups

- Male
- Young age groups
- High unemployment rate/low income persons
- Low education level
- High rates drug abuse and alcoholism
- High rates of HIV & STDs
- High rates of mental illness and homelessness
- Frequent close contacts and recent exposure to active TB cases
Reported TB Cases*  
United States, 1982–2007

*Updated as of April 23, 2008.

"You probably came in contact with someone who has an infectious smile."
Tuberculosis in Jails & Prisons

- 1992-3 national survey:
  - TB disease - 121/100,000,
  - TB infection - 10% in jails and prisons
  - (4% US population – NHANES)
- 43 current cases among officers (2 MDR)
- Most programs had “high” compliance with CDC guidelines

Tuberculosis in Correctional Facilities, NIJ/CDC, 1994
Tuberculosis in a Tennessee Jail

- Over a 3 year period active TB was diagnosed in 38 detainees/inmates and 5 guards.
- 43% of the community TB cases had been incarcerated.
- 2700 persons in jail on a given day, 159 admitted per day, 173,000 passed through during the 3 year period.
- Limited screening (two questions, TST on day 10)


Cook County – TB/Jail registry match

- 1995-2000 (6 years) of jail detainees matched to 1996-2001 TB registry:
  - 163 active cases had passed through CCJ, but not active at the time.
TB Morbidity, CCJ and Chicago, 1992-2001
TB Exposure Episodes
Cook County Jail, 1994-2000

Episodes

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
"Here it is, Arturo Constanza. Are you still at the same address?"
TB case detection: when to screen?

- **Entry screening**
  - Keep TB out—new prevalent cases
  - Identify persons already diagnosed/on therapy

- **Screening of respiratory symptomatics**
  - Identify new incident cases
  - Screening of their close contacts

- **Mass screening** in uncontrolled situations to identify all prevalent cases
  - Performed when entry/screening inadequate
  - Special outbreak situations
### TB in Prisons: Summary of Studies

<table>
<thead>
<tr>
<th>Study site</th>
<th>Type</th>
<th>No. inmates</th>
<th>Time</th>
<th>Method</th>
<th>Results (per 100K)</th>
<th>Previous DX</th>
<th>HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>Intake</td>
<td>126,608</td>
<td>1992-4</td>
<td>CXR</td>
<td>68</td>
<td>52%</td>
<td>29%</td>
</tr>
<tr>
<td>NYC-M</td>
<td>Intake</td>
<td>4172</td>
<td>1993</td>
<td>CXR</td>
<td>767</td>
<td>78%</td>
<td>29%</td>
</tr>
<tr>
<td>NYC-RJ</td>
<td>Nest- cc</td>
<td>2636</td>
<td>1985-92</td>
<td>TST</td>
<td>500</td>
<td>N/A</td>
<td>16%</td>
</tr>
<tr>
<td>Malawi</td>
<td>x-sect</td>
<td>1315</td>
<td>1996</td>
<td>Smear</td>
<td>5100</td>
<td>30%</td>
<td>73%</td>
</tr>
<tr>
<td>Iv Coast</td>
<td>Prospect</td>
<td>1861</td>
<td>1990-2</td>
<td>Smear</td>
<td>5800</td>
<td>N/A</td>
<td>30%</td>
</tr>
<tr>
<td>Georgia</td>
<td>x-sect</td>
<td>7473</td>
<td>1997-8</td>
<td>Sm/CXR</td>
<td>5995</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Prison Screening for Different At-Risk Populations

<table>
<thead>
<tr>
<th>TB (high)</th>
<th>HIV (low-mod)</th>
<th>Sputum</th>
<th>PPD</th>
<th>Clinical</th>
<th>CXR</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ (Russia)</td>
<td>$</td>
<td></td>
<td>X</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>TB (high)</td>
<td>HIV (high)</td>
<td></td>
<td></td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>$ (Africa)</td>
<td>$</td>
<td></td>
<td></td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>TB (low)</td>
<td>HIV (low)</td>
<td></td>
<td>X</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>$ (US-rural)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TB (high)</td>
<td>HIV (high)</td>
<td></td>
<td>X</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>$ (US-city)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

- Jails and prisons are a significant source of medical care (public medicine) and public health intervention for the most marginalized in society.
- Effective strategies to address these problems are beginning to emerge.
- Intervention in jails and prisons will likely lead to better health of the whole community.

