

*Manual for the Management of Binational  
Tuberculosis Patients*

*Protocol para el manejo de pacientes  
binacionales con tuberculosis*

Prepared by

**The Migrant Clinicians Network**

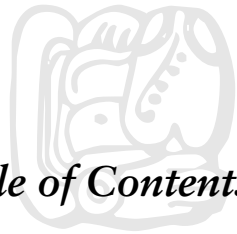


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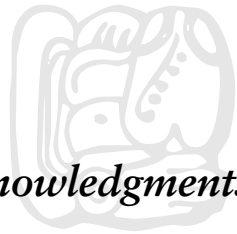




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In addition to original text, portions of several previously published and unpublished documents were translated, compiled, and edited for the production of this manual.



## *From our Medical Director*

Dear Colleagues:

During the preparation of this publication, a number of changes have occurred in the world of TB elimination and Mexico-U.S. cooperation. Several of these changes impacted the work of the staff at MCN charged with preparing the manual.

With the report from the Institute of Medicine, entitled *Ending Neglect*, the necessity of treating latent TB infection among migrants was highlighted. Those of us who provide TB treatment in rural parts of the U.S. have struggled with the differences in practice when faced with a migrant from the former Yugoslavia and a migrant from Mexico. Guidelines support the treatment of migrants who test positive for TB infection when arriving from Eastern Europe, for example. Yet the sheer volume of migrants from Mexico arriving in some communities has restricted the application of the same response.

The concern of maintaining migrants in treatment, for latent infection or active disease, while moving throughout the country for purposes of employment has been greatly reduced by the success of TB Net. Individuals with active disease identified in either country who move during the course of their treatment can also be assisted by Cure TB. The needs of those undergoing treatment who cross the U.S.-Mexico border regularly, often daily, have benefited from the border TB projects established between sister cities.

It is also important to note that Mexico revised its national guidelines for the prevention and treatment of TB (Norma Oficial Mexicana NOM-006-SSA2-1993, Para la prevención y control de la tuberculosis en la atención primaria a la salud). Shortly before the change in the Mexican regulations, The American Thoracic Society (ATS) and the Centers for Disease Control and Prevention (CDC) issued new guidelines for detection and treatment of latent infection.

Every attempt was made to list the full complement of resources available concerning binational and border tuberculosis care. As with most issues of concern, new sources of information are created frequently. While there are a number of excellent sources listed, I would

be remiss if I did not encourage all readers of this manual to contact the Migrant Clinicians Network with questions concerning TB and any other migrant health issue. As a national clinical network, MCN is uniquely qualified to address the impact of migration on health.

Thank you for your care and commitment to migrants. These men, women, and children come to this country with dreams, ambitions, and talents. Unfortunately, many suffer from the results of poverty, malnutrition, and unhealthy living conditions. Our individual ability to mitigate the effects of these conditions is so minute. All our efforts together offer the greatest hope.

*Una gota con ser  
con otra se hace aguacer*

Edward Zuroweste, MD  
Medical Director  
Migrant Clinicians Network







The border between the United States and Mexico represents the physical and cultural interface of two very large and distinct countries. The border is a political boundary but it also serves as a porous membrane through which large numbers of people and organisms pass. The presence of this large political boundary poses a number of difficulties for the control of infectious disease.

Tuberculosis (TB) is one of the infectious diseases of concern to binational public health officials. This concern is based on the fact that TB case rates tend to be higher on the border and among migrating populations. TB is a challenging disease to treat because of the long treatment period, which is complicated by mobile populations. And finally, binational TB control is complicated because of difference in the use of vaccine, diagnostic techniques, treatment regimens, and reporting systems between the two countries.

The impetus for this manual came out of a desire to provide information on some of the basic challenges facing those who manage binational TB patients. This manual is not intended to be a comprehensive resource for the diagnosis, treatment, and management of TB. Rather it is meant to be used in conjunction with other TB resources to address those issues particular to the management of binational populations. Our hope is that this manual will provide the reader with the context for binational care generally and then with more specific information needed to effectively diagnose, treat, and follow-up with binational patients.

**Chapter 1** addresses background information on the psychosocial impact of migration from Mexico to the United States. This chapter provides important contextual information about possible stressors and coping mechanisms used by people in the process of migration, which have a profound impact on how people interact with the healthcare system.

**Chapter 2** looks at the epidemiology of TB globally, nationally, and in the border region.

**Chapter 3** examines the challenges posed by TB from a political, economic, and social perspective. The issues raised in this chapter challenge us all to think about the large context in which TB occurs.

**Chapter 4** provides a side-by-side look at the official Mexican and U.S. TB protocols.

**Chapter 5** provides an overview of other key clinical issues related to binational TB care that are not addressed in the official protocols.

