

**Recommendations to Prevent and Treat TB among People Living with HIV
PEPFAR Scientific Advisory Board (SAB)**

Submitted by the TB/HIV Expert Working Group (EWG) to the SAB

Approved by the SAB on June 28, 2016

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Broad Questions posed to the TB/HIV EWG:

1. What is needed to ensure that all HIV-infected TB patients benefit from timely ART and those without TB benefit from preventive therapy?
2. How do we need to re-imagine service delivery and partnerships to reach those left behind and most vulnerable to TB/HIV (prisoners, migrant workers, key populations, (KPs) for HIV, children, healthcare workers)?
3. How can we use global data (TB, HIV, TB/HIV, other) to most effectively target resources—e.g. what are TB prevalence studies telling us about the unmet need for TB/HIV services? How to better find and retain TB/HIV cases in large urban settings? What are the implications of PEPFAR's pivots on supporting the TB/HIV response?
4. How can we collaborate more effectively to ensure better coordination of laboratory investments for TB diagnosis and HIV services?

Process Overview:

The PEPFAR Scientific Advisory Board (SAB) commissioned the TB/HIV Expert Working Group (EWG) after its last meeting in fall 2015. Between February and April 2016, the Working Group held over four teleconferences and developed a consensus set of recommendations to address the questions posed to the EWG by the Office of the Global AIDS Coordinator. The EWG presented draft recommendations to the SAB on April 19, 2016. This draft incorporates responses to comments and insights of the SAB and EWG amendments to the subsequently circulated draft report.

Summary of EWG Recommendations for PEPFAR to Prevent and Treat TB among People Living with HIV

- A. Critical gaps and missed opportunities
- B. Early ART, isoniazid preventive therapy (IPT), and Combined ART, IPT and cotrimoxazole (CTX)
- C. Early diagnosis and treatment of tuberculosis (TB)
- D. Infection Control and Considerations for Health Care Workers (HCW), Prisoners, Miners, Drug Users, Children, Infants, and Pregnant Women
- E. Use of Global Data, Joint TB/HIV Programming, Coordination of Lab/HIV Services

A. Some critical gaps and missed opportunities

1. Only 1/3 of TB cases globally are identified or reported.
2. Only half of the estimated persons living with HIV (PLHIV) with TB disease are identified
3. HIV testing coverage for presumed TB and TB patients is poor.
4. Less than 1/3 of the estimated of patients co-infected with HIV and TB cases received antiretroviral therapy (ART).
5. There is a very low uptake of the TB and cotrimoxazole preventive therapy.
6. Poor access to quality care and limited follow-up continue to cause unnecessary morbidity and mortality among prisoners (between prisons and post-release), drug users, miners, refugees, migrants, health care workers, pregnant women and infants and others identified to be at greater risk of TB and HIV.
7. There is poor implementation/monitoring of TB infection control activities.
8. Separate programming and lack of coordination and communication of HIV and TB activities are major issues that must be corrected.
9. There are inadequate data reporting and monitoring and evaluation systems for measuring the impact of TB/HIV collaborative activities.

B. Early antiretroviral therapy (ART), isoniazid prevention therapy (IPT) and combined ART, IPT and cotrimoxazole therapy (CTX)

Antiretroviral therapy (ART) is the main intervention needed to reduce morbidity and mortality in people living with HIV. In most resource-limited countries, especially in sub-Saharan Africa, ART is started too late with considerable early morbidity and mortality (1-3). The recently reported START study confirms that early ART reduced the risk of TB by 71%. Although there

is an associated statistically significant higher incidence of immune response inflammatory syndrome (IRIS) in the early ART group (4-12), WHO recommends ART should be started in all TB patients living with HIV as soon as possible within the first 8 weeks of TB treatment regardless of CD4 count. HIV-positive TB patients with profound immunosuppression (CD4 counts < 50 cells/mm³) except those with TB meningitis should receive ART within the first two weeks of initiating TB treatment (13). Rates of TB in those on ART continue to be at least 10-fold greater than in HIV-uninfected individuals. The combination of ART and isoniazid preventive therapy (IPT) has been known to reduce the risk of TB further than ART alone in populations with both early and advanced HIV disease (14-17). It is important to rule out active TB before one can place symptomatic HIV-infected patients on IPT. Chest radiography is a useful tool to rule out active TB in such patients. Despite longstanding recommendations from the WHO, uptake of IPT has been abysmally low. Further scale-up in the context of universal ART is essential.