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**Estimated TB incidence vs HIV prevalence**

![Graph showing the relationship between estimated TB incidence and HIV prevalence](image-url)
Estimated HIV Coinfection in Persons Reported with TB, United States, 1993–2006*

*Updated as of April 23, 2008.

Note: Minimum estimates based on reported HIV-positive status among all TB cases in the age group.
The Effects of TB on HIV Progression

- TB increases HIV progression
- Dually infected persons often have very high HIV viral loads
- Immuno-suppression progresses more quickly, and survival may be shorter despite successful treatment of TB
- Persons who were co-infected have a shorter survival period than persons with HIV who never had TB disease

The Effects of Immune Suppression on TB Progression

- HIV+ person has a greater risk of reactivation of latent TB infection (LTBI)
- HIV+ person is more likely to progress to TB disease following infection
- HIV+ person has a high risk of becoming sick again after treatment
- HIV+ person with LTBI has a 5-10% annual risk of developing active TB (versus 10% lifetime risk among HIV-negative persons)

The Effects of HAART on TB Progression

- Highly Active Anti-retroviral Therapy (HAART) alone can reduce the risk of latent TB infection progression to active TB disease by as much as 80%–92%.


HIV Disease Progression on TB Treatment with and without HAART

<table>
<thead>
<tr>
<th>Years of enrollment</th>
<th>TBTC 23 ARV</th>
<th>CPCRA/ACTG No ARV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline CD4 cell count</td>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>Use of HAART during TB treatment</td>
<td>80%</td>
<td>0</td>
</tr>
<tr>
<td>Death within 1 year of start of TB therapy</td>
<td>4.5%</td>
<td>20%</td>
</tr>
<tr>
<td>Death or new OI within 1 year of TB therapy start</td>
<td>15.7%</td>
<td>38.9%</td>
</tr>
</tbody>
</table>

Burman et al, CROI 2003, Clin Infect Dis
Clinical Presentation of HIV-related TB

- **CD4 counts >350**
  - Disease usually limited to the lungs
  - Often presents like TB in HIV-uninfected persons
  - “typical” chest X-ray findings with upper lobe infiltrates with or without cavities

- **CD4 counts <50-100**
  - Extrapulmonary disease is common
  - Disseminated disease with high fevers and rapid progression is seen
  - Chest X-ray findings often look like “primary TB” with adenopathy, effusions, interstitial or miliary
Pulmonary TB in Early and Late HIV Infection

<table>
<thead>
<tr>
<th>Features of pulmonary TB</th>
<th>Early Stage HIV infection</th>
<th>Late Stage HIV infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical picture</td>
<td>often resembles post-primary PTB</td>
<td>often resembles primary PTB</td>
</tr>
<tr>
<td>Sputum smear result</td>
<td>often positive</td>
<td>more likely to be negative</td>
</tr>
<tr>
<td>Chest X-ray appearance</td>
<td>upper lobe infiltrates with or without cavitation</td>
<td>infiltrates any lung zone, no cavitation; miliary; normal</td>
</tr>
</tbody>
</table>

Smear-negative Pulmonary TB

- TB sputum culture is the gold standard for TB diagnosis

- If sputum smears are negative:
  - Obtain sputum culture if available
  - Culture will improve the quality of care and assist the confirmation of the diagnosis
  - A CXR can help with earlier diagnosis, i.e., if findings show intrathoracic adenopathy, miliary changes, or upper lobe infiltrates
Diagnosing TB in Persons with HIV

- In HIV-positive or suspect patients:
  - 3 sputum samples for microscopy are indicated for any symptoms of TB regardless of duration or sputum characteristics
  - Fever and weight loss can be important symptoms
  - If sputum smear is +, a chest X-ray is not required to confirm the diagnosis PTB

Post - Primary Tuberculosis – “Re-activation”

- Air space consolidation
- Cavitation, cavitary nodule
- Upper lung zone distribution
- Endobronchial pattern of spread
Primary Pulmonary Tuberculosis

- **Distribution**: Slight upper lobe predominance but any lobe can be involved
- Intrathoracic adenopathy, hilar and paratracheal
- Cavitation is uncommon (<10%)
- Miliary pattern

HIV & TB: Adenitis
Understand the Differential Diagnosis of Smear-Negative PTB in HIV Patients

- Always reassess the patient for conditions that may be mistaken for PTB, including non-infectious conditions.
- Acute bacterial pneumonia is common in HIV patients (short symptom history usually differentiates pneumonia from PTB).
- Consider PCP:
  - In a seriously ill patient with dry cough, severe dyspnoea and bilateral diffuse infiltrates.
  - Concomitant treatment of TB and PCP may be lifesaving.
  - PCP almost never produces a pleural effusion.