**Chapter 6** provides an overview of resources available to assist in managing binational TB patients.





## *Stressors Associated with Migration from Mexico to the U.S.*

*(Taken from the Proceedings of the 1999 Mental Health Intensive,  
Portland Oregon, by Carmen Retzlaff, MPH, CHES)*

In research conducted by Maria de Jesus Diaz Pérez, PhD, of the Instituto Mexicano de Psiquiatria she identifies the socio-economic and cultural profile and potential stressors of Mexican workers migrating to the United States for work and their families left behind. The migration of Mexicans to the United States has a long history. While historical conditions change, migration continues, demonstrating a profound interconnection between the two countries.

Migrants leave home with any number of dreams but their main objective is income, for survival: to send money to their families. Wage differences are essential to understanding the dynamics of Mexico-U.S. migration. For workers with no specialized skills the daily wage in Mexico could be compared to the hourly wage in the United States.

The *Binational Study on Mexico-U.S. Migration*<sup>1</sup> reports that there are more than seven million Mexicans in the U.S., including four million with legal papers. Most migrants can be classified as temporary migrants. These migrants generally come in search of seasonal work and may be documented or undocumented. A second category is permanent residents, who can also be documented or undocumented. The smallest group are those who have gone through the U.S. naturalization process.

The four Mexican states with high migration traditions are Jalisco, Michoacán, Guanajuato, and Zacatecas. More and more people are now traveling to the United States from other states, especially rural areas, including Oaxaca and Guerrero. On the U.S. side, some states have been traditional receiving states for Mexican migrants. This picture, too, is becoming more complex. Relatively new receiving states like North Carolina are now among the most common desti-

nations. The data also reveal an increasing number of women involved in binational migration.

A recently-published study<sup>2</sup> outlines a number of variables found to be predictors of migration from Mexico to the United States:

- Being male between the ages of 15 and 44
- Living in an extended family
- Being from a small community (less than 100,000 inhabitants)
- Having previous migratory experience
- Having family members, friends or acquaintances living in the United States
- Having children under the age of 12 living in the same household
- Having papers to cross the border
- Not owning land, a home, or a business in Mexico

There also exist common personal economic motivations, including the desire to build a house or buy some animals, or to provide education for children. Those who come to earn money to buy a house or for another specific purchase generally stay in the United States for short periods. Those trying to provide educational opportunities for their families may stay longer, sending money back to Mexico. Those with specific personal motivations who migrate voluntarily (versus out of desperation) generally show better adaptation to the new culture.

Researchers such as Diaz Pérez referred to the “double standard” as an important phenomenon in Mexico-U.S. migration.<sup>3</sup> In the community of origin the man who travels North for work to support his family is seen as valiant, as a good provider. When he gets to the United States he is viewed as a criminal, an illegal alien. When he returns home, the migrant worker is viewed as “someone” in the community. These perceptions are so distinctly different, they place undocumented workers at high risk for the development of psychosocial problems.

Americans attempting to understand migration should also realize that there is a cost to the worker for coming to the United States. The perception that those coming from Mexico for work had no jobs there is false. Indeed, they are not the poorest of the poor. The cost of migration includes the amount of money the migrant forfeits from the time he makes the decision to migrate to the time he receives his first payment in dollars.<sup>4</sup> This could mean days or months without income, a fact which prohibits many from going north.

A second phenomenon is the “revolving door” of ongoing cultural exchange. Workers usually migrate with the intention of return-

ing to Mexico. Upon returning, they bring back elements of life-styles they have experienced in the United States. As in migrant-receiving communities in the United States, small communities in Mexico begin to show signs of cultural exchange, like bilingual signs and homes with satellite dishes. Some rural communities have changed the dates of their traditional celebration in order to correspond to the migrant schedule: Having the men returning from work to participate is an important way for the community to remain united.

Migration can cause several types of stress for the worker, including marital stress, parental stress, and stress due to cultural and family change.<sup>5</sup> Marital stress can occur from partners having differing opinions about returning to Mexico. Men sometimes want to travel to the United States alone because their wives may not want to return. Men may want to return to increased prestige in the village, but women may find greater economic and social opportunity in the United States.

Similarly, fathers may choose to leave children behind because they do not want their children growing up in the United States. They fear the heightened levels of sexuality and violence in the States. There is a perception that the U.S. government interferes with the education and discipline of children. Mexican migrants experience cultural and family change as a stressor when they associate living in the United States with the painful loss of tradition and culture. In addition, when they compare themselves to Americans, they see that in the United States they are in the lowest social position, which can also be experienced as a great sense of loss.

Life in rural Mexico is often dramatically different than in the United States. Rural communities often do not have electricity, sewage systems, etc. Gender roles are very traditional. Mexican communities with high rates of emigration to the United States are disproportionately comprised of women, the elderly and children during large portions of the year.

A study of migrants' wives in rural communities<sup>6</sup> found that stressors for the wives of families headed by migratory workers include:

- Cultural distance
- Concern for absent spouse
- Increased responsibility for woman left behind
- Family disintegration—fear of abandonment (that the man will establish a family in the U.S. and stay there)

Women left behind in these communities find their traditional roles changed. In rural Mexico, it is generally considered bad for

women to work outside the home. When men migrate, however, women become responsible for holding the family together. The resulting non-traditional roles are not usually assumed voluntarily, but seen as an undesirable consequence of the man's migration.