In addition to IPT, there is now strong evidence that cotrimoxazole preventive therapy (CPT) initiated before or with ART regardless of CD4 count also reduces morbidity and mortality with benefits continuing indefinitely, and this has led WHO to update and revise its recommendations on CPT (18,19). Unfortunately, as with IPT, the evidence suggests that CPT is greatly underused.

Recommendation 1: Immediate ART for all people with HIV. Implement WHO's new recommendation on "Treat All" which emphasizes that all people living with HIV be started on ART "regardless of clinical stage or CD4 cell count". This will greatly reduce morbidity and mortality and the risk of TB. ART should be started as soon as possible (within 2-4 weeks) after TB treatment according to WHO guidelines. OGAC should work with host countries, WHO, and other stakeholders to incorporate strategies to enhance case finding for TB in HIV-positive persons and of HIV in persons with TB disease as starting points to catalyze this critical recommendation.

Recommendation 2: IPT and CTX preventive therapy for all HIV+ people without TB disease. Provide isoniazid (INH) preventive therapy and cotrimoxazole (CTX) preventive therapy with ART to all people with HIV and without TB disease to reduce the risk of TB and mortality. We favor the scale up of a single pill containing INH and CTX (20) for all persons in whom joint prophylaxis is indicated according to WHO guidelines, while using IPT alone for 36 months in asymptomatic HIV-infected persons with CD4 counts $>350/\text{mm}^3$ and CTX along with anti-TB therapy in those with active TB disease (13, 19). OGAC should encourage research to explore the use of shorter acting rifamycin-containing preventive regimens (21), and incorporate their use into program settings when the data permit.

C. Early diagnosis and treatment of tuberculosis (TB)

In patients co-infected with HIV and TB, active TB disease must be ruled out and if found, TB treatment must be started promptly before ART can be initiated. Hence, there is an urgent need to speed up TB diagnostic algorithms and TB treatment. Due to resource limitations, most high-TB-prevalence countries are still using for TB diagnosis smear microscopy with a low sensitivity with a detection threshold of 5,000-10,000 bacilli per milliliter of specimen vs. 10-100 organisms

needed for culture. Since the bacillary burden in sputum is lower in HIV-infected individuals, AFB smear is less sensitive in this important group of TB patients (22-25). WHO recommends collecting only 2 sputum samples since the diagnostic yield of an AFB smear for the third sample is low to avoid laboratory overburden and false results (26, 27). Recently, the WHO endorsed substitution of smear microscopy for one of the collected samples with the Xpert MTB/RIF assay (Cepheid, Sunnyvale, CA, USA), a PCR-based automated test, designed to simultaneously detect *Mycobacterium tuberculosis* (MTB) and resistance to rifampin (RIF) directly in clinical specimens in less than 2.5 hours (28). Because early morning sputum samples have superior diagnostic value compared to spot samples (29), only 1 single early morning sample per patient needs to be examined. Resistance to RIF is frequently accompanied by resistance to INH and is used as a surrogate marker for MDR-TB (30, 31). Furthermore, the WHO recommends treating patients infected with RIF mono-resistant strains with the same second-line antibiotics as MDR-TB patients (32). In a multi-center study that assessed adult patients at urban health centers in 6 developing countries, Xpert detected 90.3% of the culture-confirmed TB cases (vs 67.1% by smear microscopy), with high sensitivity even in co-infection with HIV (33-35). A new Xpert MTB/RIF Ultra assay appears to be even more sensitive than Xpert (LOD of 5 CFU/ml vs. 50 CFU/ml for Xpert) and could be as sensitive as liquid TB culture (36). Use of PCR-based assays has been shown to improve diagnostic sensitivity and turn-around time (TAT), with implications for faster initiation of treatment. What will really facilitate the start of TB treatment is GeneXpert Omni, a point-of-care Cepheid portable lightweight (2.2 pounds, 9 inches tall), machine, with presumably the same high quality PCR-based cartridge tests as the existing family of GeneXpert systems (37.)

