AN OUNCE OF PREVENTION: TB INFECTION CONTROL STRATEGIES AND THE TB BASICS MODEL

OVERVIEW

No healthcare worker should become infected with tuberculosis (TB) by simply going to work, and no client should leave a health clinic with a new infection. Unfortunately, TB transmission has been well-documented in healthcare and other congregate settings, which can become amplification points for transmission if infection control measures are not rigorously and routinely applied. Such transmission affects both patients and healthcare workers (HCW), especially people living with HIV (PLHIV) who are particularly vulnerable to infection and progression from TB infection to disease. Largescale hospital acquired infection transmission in health facilities has been linked to the resurgence of drug-resistant TB in New York City in the 1990s and to outbreaks of extensively drug-resistant (XDR-TB) in South Africa.

Protecting the global healthcare workforce is not optional – to ensure effective public health programs, it is critical to ensure that HCW are not exposed to TB or other deadly infections during their routine work. The urgency of reducing TB transmission in healthcare and other congregate settings has also been intensified by the emergence of multidrug-resistant TB (MDR TB) strains, which are deadlier and costlier than drug-susceptible strains.

As the world has moved to universal antiretroviral treatment (ART), it is expected that a rise in PLHIV attending HIV care and treatment programs will occur. Acting with greater urgency to scale-up effective infection control interventions in this new era is key, otherwise the risk of exposing vulnerable individuals to TB will increase. TB is the leading cause of death among all PLHIV, even if they receive life-saving ART.

All facilities, particularly facilities providing HIV clinical services, must have rigorous infection control measures in place to: 1) protect HCW providing critical HIV testing, counseling, and treatment services; 2) ensure high-quality services and access to care for patients seeking HIV clinical services critical to meeting "90-90-90"[1]; and 3) reduce the likelihood of exposure to TB and other opportunistic infections that can put the lives of patients and HCW at risk.

The World Health Organization's (WHO) 2018 Global Tuberculosis Report, identified TB infection control in healthcare facilities, high transmission settings, and households as a core component of global TB control efforts.

CDC'S ROLE

The U.S. Centers for Disease Control and Prevention (CDC) has unique expertise in TB, airborne infection control, healthcare epidemiology, and engineering and facility design. This combination of public health assets allows CDC to work globally to:

- Provide technical assistance to ministries of health to design and implement effective infection control policies;
- Build capacity for infection control through multi-disciplinary trainings and mentorship programs;
- Design, implement, and systematically evaluate innovative strategies aimed at reducing TB transmission in institutional settings;
- Assist health facilities in establishing systems for monitoring disease transmission and incidence, especially among HCW;
- Conduct operational research to build an evidence base for improved strategies and practices for breaking the cycle of transmission; and
- Translate science and evidence-based policy into public health programs.

ACCOMPLISHMENTS / RESULTS

In 2013, CDC launched TB BASICS (Building and Strengthening Infection Control Strategies), a collaborative global TB initiative that uses innovative tools and a mentoring model to assist countries with high TB, MDR TB, and HIV burdens in assessing and improving TB infection-control practices in health facilities using a continuous quality improvement approach. To meet the objectives of TB BASICS implementation in TB designated hospitals, a three-phase approach is applied through workshops, implementation, and monitoring and evaluation. Expected outcomes of TB BASICS implemented in facilities will improve TB infection-control environments as well as encourage HCW to be more conscientious in promoting TB infection control.

[1] The stated goal of the "90-90-90" global targets is by 2020, (1) 90 percent of all PLHIV will know their HIV status; (2) 90 percent of all people with diagnosed HIV will receive sustained (ART; and (3) 90 percent of people receiving ART will have viral suppression

Since its launch, 15 countries on three continents – South America, Africa, and Asia – have started the TB BASICS initiatives. The tools used can be tailored to the local context and have been translated into eight languages. Implementation of the programs has resulted in a 76 percent improvement in TB infection control practices, with improvements detected as early as two months after initiation. An assessment of the sustainability of the TB BASICS initiative was assessed in Nigeria; 83 percent of facilities were still successfully implementing recommended TB infection-control measures two years after conclusion of the initiative. The program's accomplishments are an example of CDC's global reach and its ability to foster dissemination of science and support implementation of evidence-based public health policy. CDC is now pursuing further opportunities to scale up and incorporate this model into programmatic support platforms globally.

In addition to infection-control activities, CDC initiated pilot projects in Nigeria and Ethiopia to assess the feasibility, acceptability, and yield of models for providing routine TB screening for HCW. In both countries, a comprehensive health model is used, which also provides screening for other health conditions, including diabetes, hypertension, body mass index, and HIV. Overall acceptance of the screening program has been high, with >85 percent of HCW electing to participate in the voluntary program. Acceptance of HIV testing has been >90 percent. The rates of active TB among HCWs in Ethiopia and Nigeria were 2.5 (Nigeria) to 4.5 (Ethiopia) fold higher than that of the general population in the two countries, suggesting increased occupational risks.

Given the high yield of the TB-screening program, Nigeria is incorporating surveillance for TB among HCW into its national TB-reporting system, allowing the monitorization of HCW TB rates at the national and subnational levels. TB ratios will also be used to identify potential areas of needed improvement in infection-control efforts in the healthcare systems.

FUTURE EFFORTS

CDC's future TB infection-control activities include:

- Scaling-up and mainstreaming evidence-based infection-control interventions in all CDC-supported ART sites;
- Incorporating TB infection-control measures into Site Improvement Monitoring System and health facility assessments;
- Assisting ministries of health and healthcare facilities in establishing systems for monitoring for TB (infection and disease) among HCW, an occupational health and workplace safety issue and indicator of the effectiveness of TB infection control;
- Initiating TB infection-control programs in other high-risk congregate settings where there is an increased risk for TB transmission, such as prisons;
- Developing training programs in high-burden TB settings to help develop cadres of skilled infection-control personnel; and
- Using newer technologies to enhance disease detection and monitor program performance.

BENEFITS OF OUR WORK

The anticipated benefits of these efforts include:

- Reduction in TB-related morbidity and mortality among patients, HCW, and PLHIV;
- Programmatic scale-up of effective, sustainable TB infection-control programs for healthcare and other congregate settings; and
- Improved quality and safety in the delivery of healthcare services.