Other problems are associated with the man's return to his home community. The woman may be stressed by his demands for explanations of changes made during his absence or feel that his demands for attention from her or the children are unreasonable. The men may not feel that they belong anywhere. While in the United States, they may spend the whole time wishing they were in Mexico. In Mexico, things don't feel the same, they may feel as if their family is waiting for them to leave, as though they are intruding upon the normal life of the family.

Current studies report a dramatic rise in substance abuse in rural Mexicans with U.S. emigration. For men, rates are lowest among those who have no contact with U.S. emigration. Rates begin to rise for men who know people who emigrate, and rise further if they have a family member who emigrates. Rates are highest for migrant men themselves. The pattern is similar for women (with more abuse of prescription drugs), but a more dramatic rise is seen in women who have a family member who emigrates, almost equaling rates among women who migrate themselves.

Health care in Mexico is socialized medicine, but this merely makes health care low cost, not no-cost. Poor women, especially, are reluctant to spend money on their own health, and do not access services often. They prioritize the use of time and money to get health care first for children, then for husbands, then for themselves. On the other hand people in Mexico make less distinction between physical and mental health and see the two as being more entwined.

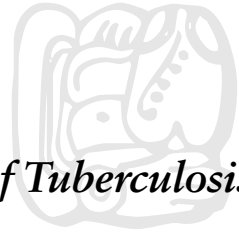
The stresses of migration as well as the coping mechanisms employed by migrants have a number of implications for binational TB treatment. When working to combat TB in a mobile, binational population, it is important to develop strategies which are sensitive to the psychosocial realities of the population.



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## *Epidemiology of Tuberculosis*

### **An Ancient Disease and Colonizers' Epidemic**

Tuberculosis has been present in humans for at least 7,000 years, and was a common disease in ancient Egypt as early as 4,000 BC.<sup>1</sup> The disease likely occurred as endemic in animals long before it affected humans, with *Mycobacterium bovis* as the most likely infecting crossover organism. Tuberculosis probably existed as a relatively insignificant disease throughout human history. Epidemic spread began slowly with increasing population density, and spread worldwide with European migration and colonization. Within a geographic area, the tuberculosis epidemic generally reached a peak 50 to 75 years after beginning, then slowly declined. Humans in affected locales eventually develop a resistance to the invading bacterial parasite.<sup>2</sup>

The conditions that enabled tuberculosis to change from a minor human disease to a deadly worldwide epidemic are those that still fuel the epidemic today: increased population and poverty. Crowded living conditions, which emerged in feudal Europe, made the spread of all infectious diseases more efficient. Tuberculosis, spread by airborne bacteria from the coughing of infected persons, is especially contagious where people live, work and travel in close quarters. Poverty contributes to overcrowding and adds the element of malnutrition, making people more susceptible to tuberculosis and other infectious diseases.

Tuberculosis existed throughout the Americas before the arrival of European colonizers,<sup>3</sup> but was a rare disease. Europeans brought the tubercle bacillus with them to North America, and the epidemic peaked in the United States simultaneously with that in Western Europe, in the 1700s and early 1800s. During its peak, tuberculosis was the largest cause of death in the United States.<sup>4</sup>

Tuberculosis rates gradually began to decline in the United States in the early 1800s. In 1805, the tuberculosis death rate in New York was 750 per 100,000 people. That rate fell to 400 by 1870, and the

national death rate was 188 per 100,00 by 1904. By 1969, the tuberculosis death rate in the U.S. was 4 per 100,000.<sup>5</sup> The decline was assisted by the discovery of streptomycin and isoniazid and the beginning of successful chemotherapy for tuberculosis,<sup>6</sup> but began before these therapies were introduced.<sup>7</sup>

Treatment of patients with TB in sanatoria-country retreats where fresh air, diet and exercise were said to aid in a cure-were popular in the United States and Europe during the late nineteenth and early twentieth centuries.<sup>8</sup> Their effectiveness as treatment was questionable, but they probably did assist in slowing the epidemic by removing contagious cases from homes and urban environments. Tuberculin testing of dairy herds and pasteurization of milk reduced the incidence of bovine tuberculosis.<sup>9</sup> BCG, the bacille Calmette-Guérin vaccine, is used widely worldwide, and is estimated to be the most commonly used vaccine.<sup>10</sup> Despite its popularity, BCG remains the most controversial of all vaccines used today: its efficacy and role in preventing tuberculosis and its safety continue to be questioned as it has since its introduction in the 1920s.<sup>11</sup> The decline in the incidence of tuberculosis in the United States and Europe probably primarily reflects the natural course and timing of the tuberculosis epidemic<sup>12,13</sup> as well as increased socioeconomic development resulting in better housing and nutrition.<sup>14</sup>

## **Re-emergence of Tuberculosis in the United States and Worldwide**

After years of slow and steady decline in the United States and other industrialized countries, the number of tuberculosis cases began to rise again in the late 1980s and early 1990s.<sup>15</sup> From 1985 to 1992, U.S. TB case rates climbed. An estimated additional 40,000 cases have occurred that would not have happened had historical declines continued in this country.<sup>16</sup>