Tests based on the detection of mycobacterial lipoarabinomannan (LAM) antigen in urine have emerged as another potential point-of-care test for TB and showed promising results in HIV-positive individuals with very advanced disease. Indeed, the LAM test improved mortality in HIV-infected patients (38-40) in a large randomized controlled trial. One of the most important findings is that survival appeared to be linked to early TB diagnosis and treatment in the LAM group compared to the non-LAM group. In spite of the low sensitivity (54.6%) (95% CI, 40.4-50.9) and specificity of the LAM test (88.7%) (95% CI, 86.3-90.7), WHO has recommended to use it for the diagnosis of active TB in HIV-positive adult in-patients with signs and symptoms of TB (pulmonary and/or extrapulmonary) and a CD4 cell count less than or equal to 100 cells/mm³, and people living with HIV who are seriously ill and in respiratory distress (regardless of CD4 count or if the CD4 count is unknown) (41). The continuous vigilance of health workers in suspecting TB among people living with HIV is extremely important to improve the long health service diagnosis delay and associated higher risk of death (42). While these new PCR diagnostic tests will take time for widespread implementation, it is possible to reduce considerably TB mortality in HIV-infected patients by judicious and aggressive use of presently available tests, particularly chest radiography when available and to initiate TB treatment promptly.

Recommendation 3: Diagnostic priorities to assure early diagnosis and early treatment of TB. The main goal is to diagnose early and treat both TB and HIV early. The sooner we start TB treatment the sooner it will be possible to start ART. While culture remains the gold standard, countries should use the diagnostic method (s) available at their health center or quickly refer patients to centers where the best diagnostic tests are available.

- We favor the use of **urine LAM** as a point-of-care TB diagnostic test for all HIV-infected adults admitted to medical wards who are seriously ill (“defined based on 4 danger signs: respiratory rate > 30/min, temperature > 39°C, heart rate > 120/min and unable to walk unaided” [41]) and/or with CD4<100/mm³ (41). This test should be carried out within 24 hours of admission. A positive test should allow referral and immediate start of anti-TB treatment. This will allow early diagnosis of TB in those most likely to die of TB and can be a major step in resource-limited countries to reduce HIV-associated TB deaths.
- For the same reason we support the evaluation and, when evidence permits, scale-up of the Cepheid **Xpert OMNI** point-of-care test. We also support the evaluation and implementation of the new generation highly sensitive Cepheid **Xpert Ultra** test, including in non-respiratory sampling such as stool; in young children as it could dramatically improve diagnostic yield and rapid detection of rifampicin resistance. The limitation of all PCR-based tests is their lower yield when using spot sputum compared to the favored early morning sputum resulting in a delay in diagnosis for some patients.
- **Chest radiography (CXR)** in contrast, when associated with clinical findings can identify quickly patients with probable TB and facilitate the provision of immediate same day TB treatment. CXR is also useful in the diagnosis of TB in children, as part of an algorithmic approach that includes careful history, symptoms and contact evaluation, and diagnostic testing. High quality CXR equipment and clinicians skilled at CXR interpretation are essential. PEPFAR should support use of mobile CXR services for decentralized TB screening efforts in poorly resourced TB and HIV endemic settings. Training on the use of CXR for pediatric TB diagnosis is critical.
- New simpler tests to diagnose latent TB infection (LTBI) are needed.
- All TB centers regardless of their size should be able to test for HIV and vice versa.
- All patients exposed to drug-resistant TB or who test positive for rpoB mutations with Xpert testing should have full drug susceptibility testing (DST) done to guide appropriate treatment for DR-TB.
- Research to define appropriate preventive therapy for household contacts of DR-TB patients is urgently needed.

D. Infection control and considerations for prisoners, miners, drug users, health care workers, infants, children, and pregnant women

Infection Control

Infection control measures must be put in place and enforced to prevent TB, particularly in vulnerable populations such as people living with HIV (PLHIV), health care workers (HCW), prisoners, miners, migrants, refugees, drug users, children, infants and pregnant women.

Infection control in health centers aims to prevent TB transmission primarily among PLHIV and HCWs. Nosocomial TB transmission to PLHIV is well documented (43, 44). The World Health Organization’s (WHO) 2013 *Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection* recommend decentralizing and integrating the provision of ART to TB clinics and offering ART and TB treatment and diagnostic services at a single point of care (45). This strategy has the potential to bring individuals with diagnosed and undiagnosed HIV in close proximity with individuals with undiagnosed and/or untreated TB, hence increasing

the risk of nosocomial TB transmission. At the GHESKIO Centers in Port-au-Prince, Haiti where voluntary counseling and testing is offered to over 30,000 new persons annually, one third of adults coming for HIV testing and presenting with chronic cough turned out to have active TB disease (46). Since 2001, such patients are prevented from reaching the waiting room, and screened immediately for TB. There is a huge opportunity at such centers to diagnose and treat patients with TB presenting with or without HIV coinfection when TB infection control measures are properly implemented and persons with suspected TB are rapidly screened.