Pattern of TB and Survival of Patients with HIV-related TB

Extra-pulmonary TB

- More strongly HIV-related than PTB
  - If combined extra-pulmonary TB (EPTB) and PTB, HIV infection is even more likely
- Patients with HIV and EPTB are at risk for disseminated disease and rapid clinical deterioration

Extra-pulmonary TB

- If a patient has EPTB, look also for PTB with sputum smears - many patients with EPTB, however, do not have coexisting PTB
- Forms of EPTB commonly seen in patients with HIV-associated TB include:
  - Lymphadenopathy
  - Pleural effusion
  - Abdominal
  - Pericardial
  - Miliary TB
  - Meningitis
Extra-pulmonary TB

- Presentation
  - Constitutional symptoms (fever, night sweats, weight loss)
  - Local features related to the site of the disease

- Diagnostic tools
  - X-rays, ultrasound, biopsy

- Diagnosis may be presumptive provided other conditions are excluded

- Note: disseminated TB may have no localizing signs, may present with anemia, or low platelets

TB Treatment

Anti-TB regimens in an HIV-positive patient follow the same principles as in HIV-negative patients
TB Treatment

- **Cautions:**
  - Extensive disease
  - Culture positive at 2 months
  - Daily during initial phase then thrice weekly or daily

TB/HIV – Starting ART

- All patients with tuberculosis and HIV infection should be evaluated to determine if antiretroviral therapy (ART) is indicated during the course of treatment for tuberculosis

- Appropriate arrangements for access to antiretroviral drugs should be made for patients who meet indications for treatment
TB/HIV – Starting ART

- Given the complexity of co-administration of antituberculosis treatment and ART, consultation with a physician who is expert in this area is recommended before initiation of concurrent treatment for TB and HIV infection, regardless of which disease appeared first.
- However, initiation of treatment for TB should not be delayed.
- Patients with TB and HIV infection should also receive cotrimoxazole as prophylaxis for other infections.

How Can Outcomes of HIV-Related TB be Improved?

- Appropriate treatment of TB
- Assure adherence with TB treatment through directly observed therapy (DOT)
- Co-trimoxazole prophylaxis/preventive therapy (CPT)
- Initiate Highly Active Anti-Retroviral Treatment (HAART)
Co-trimoxazole Preventative Therapy (CPT)

- Reduces the risk of:
  - *Pneumocystis jiroveci* pneumonia (PCP)
  - Toxoplasma
  - Bacterial infections

- Reduces deaths and hospitalizations

- Also effective against:
  - Pneumococcus, salmonella, nocardia

CPT

- **All HIV-positive TB patients** *should receive CPT* regardless of the CD4 count, for at least the duration of anti-TB treatment.

- Extend CPT beyond the end of anti-TB treatment if the CD4 cell count is less than 200 cells/mm³
Case Study

- A 29 yo incarcerated woman comes to see you because of fever and marked dyspnea. Her boyfriend had died of AIDS 2 years ago, but she has never sought evaluation.
- You order sputum times 3 for AFB and a chest X-ray
- You order an HIV test

Case Study

- The initial chest X-ray is interpreted as normal
- 3 smears are AFB negative
- Her HIV test is + and the CD4 count is 26
- She remains febrile and short of breath (SOB)

Q1: What would you do?
Case Study

- Empiric trial of PCP and CAP treatment started
- 5 days later she is much worse
- A repeat X-ray now shows diffuse reticular-nodular infiltrates throughout the lungs, with a miliary pattern

Q2: What is your next step?
Q3: How would you classify this patient and what treatment category?