The rise in tuberculosis incidence in the United States corresponded to rising rates of infection throughout the world.<sup>17</sup> The rise in tuberculosis rates in poorer countries (including a marked rise in cases in sub-Saharan Africa) are due to three factors: (1) demographics in developing countries, (2) the increase in drug-resistant strains of tuberculosis, and (3) the HIV epidemic. Demographically, children born in past decades in regions with high population growth rates are reaching ages at which TB morbidity and mortality are high. In many of these same countries, famine, war, and natural disasters create large populations of displaced, malnourished people in crowded living

conditions.<sup>18</sup> These demographic factors are largely responsible for the massive numbers of people dying of TB today: according to the World Health Organization (WHO), more people are dying of TB today than any other time in history—between two and three million deaths per year.<sup>19</sup>

The emergence of multi-drug resistant TB (MDR TB) represents a major worldwide public health threat. Drug-resistant strains are equally as contagious as normal TB bacillus, but less curable. Cure rates surpassing 95% for regular TB fall to 70% or less when isoniazid and rifampin resistance occurs.<sup>20</sup> MDR TB is primarily a consequence of poorly managed TB treatment.

Inappropriate treatment regimens, self-medication with powerful anti-TB drugs, the proliferation of inferior drugs, and interruptions in patient treatment all give TB bacilli the opportunity to become resistant to one or more drugs over time, making the disease more difficult and expensive to cure. These patients then go on to infect others, creating a vicious cycle of drug resistance.

The WHO strongly advises Directly Observed Treatment, Shortcourse (DOTS) to assure completion of therapy and as a deterrent to MDR TB, but estimates that fewer than 15% of persons with TB are currently being treated with this method.<sup>21</sup>

Perhaps the greatest fear of public health officials worldwide related to the rising incidence of tuberculosis is the disease's deadly interaction with a relative newcomer in epidemics: human immunodeficiency virus (HIV) infection. Under normal circumstances, the lifetime risk of developing tuberculosis after being infected is 10%.<sup>11</sup> In immunocompromised persons, such as those affected by HIV, these chances are less optimistic, and their risk of tuberculosis due to reactivation of latent infection is greater.<sup>22</sup> HIV-infected persons are not thought to be any more contagious with TB than other patients, and in fact have a higher incidence of noninfectious extrapulmonary forms of the disease.<sup>23</sup> Despite this fact, the increase in rates of TB infection due to HIV is, and will continue to be, substantial worldwide.

An estimated 5 million persons worldwide had dual HIV and TB infection from the beginning of the HIV pandemic to mid-1993, a majority of whom lived in sub-Saharan Africa.<sup>24</sup> In 1999, an estimated 30 percent of TB patients were HIV-infected in some regions of Africa.<sup>25</sup> The situation, already catastrophic in Africa, is rapidly worsening in Asia. In the next three to five years, 20-25% of cases of tuberculosis in WHO's Southeast Asia Region could be attributed to HIV.<sup>26</sup> It is largely the dual HIV/TB epidemic that accounts for rising

TB rates in industrialized nations beyond those attributable to immigration from poorer countries.

## **Tuberculosis in the United States Today**

Tuberculosis in the United States peaked in the early 1800s and declined at a steady rate until 1985. From 1985 to 1992, the number of tuberculosis cases in the United States rose steadily. The 1992 peak did not approach the proportions of the earlier epidemic. As late as 1953, the tuberculosis case rate per 100,000 people in the U.S. was 53.0, and the death rate was 12.4. In 1992, the case rate was 10.5, and the TB death rate 0.7.<sup>27</sup> The upward trend after so many years of steady progress toward elimination was, however, surprising and alarming to public health officials. The two primary factors that contributed to the rise in TB case and infection rates in the U.S. from 1985 to 1992 were: (1) immigration from countries with high TB infection prevalence and (2) the HIV epidemic.<sup>28</sup>

These factors correspond with the epidemiological profile of the disease. Tuberculosis infection in humans results primarily from airborne transmission, i.e. from breathing in air contaminated by the cough of an infected person. After initial infection, approximately 5 to 10% of people will develop a progressive primary disease, usually within two years. This form of the disease is common in children, and usually these children remain smear negative (i.e. a smear of sputum is not shown to contain tubercle bacilli; these individuals are not contagious). Most people do not develop the disease; their bodies mount an effective immune response to the initial infection. These people will have a positive response to a tuberculin skin test. If immunity wanes later in life, due to age, disease, or other factors, they are at risk of developing active tuberculosis as a result of reactivation of the pre-existing dormant infection. Disease in adults is sputum positive in about 50% of cases.<sup>29</sup> Therefore, populations immigrating from high-TB prevalence countries may harbor an inactive infection for years before acquiring an active TB case and becoming contagious. Persons with compromised immunity due to HIV are at greater risk for reactivation of a past infection as well as more susceptible to primary infection.