In 2009, the WHO published Tuberculosis Infection Control (TBIC) guidelines that outlined evidence-based effective and affordable managerial, administrative, personal and environmental measures required to reduce the risk of TB transmission within hospitals and congregate settings (47). The targets suggested for global level implementation of TB infection control laid out in these guidelines were for 50% of countries by 2012 and all countries by 2013 to have: 1) Developed a national TB infection control plan 2) Set up national surveillance of TB disease among health workers 3) Assessed major healthcare facilities and congregate settings for TB infection control 4) Reported on the implementation of TB infection control. Rigorous implementation of these guidelines could minimize risk to PLHIV, but indicators recommended by the WHO for monitoring TBIC activities, however, are poorly reported. In 2012, only 82/207 (40%) countries and 16/41 (40%) of high TB/HIV burden countries) reported any data on infection control practices (48). In the 2015 revision of the WHO *Guide to monitoring and evaluation for collaborative TB/HIV activities*, a recommendation was made for two global and national TB/HIV indicators for TBIC: 1) The proportion of health-care facilities providing services for PLHIV that have infection control practices that include TB control. 2) Relative risk of TB among healthcare workers compared with the risk in general population (as a proxy measure of effectiveness of TBIC practices in healthcare provision) (49). In 2015 the WHO published a *Checklist for Periodic Evaluation of TB Infection Control in Health Care Facilities* to help facilitate efforts to track progress in TBIC implementation (50). Globally there is very poor surveillance of TB among healthcare workers. In 2012, only 68/217 (31%) of all reporting countries and 13/41 (30%) of high burden countries were able to report on the rate of TB among healthcare workers (51). Apart from low completeness for this indicator, countries lack standard systems for capturing these data, the data need to be adjusted and compared to national TB rates, and there may be under-reporting if healthcare workers seek TB care in other settings (such as the private sector) in which TB cases (or more specifically, TB cases in healthcare workers) are not notified. The TB Care 1 *Guide on monitoring TB incidence among HCWs* suggests that countries should analyze the reliability and coverage of TB disease incidence data among HCWs by periodically monitoring the percentage of HCWs who have had a documented TB screening (52). However, these data quality measures are not requested by WHO global reporting systems. The inclusion of TB in the International Labor Organization (ILO) list of occupational diseases in 2010 could be used to stimulate advocacy for establishing national legal frameworks for investigating, recording and notifying TB among HCWs (53). Guidance for setting up national or facility systems for monitoring TB among HCWs has been published by the ILO (54).

HCWs working on medical or TB wards, in emergency facilities and in the laboratory are at high risk of TB and this risk is exacerbated if infection control measures are inadequate (55, 56). Needle stick injuries and exposure to infected body fluids also place health care workers at

increased risk of HIV infection. HCWs living with HIV are especially vulnerable to infection and rapid disease progression if exposed to TB (57). HCWs are also at increased risk of exposure and development of drug-resistant TB (58). For HCWs, good policy directives for TBIC in health care facilities include managerial activities, administrative and environmental controls and personal protection. The key administrative components are to promptly identify people with TB symptoms, separate infectious patients from others, institute cough etiquette and respiratory hygiene and minimize the time spent in health care facilities. The most effective environmental controls are the least expensive, but often the least used, and include windows remaining open, adding windows and skylights and constructing outdoor waiting areas. The key personal protection components include HIV and TB testing of health care workers and ensuring that those HIV-positive do not work in high risk environments such as medical in-patient wards or TB clinics and that they have access to ART, IPT and CPT. All people working at places where healthcare is provided (whether employed, volunteering or in training) should be included in the same activities and measures for protection and care of HCWs.

Considerations for Prisoners and Miners

Prisoners have HIV and TB prevalence rates that are several times higher than in the general population (59, 60). Miners are at risk of both infections due to being away from families, being exposed to commercial sex, living and working closely together in dormitory type conditions and, for those working in ultra-deep mine shafts being exposed to silica dust (61). TB rates in South African gold miners, for example are among the highest in the world, and surveys on mining operations in South Africa have found HIV prevalence rates of between 15-25% (62). For prisoners and miners, there are a number of potential actions which could mitigate the risk of TB and HIV: a) structural approaches to reduce overcrowding, improve TB infection control, and provide adequate nutrition; b) screening for HIV and TB respectively for prisoners on entry to prison and during incarceration and for miners on taking up employment and if sick during their time of work ; c) providing HIV and TB treatment for both prisoners and miners with linkage of care of national HIV and TB programs respectively with the prison medical system and the mining health services. Ensuring condom availability is important for miners. Training, guidelines, medications, monitoring and supervision of the prison and mining systems are also additional steps.