Case Study

- Patient is started on a standard anti-TB treatment regimen while sputum cultures pending
- She gradually improves. She continues cotrimoxazole in preventive dosage and ART is started
- Sputum culture results are available after 4 weeks and are positive for *M. tuberculosis* complex
Lessons Learned

- Knowing HIV status allows introduction of other life-saving interventions for HIV + TB patients
- A chest X-ray is not necessary to diagnose TB if the smear is positive
- Smear negative TB is common in advanced HIV disease and the diagnosis can be difficult
- In the severely ill HIV + patient who is failing a trial of PCP and Pneumonia therapy, empiric anti-TB therapy is indicated even if AFB smear negative

Lessons Learned

- A chest X-ray can be useful in the workup of smear negative patients with HIV
- Empiric treatment for TB can be life-saving in severely ill HIV patients who do not respond to treatment for other infections
- Sputum culture will assist in confirming the diagnosis of TB and can improve care
Issues in Using HAART During TB Therapy

- Identification of patients who will benefit from antiretroviral therapy
- Drug-drug interactions
- Immune reconstitution events
- Overlapping ARV and TB medicine side effect
- Adherence with multi-drug therapy for two diseases
- Coordinating care between TB and HIV care providers

Treatment of TB for HIV-Positive Persons

- Rifampin-based regimens generally recommended for persons
  - Who have not started antiretroviral therapy
  - For whom rifampin-incompatible PIs or NNRTI-based regimens are not essential
- Initial treatment phase should consist of:
  - Isoniazid (INH)
  - Rifampin (RIF)
  - Pyrazinamide (PZA)
  - Ethambutol (EMB)
- RIF may be used with some PIs and NNRTIs
Treatment of TB for HIV-Positive Persons

- For patients receiving PIs or NNRTIs, initial treatment phase may consist of:
  - Isoniazid (INH)
  - Rifabutin (RFB)
  - Pyrazinamide (PZA)
  - Ethambutol (EMB)
- An alternative non-rifamycin regimen includes INH, EMB, PZA, and streptomycin (SM) but is not generally recommended.

Treatment of TB for HIV-Positive Persons

- The continuation phase of treatment should be:
  - Isoniazid and rifampin for 4 months
  - Isoniazid and ethambutol for 6 months can be used but is associated with higher rates of failure and relapse in HIV-positive persons.
Rifampin Decreases Blood Levels of Nevirapine and Efavirenz

<table>
<thead>
<tr>
<th>NNRTI</th>
<th>Effect of rifampin on NNRTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nevirapine (NVP)</td>
<td>↓ 37-58%</td>
</tr>
<tr>
<td>Efavirenz (EFV)</td>
<td>↓ 13-26%</td>
</tr>
</tbody>
</table>

Rifampin Markedly Decreases Blood Levels of all PIs

<table>
<thead>
<tr>
<th>Protease Inhibitor</th>
<th>Effect of rifampin on PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saquinavir</td>
<td>↓ by 80%</td>
</tr>
<tr>
<td>Ritonavir</td>
<td>↓ by 35%</td>
</tr>
<tr>
<td>Indinavir</td>
<td>↓ by 90%</td>
</tr>
<tr>
<td>Nelfinavir</td>
<td>↓ by 82%</td>
</tr>
<tr>
<td>Amprenavir</td>
<td>↓ by 81%</td>
</tr>
<tr>
<td>Lopinavir/ritonavir</td>
<td>↓ by 75%</td>
</tr>
</tbody>
</table>
HAART and Rifampin-Based TB Therapy

- Recommended regimen: **efavirenz plus 2 nucleosides (higher dose EFV)**
  - Use EFV for adults and children >3 years old
  - Avoid 1st trimester of pregnancy

- Choice of nucleosides
  - Usual adult first line therapy: zidovudine + lamivudine (AZT/3TC)
  - Atripla – tenofovir/emtracibine/efavirenz

Risk Factors for TB Treatment Failure or Relapse in Studies of HIV-Related TB

- CPCRA/ACTG study - low CD4 cell count
- TBTC Study 22 - low CD4 cell count, extrapulmonary involvement, azole use, younger age
- TBTC Study 23 - low CD4 cell count
- Baltimore cohort - low CD4 cell count
Treatment Options: ART During Rifampin-Based TB Therapy

- Other options:
  - “Triple NRTI” = Abacavir or tenofovir plus 2 NRTIs
    - Not as potent as other options, but no drug interactions
  - Nevirapine (NVP) plus 2 NRTIs
    - Some successful clinical experience in Spain
    - Persistent worry about low blood levels
    - Some suggest increasing NVP to 300 mg twice-daily

When to Start ART During TB Therapy?