As tuberculosis ceased to appear threatening to the U.S. population in the 1960s, '70s and early '80s, funding for research and surveillance of the disease waned.<sup>30, 31</sup> In 1993, Congress substantially increased resources to reestablish a public health infrastructure for TB control.<sup>32</sup> This refocusing of efforts and funding probably accounts for

the reversal of the upward trend in TB case rates in the U.S. The total number of TB cases in the U.S. in 2000 represented a 39% decrease from the 1992 peak. The case rate in 2000 was 5.8 per 100,000 population.<sup>33</sup>

Tuberculosis cases in the United States are primarily pulmonary (80%), with lymphatic tuberculosis the leading site of disease among extrapulmonary cases.<sup>34</sup>

## Populations at Greatest Risk

In the United States, tuberculosis rates continue to show marked racial and ethnic disparities. Given the parallel disparities in income related to race and ethnicity in the United States, these factors are difficult to separate in epidemiological descriptions. Case rates for white, non-Hispanic people in the U.S. were 1.9 per 100,000 in 2000. Black, non-Hispanic persons had a rate of 15.2 for that same year. Persons of Hispanic origin and American Indian/Alaskan Natives had similar rates of 10.8 and 11.4, respectively. Case rates for Asian/Pacific Islanders were the highest of any group at 32.9.<sup>35</sup>

Foreign-born Americans also continue to be at greater risk for TB infection. In 2000, U.S.-born persons accounted for 54% of reported TB cases, and 46% of cases were among foreign-born persons. In 1992 only 27% of TB cases in the United States were among foreign-born persons.<sup>36</sup> Mexico was the largest contributing country of origin for U.S. TB cases among foreign-born persons in 2000.<sup>37</sup>

Data on job status of persons with reported TB cases clearly indicates a connection between poverty and the disease. In 2000, 56.8% of TB case records showed that the patient had been unemployed for the past 24 months. Among the employed, health care workers are at higher risk than the general population, comprising 2.8% of all 1997 cases. Migrant farmworkers are also at increased risk. They comprised 1.2% of all U.S. cases in 2000,<sup>38</sup> and are estimated to be six times more likely to develop tuberculosis than the general population of employed adults.<sup>39</sup>

Persons with HIV infection are also at increased risk for tuberculosis. Though national statistics are not yet available, Florida reported 38.5% of its 2000 TB cases were in HIV-positive persons, and in Puerto Rico 60% of TB cases were in HIV-positive persons. Most states with available HIV-status data on TB cases reported that 20 to 30% of their total cases were in HIV-positive persons (Georgia, Louisiana, North Carolina, South Carolina, District of Columbia and Tennessee). The states of Nevada, Oklahoma, Kansas, Arkansas, Minnesota,

Wisconsin, Oregon and South Dakota reported 15% or fewer of the total TB cases in 1997 were in HIV-positive persons.<sup>40</sup>

Other high-risk groups include homeless persons (who accounted for 6.1% of all U.S. cases in 2000); residents of correctional facilities (3.6% of all 2000 cases); residents of long-term care facilities (2.6% of 2000 cases); injecting and non-injecting drug users (2.5% and 7.5% of 2000 cases, respectively); and persons with excess alcohol use (15% of 2000 cases).<sup>41</sup>

Tuberculosis in the United States continues to be largely an adult disease, with highest incidence rates in the elderly. Well over half of the reported cases occurred in adults ages 25 to 64.<sup>42</sup>

## Geographic Disparities

Geographic distribution of tuberculosis in the United States corresponds heavily to socioeconomic conditions. Southern states, which tend to be poorer, have disproportionately high rates of tuberculosis. Some of these states (i.e. California, Texas and Florida) are states with heavy immigration from Latin American and Caribbean countries with high TB incidence and prevalence. In the United States, TB cases are also concentrated in large metropolitan areas. These areas correspond again, with higher poverty rates and more immigration from countries with high rates of tuberculosis. The states with the highest TB case rates in 2000 were Hawaii, Alaska, California and New York.<sup>43</sup>

The U.S.-Mexico border presents a population at risk in several respects, including: immigrants from Mexico and other high-incidence Central American countries; a high percentage of migrant farmworkers; and high rates of poverty on both sides of the border. The U.S. side of the border includes the three poorest counties in the U.S.<sup>44</sup> The 2000-mile area is primarily rural and predominantly Hispanic. Rapid industrialization, further enhanced by the North American Free Trade Agreement (NAFTA), has increased migration to the border on both sides, especially of young adults.<sup>45</sup>

Tuberculosis rates along the border are higher than national rates in both countries. U.S. rates are lower than those on the Mexican side, and drug resistance seems to be higher in the Mexican states.<sup>46</sup> In 1992, U.S. border states reported a case rate of 16 per 100,000 people, while the national rate was 9.4.<sup>47</sup> Migration between countries makes surveillance and monitoring of treatment major issues for the border population. Preliminary epidemiologic findings from border case surveillance present a profile of patients likely to be lost to treatment:

These patients are likely to be males ages 32–40, married or with unknown marital status, of “unknown” birth origin, non-drug-resistant on prophylactic treatment, and moving South when lost to follow-up. These findings help shed light on an elusive population in a high-risk geographic area.<sup>48</sup>

## Surveillance and Treatment Systems

In the United States, states have the lead role in surveillance efforts, with each state deciding which diseases should be reported to the health department and what information is reported to the Centers for Disease Control and Prevention (CDC). Most state surveillance programs include infections from the list of “nationally notifiable” diseases prepared in consultation with the CDC. State policies dictate what diseases physicians, laboratories and hospitals are required to track and report. All but one state require health care providers to submit tuberculosis reports.<sup>49</sup> There is no national requirement on reporting or tracking tuberculosis. Likewise, although recommendations do exist, the United States does not have a national standard for diagnosis and treatment of tuberculosis, and states and individual clinics and laboratories determine their own protocols.

While the U.S. surveillance system is comprehensive in comparison to that of poorer countries, recent public health threats from infectious disease have created a renewed interest in keeping systems up-to-date. New epidemics like HIV/AIDS and re-emerging ones like tuberculosis, along with corresponding new challenges related to drug resistance, have made infectious disease surveillance a priority once more.<sup>50</sup>

In addition to strengthening and bringing up-to-date state and national laboratories and computer surveillance systems, new methods of tracking both the epidemic and its treatment are being introduced.<sup>51</sup> New technology such as DNA fingerprinting can work with traditional surveillance techniques to refine our understanding of which strains are spreading by which routes and mechanisms, and among which populations. Many state epidemiologists do not feel that their surveillance programs sufficiently study antibiotic-resistant diseases, an area in which new technology can play a role.<sup>52</sup> Traditional contact investigations have been shown by DNA fingerprinting analysis to fall significantly short of tracking the source and spread of a TB outbreak. Because such investigations often lead to testing in high-risk populations, they often find contact cases that are not actually the result of exposure to the index case.

Combining traditional contact investigation with DNA fingerprinting of *Mycobacterium tuberculosis* can improve the understanding of how tuberculosis is transmitted.<sup>53, 54</sup> The National Tuberculosis Genotyping and Surveillance Network established in 1996 has a DNA fingerprint database from sentinel cases.<sup>55</sup> From this database, researchers are learning more about and identifying more clusters within the United States.

However, efforts to control and end TB in the United States cannot focus exclusively on cases within our borders, nor on surveillance alone. In this age of immigration, emigration, the global market and international travel, no country stands alone in terms of infectious disease. TB, like other communicable diseases, knows no borders. In order to eliminate TB in the United States, the United States must take part in international control efforts.<sup>56</sup>



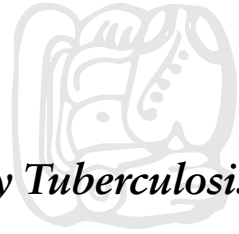


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## *The Challenges Posed by Tuberculosis*

*(Mary Ellen Good, RN, contributed to this chapter.)*

### **The Problem**

First the good news. *Mycobacterium tuberculosis* is a treatable infectious disease and we have the technology and the resources to cure everyone in the world suffering from it. We even have the possibility of curing those with multi-drug resistant strains (MDR-TB) if we choose to. The bad news is we have made the wrong choices, and in doing so, we have allowed TB to become the number one infectious cause of preventable deaths in adults.<sup>1</sup> Morbidity and mortality statistics prove that what we have been doing is not working, yet we continue to do it. The World Health Organization (WHO) predicts that in the current decade, 300 million people will become infected with TB bacilli, 90 million TB cases will occur, and if access to care does not become a global priority, 30 million will die.<sup>2</sup> Some estimate that as many as two billion persons—a third of the world's population—are currently infected with *M. tuberculosis*.<sup>3</sup> But remember the good news! There is still hope, if we act quickly and effectively.

In 1985, Michael Iseman, MD, of the National Jewish Medical and Research Center, warned of a TB time bomb waiting to explode.<sup>4</sup> In failing to prevent or contain resistance to first-line drugs, he wrote that "we are unwittingly transforming an eminently treatable infection into a life-threatening disease that is exorbitantly expensive to treat." He stressed the need for an international response noting that "proactive multi-national program might diffuse the time-bomb."<sup>5</sup> The time bomb continues to tick loudly; what Iseman predicted 14 years ago is now reaching epidemic proportions.

The vast majority of the U.S. public is unaware of the global TB crisis because the disease is not a visible problem in mainstream America. While many are aware of the growing incidence of MDR-TB in the world, they do not fear for their lives, or the lives of their loved ones. They believe the problem exists far away on some other conti-

ment where poor people do not receive treatment. What many fail to understand is that TB is a serious threat for all humankind. Without a world wide understanding that there is a serious problem, global elimination strategies will be ineffective.