Considerations for Children, Infants, and Pregnant Women

Children, infants and pregnant women are other populations vulnerable to TB. An estimated one million children <15 years developed TB in 2014 with case fatality of at least 10% (63). TB in children 0-14 years of age constitutes at least 10% of the total disease burden and is associated with considerable morbidity and mortality. Young, HIV-infected and malnourished children are at high risk of developing TB disease and severe forms of disease like TB meningitis, following recent exposure to *M. tuberculosis* (64), with BCG shortages exacerbating this risk. The paucibacillary nature of TB in children with its associated diagnostic challenges and limited emphasis on pediatric TB in public health programs have led to the exclusion of children from much needed TB and TB/HIV service delivery interventions that would improve case detection and outcomes. Young children with TB frequently present to child and maternal health services with malnutrition and acute respiratory infection and the diagnosis of TB is not considered. HIV-

infected pregnant women are at high risk of TB with high risk of poor outcome for mothers and infants (65); routine TB screening is not well-implemented in PMTCT programs. All vulnerable populations and especially PLHIV, and HCWs infected with HIV – as well as all those with TB disease – should be protected from stigma and discrimination.

Recommendation 4: Infection control in health centers. Create a formalized TB infection control policy and monitoring system to ensure that infection control measures are implemented and that in each medical facility a system is in place to record and report whether key health care workers such as clinicians, nurses, patient attendants, laboratory technicians, social workers and community health workers are getting TB and are linked to care and treatment and that fellow HCWs and close contacts have access to TB screening and preventive therapy.

Implement the 2015 revision of the WHO *Guide to monitoring and evaluation for collaborative TB/HIV activities* global and national TB/HIV indicators for TB infection control (TBIC): a) The proportion of health-care facilities providing services for persons living with HIV (PLHIV) that have infection control practices that include TB control; b) Relative risk of TB among healthcare workers compared with the risk in general population (as a proxy measure of effectiveness of TBIC practices in healthcare provision); for operational success at a minimum programs should ensure the availability of PPE for staff, surgical masks for patients, air flow patterns established in congregate settings with cross ventilation ensured; and 3) Establish regional and national champions for TBIC, on-site facility training combined with quality improvement assessments, and priority-based TBIC investments. Involving all stakeholders including National Program Managers (for HIV, TB, Infection Prevention and Control and/or Occupational Health Services) and advocating for health facilities to have TBIC measures in place, would result in substantial improvements in TBIC.

The TB Care 1 *Guide on monitoring TB incidence among HCWs* suggests that countries should analyze the reliability and coverage of TB disease incidence data among HCWs by periodically monitoring the percentage of HCWs who have had a documented TB screening.

Recommendation 5: Improve services for prisoners, miners, drug users, and health care workers. Provide HIV and TB screening and treatment for prisoners, miners, drug users, and health workers, and monitor linkage of care of national HIV and TB programs within the prison, mining, and general health services. Forge close links between the national program and the prison medical system to guarantee continuity of TB and HIV care during inter-facility transfer and on release from prison to ensure individual health, prevent the development of drug resistance, and reduce the risk of community transmission of infection. Avoid overcrowded conditions; provide condoms and sexually transmitted infection (STI) care, and document, link, and monitor service delivery for prisoners, miners, and health care workers to national HIV and TB programs.

Recommendation 6: Improve services for infants, children, and pregnant women

- Expand TB contact management activities in infants, children, and pregnant women.
- Expand and reinforce contact tracing of children of adult index cases as most likely source of infection to decrease the number of children that are missed or present very late.

- Child-and family friendly strategies to IPT delivery should be evaluated including the use of home-based IPT delivery and shorter rifampine based regimens including fixed dose child-friendly drug combinations. The optimal duration of IPT in HIV-infected children in high-burden settings should be evaluated through operational research. Appropriate IPT recording tools should be implemented to document contact management and IPT delivery in all vulnerable populations including children.
- Pediatric TB training modules for health-care workers (HCW) should be included in all maternal and child health programs. Antenatal and postnatal TB screening of pregnant women in PMTCT services should be strengthened and include the use of broader TB screening algorithms and IPT initiation in at-risk infants and pregnant women with appropriate safety monitoring. Ongoing supply of BCG should be ensured.
- TB testing should be used as an opportunity for HIV testing and linkages to ART care in children. Hospital-DOTS linkage should be implemented to improve continuity of care, treatment outcomes, and recording and reporting of TB (including MDR-TB) in children and other vulnerable groups. TB treatment registers should be implemented in every health facility to capture the burden of TB, including in children.
- Encourage the development and program evaluation of better TB diagnostic tests for infants and children. Develop better drug dosing information for severe forms of pediatric TB and TB in pregnancy by promoting inclusion of infants, children and pregnant women in research trials.
- Since we now have pediatric first-line therapy, fixed-dose combinations (FDCs), with the higher doses recommended by WHO, PEPFAR should encourage partners to implement these new pediatric TB FDCs in program settings.