- HIV-infected TB patients should be evaluated for ART immediately
  - CD4 ≤ 200 - start ART between 2-8 weeks after start of anti-TB therapy
  - CD4 > 200 but < 350 - start ART 8 weeks after start of anti-TB therapy
  - CD4 ≥ 350 - defer ART but re-evaluate at 8 wks and at end of anti-TB therapy

- HIV-infected patients already on ARVs who develop TB should begin anti-TB meds immediately
Overlapping Drug Toxicity Profiles: Antituberculosis and Antiretroviral Drugs

<table>
<thead>
<tr>
<th>Side effect</th>
<th>Anti-TB</th>
<th>Anti-HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rash</td>
<td>PZA, RIF</td>
<td>NVP, EFV, ABC</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>INH, PZA</td>
<td>AZT, AMP, IDV</td>
</tr>
<tr>
<td>↑ AST</td>
<td>INH, PZA, RIF</td>
<td>NVP, IDV, Hep C</td>
</tr>
<tr>
<td>↓ WBC</td>
<td>RBT</td>
<td>AZT</td>
</tr>
</tbody>
</table>

Immune Reconstitution Syndrome

- Also called Immune Reconstitution Inflammatory Syndrome (IRIS)
- “A strong inflammatory response to a pre-existing infection or condition by an immune system that has been invigorated by the recent initiation of HAART.”
- TB-related IRIS can be associated with significant morbidity and mortality
- May require use of corticosteroids
Examples of Severe IRIS Reactions

- Enlarging adenopathy that compromises function (airway, GI tract)
- Expanding CNS lesion
- Acute respiratory failure
- Acute adrenal insufficiency
- Bowel perforation

Factors Associated With IRIS Worsening

<table>
<thead>
<tr>
<th></th>
<th>Paradoxical worsening (n=6)</th>
<th>No paradoxical worsening (n=76)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age, yr</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>Male (%)</td>
<td>83%</td>
<td>70%</td>
</tr>
<tr>
<td>Pulmonary + extrapulmonary TB</td>
<td>83%</td>
<td>24%</td>
</tr>
<tr>
<td>Median initial CD4 cell count</td>
<td>69</td>
<td>154</td>
</tr>
</tbody>
</table>

*Chest 2001; 120:193-7*
### Characteristics of Patients Having Paradoxical Reactions vs. Those Not Having Paradoxical Reactions

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Paradoxical reaction (n = 6)</th>
<th>No paradoxical reaction (n = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial CD4 cell count</td>
<td>46.5 (30-312)</td>
<td>35 (18-225)</td>
</tr>
<tr>
<td>HIV RNA log_{10} copies/ml</td>
<td>6.1 (6.0-6.3)</td>
<td>5.1 (5.0-5.7)</td>
</tr>
<tr>
<td>Change in HIV RNA after HAART</td>
<td>-2.4 (-2.1- -4.1)</td>
<td>0.4 (0.2- -2.8)</td>
</tr>
<tr>
<td>Time from TB therapy to HAART, days</td>
<td>22.5 (0-60)</td>
<td>110 (0-375)</td>
</tr>
<tr>
<td>Time from TB therapy to HAART &lt;60 days</td>
<td>100%</td>
<td>18%</td>
</tr>
</tbody>
</table>

*Arch Intern Med 2002; 162:97-99*

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### Monitoring

- **Efficacy**
  - Follow-up sputum examination as per program protocol
  - Improvement in cough, fever, and weight gain

- **Side effects**
  - Observe for rash, symptoms/signs of hepatitis, anemia, peripheral neuropathy
Coordination of Services

- TB and HIV care services should be coordinated
- TB staff need to be aware: many HIV-positive TB patients develop other HIV-related illnesses during TB treatment and many HIV-positive persons or AIDS patients develop TB during HIV care or under treatment with ART

TB/HIV Collaborative Activities

- Coordination needed between HIV and TB programs and clinics to:
  - Prevent HIV among TB patients
  - Prevent TB among HIV patients
  - Test patients and contacts for both conditions
  - Coordinate therapy
    - Avoid drug interactions
    - Maximize adherence with DOT/treatment supporters
Summary

- TB increases HIV progression
- HIV increases TB progression
- Standard TB treatment usually cures TB in TB/HIV, length of therapy – 6-9 months (esp. if CD4 < 100)
- Despite successful TB treatment, mortality among TB/HIV patients remains high
- All HIV/TB patients qualify for cotrimoxazole prophylaxis and it improves survival

Summary

- HAART for eligible patients greatly improves survival
- Different HAART regimens may be required because of drug interactions with rifampin
- Programmatic synergy between the TB and HIV programs is needed to improve treatment of both conditions and will reduce disease and death