Over a century ago, in 1882, Robert Koch discovered the TB bacillus, thus transforming the disease from a consequence of poverty and social misery to a scientific phenomenon.<sup>6</sup> Prior to his discovery, TB had been viewed as an outcome of poverty, since it was then, as it is now, a disease of the poor. Things have not changed much over the past 100 years. History continues to prove that “tuberculosis is closely related to social problems of housing, food, wages, rest, clothing, and insurance, and can in no way be separated from them.”<sup>7</sup> Although we do have a cure for *M. tuberculosis*, we have yet to find a cure for its root cause: poverty.

To eradicate TB, we must first agree on the cause. While some view tuberculosis in purely biological terms as a problem of an infectious organism, others see it in economic terms as the result of collapsed structures that create poverty. Some understand it in political terms as a result of policies and national health care decisions; others view it as a historical outcome of ineffective TB programs and medical mismanagement. Others view it as a human rights issue, a consequence of world wide race, gender and class discrimination.

TB would be easier to deal with if it were a simple disease caused by only one factor. Unfortunately, all of the above reasons play a part, and until we see the problem in this light, we will not be effective in eradicating it. *M. tuberculosis* is a complex disease with a multitude of factors that requires a comprehensive, global response. Are we ready to face the beast? This is the dilemma that challenges us all.

## The Issues

### Morbidity and Mobility

The health of a society depends on the health of all its members. While we can celebrate the fact that TB is on the decline in the general U.S. population, we cannot turn our back on the fact that it is a growing problem among the historically under-served, including along the U.S.-Mexico border and among migrants. This high rate of infection, along with a rise in drug resistance along the U.S.-Mexico border, is due, in part, to inadequate treatment regimens and failure to provide continuity of care, as well as transmission of drug-resistant strains. It is also an indicator of the lack of awareness of the disease by society as a whole.

We can view the growing problem of TB on the border as a border problem, or we can embrace it as an opportunity to work cooperatively with our neighbors in Mexico to eradicate TB in both countries. Until TB disappears on the border, and in lands beyond, it will continue to threaten the health and safety of all people, including those who think they are immune simply because they live in the richest country in the world.

TB on the border is not necessarily the same problem as TB in migrants, who usually spend as little time as possible on the border.<sup>8</sup> Treating a mobile population requires different strategies than treating a more stationary population which lives in Mexico but works in the U.S., or that functions on both sides of the border in day-to-day activities. While both situations require a binational approach, migrants have unique needs related to their mobility. It is best to separate out the two issues as each has its own set of problems and contributing factors.

Higher rates of all infectious disease in migrants are due to poverty, overcrowding and lack of sanitation, combined with greater exposure to diseases.<sup>9</sup> TB is long believed to be related to overcrowded and unhealthy living conditions, in which many migrants are forced to live. Malnutrition also adds to the severity of the overall infectious disease burden. Lack of access to health care is a significant risk factor for primary infection. Linguistic, cultural, financial, immigration, educational and other barriers compound the problem of obtaining needed health care.

The responsibility for providing health care to migrants with tuberculosis must fall upon the service provider where the patient seeks care, regardless of national origin. In the United States, health care is not a right, but rather a privilege, and you only get what you are eligible for based on ability to pay or on meeting program criteria. Immigration status creates access barriers for many migrant workers who are not eligible for health care. Many more are eligible, but due to fear of deportation, they under-utilize services because they do not want to be labeled a public burden. Health care for migrants and their children is fragmented at best.

The Department of Health and Human Services (DHHS) Advisory Council for the Elimination of Tuberculosis (ACET) has a plan to eliminate TB from the United States by the Year 2010.<sup>10</sup> The plan prioritizes prevention of TB in high-incidence populations such as migrant and seasonal farm workers. ACET developed recommendations for the Public Health Service, public health departments, and for providers

serving migrants. They include strategies for prevention and control, diagnosis, and follow up.

What is missing in this plan, and many other s like it, is the recognition that migrants move not only between states, but between nations as well. Contrary to popular belief, this movement is highly unpredictable. While it is true that health departments need to collaborate with other health departments, it is also true that we need to communicate with health care agencies beyond our borders. It is not enough to say that the Centers for Disease Control and Prevention and the Health Resources and Services Administration should work together. We can no longer risk this myopic view. TB is a moving target, and it respects no border. We must think and act globally and open our minds to new ways of defining the disease, eligibility for care, and an effective response.

### **Bigger Than a Bug**

Tuberculosis is a much bigger problem than drug-resistant or genisms. If it were a matter of killing all the bugs, the task would be easier. Simply stated, the problem is not a bug, it is a beast. It is huge in scope and requires a different approach than what has historically been applied. Where to start? Logically, there's no place like home. Local-level responses that are community-based are usually the most effective, but beyond local, we can not risk losing sight of the global picture. We must set a goal of access to care for all people and assure that care is equitable and effective.

### **Social Justice**

Farm et al.<sup>11</sup> raise important questions regarding medical ethics related to caring for the poor, such as:

- As medical providers, we provide care to the poor, but do we do it because the poor deserve our help?
- Is it our professional imperative to provide the best possible care irrespective of patients' economic status, or do we only give what people can afford?

These types of questions guide thinking; the answers guide medical practice.