Recommendation 7: Break down HIV- and TB-related stigma. Develop strategies to break down the stigma related to HIV and TB to encourage better protection and care for vulnerable groups, including HCWs living with HIV.

E. Use of global data, joint TB/HIV programming, coordination of lab/HIV services

Given the progress in scale-up of collaborative TB/HIV activities over the past decade, the focus on monitoring and evaluation is now transitioning to impact measurement and quality of delivery of care (66). New indicators that measure timing of ART and completion of IPT aim to improve the cascade of care and outcomes for people living with HIV. There is an urgent need to assist countries take up the new indicators set out in the 2015 revision of the *Guide to monitoring and evaluation for collaborative TB/HIV activities* (66) and measure the proportion of HIV positive TB patients started on ART within 2-8 weeks. There is a great need for joint TB and HIV Programming. Separate program management and service delivery particularly in high TB and HIV countries and weak collaboration and communication between TB and HIV programs are key challenges and prevents access to care and deter the scale-up of services. Separate documentation and reporting of implementation and progress in many settings results in low quality and inadequate patient follow-up and a weak cascade of care and little chance to learn from data to improve programming. In addition, the impact of the implementation of collaborative TB/HIV activities at a program level has not been measured to guide the response.

There is a need to ensure better communication and coordination among technical partners to ensure the provision of complementary not competitive technical assistance that is aligned to the country's priority areas (e.g. NSP, national guidelines). In many countries, the TB services are much more decentralized than the HIV and ART services. Such decentralization needs to be leveraged to expand access to HIV testing and ART delivery for patients with TB. In addition, HIV referral networks and services providing care and support for at risk or vulnerable populations, such as harm reduction programs, prisons, or mother and childcare services, are untapped opportunities in many settings for increasing access to prevention, treatment and care of HIV-associated TB. Joint TB and HIV programming should be strengthened including through the establishment of accountability mechanisms at national and sub-national levels. Joint TB and HIV program reviews of high TB and HIV burden countries should be promoted.

Recommendation 8: Improve targeted use of global data, joint programming of TB/HIV interventions, and coordination of clinical and laboratory services.

- Measure the impact of the implementation of collaborative TB/HIV activities at a program level to guide the response.
- Designate a ministry of health position to oversee both HIV and TB programs. It is also important to make sure that the directors of both programs work together, share resources, and do not duplicate effort.
- Strengthen joint TB and HIV programming including through the establishment of accountability mechanisms at national and sub-national levels. Joint TB and HIV program reviews of high TB and HIV burden countries should be promoted.
- Develop operational guidelines for effective care of patients with HIV/TB at both HIV and TB centers to make sure that both TB and HIV care are provided at one center (one-stop operation); and develop guidelines for services expected to be offered for HIV-TB patients at different HIV and TB centers to explicitly guide differentiated care within the host country's national HIV and TB programs.
- Create monitoring systems to measure the time from diagnosis of HIV in a TB patient to initiation of antiretroviral therapy (ART), and from HIV diagnosis to viral suppression (VS).
- Gaps in the TB/HIV cascade of care from TB screening to TB treatment and ART or preventive therapy need to be systematically identified and addressed.
- Use PEPFAR service delivery mapping systems to show colocation or separate locations of HIV and TB service delivery centers, including diagnostic laboratory system sites, to enable targeting of services to where the need is greatest and to avoid excessive site differentiation which would make it harder for persons to access high-quality collaborative TB/HIV services.
- OGAC should create a TB/HIV dashboard to present the results of the mapping exercise along with other program input, process, and impact data to demonstrate where TB/HIV collaborative services are being delivered effectively and where and how improvements are needed.
- OGAC and partners should accelerate TB/HIV services implementation and enhance accountability and reporting to optimize service delivery outcomes and impact.

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