Those who are sick and poor (sick, often *because* they are poor) are examples of inequalities of access and outcomes that challenge medicine today.<sup>12</sup> In an increasingly interconnected world, inequalities are both local and global. For those who are poor that receive effective TB treatment, the outcomes are good, but the gap is widening. The significance of external factors and their effects on the lives of the poor can not be downplayed. Poverty creates barriers such as lack



of transportation to health care facilities, lack of child care, lack of money to purchase needed medication, lack of safe drinking water, and even lack of "safe air" for family members crowded together in substandard housing with a TB-infected patient.

Poverty, inequality, and political factors create risks for serious health problems. There is a need for greater governmental involvement and commitment to addressing the causes as well as the effects of disease. Short courses, multi-drug regimens result in excellent outcomes, even in the most poor.<sup>13</sup> But in addition to drugs, people also need economic assistance to allow them safe drinking water, food and shelter. Strategies must focus on prevention of the spread of TB via treatment of the most vulnerable. Public subsidies for high priced third-line drugs, and for the development of new drugs is critical. In short, we need a born-again commitment to public funding for public health.<sup>14</sup>

Today we can afford to cure the poor who move back and forth across the border, as well as those who are sick in faraway lands. If we act responsibly today, we will protect ourselves, our children and our grandchildren from a disease which will become much more resistant and much more expensive to treat with the passage of time. If we allow inequality and poverty to continue to grow in our communities, and in those faraway communities across our border, we are feeding the beast. And as poverty grows, so grows the beast.

### **Money**

In this era of cost-effectiveness, we have focused on the wrong question: How much will it cost to do it? The better question is: How much will it cost if we don't?<sup>15</sup> The answer to the second question can be measured in human terms by the number of lives lost. If WHO predictions are true, 30 million people will die from TB this decade.

The fact is, it is much too expensive not to treat TB now, when the percentage of resistant cases is still manageable.<sup>16</sup> Significantly greater resources, particularly American resources, must be devoted to it. To address TB before such strains create new infections, we need the pro-active multinational program Iseman called for a decade ago.

### **Politics and MDR-TB**

We have been told over and over again that treatment of MDR-TB is too expensive in poor countries, and we have accepted that as just the way it is. Political and economic arguments against MDR-TB treatment claim that there are insufficient funds to cure all TB cases. The world today is richer than it has ever been in history, although wealth is not concentrated in regions where TB is endemic. If we accept the

statement that some countries are just not able to cure their TB problem, then we must also be willing to accept the responsibility for dealing with their problem when it becomes our own, as indeed it will. If we do not eradicate MDR-TB soon, it will not discriminate between the rich and poor, and worse yet, there will be no effective treatment for anyone if drug resistant strains continue to evolve.<sup>17</sup>

Paul Farmer and other international TB experts raise important questions about why TB is a treatable disease in the United States, and untreatable in parts of the world such as Latin America and Russia. MDR-TB requires aggressive treatment, and accepting the “not cost-effective” rationale is clear acknowledgment that we place different values on human life.<sup>18</sup> Our mission as healthcare providers is to provide care to *all* patients. Not the patients we *used* to have, or the ones we *wish* we had, but the real patients who present themselves day after day for care. It demands our patients if we say, “We must provide care to everyone, *even the ones who can’t afford to pay.*” We need to rephrase that to, “*especially the ones who can’t afford to pay,*” for it is *they* who are most vulnerable, most sick and most contagious.<sup>19</sup>

## Border Issues

People who migrate and people who live on the border are two different populations and the issues of preventing and controlling TB must be separately addressed for each. In his book *Border People*, Martinez<sup>20</sup> states “the basic function of a border is to delimit one nation from another and to control the movement of people and goods from one side of the boundary to the other.” Border’s function to keep people in their own space and to prevent, control, or regulate interactions among them. As we know, TB respects no borders. Being airborne allows it the freedom to move back and forth across the line, indiscriminately spreading disease.

Martinez reviews the history of the U.S.–Mexico border and describes it as a result of “territorial and cultural conflict, sustained in recent times by great economic disparity between the two nations.” He estimates that it is home to close to 9 million people who live side by side and describes it as the only place in the world where “so many millions of people from two so dissimilar nations live in such close proximity and interact with each other so intensely.” There is no other international boundary in the world that divides two nations so economically unequal and so culturally different.<sup>21</sup>

The border region consists of two geographic entities that are highly interdependent, yet that remain bound to their respective nations. The U.S. side reflects a federalist government, while the Mexi-

can side manifest centralism. These two distinctly different political systems must be considered when addressing border health issues in a binational context. Programs that fail to respect political, cultural, and socio-economic differences can not expect to succeed.

The global era has created a highly internationalized economic system that draws countries closer together through interdependent trade networks. Free trade is perceived to be good for everyone as manifested in the North American Free Trade Agreement (NAFTA). The results of NAFTA have accelerated transnational economic interaction and integration along the border. The business world understands the benefits of transnational interactions and processes, and reaps those benefits in financial terms. With an increased flow of economic and human resources across the border, the two economies benefit; as the economic system is strengthened, there is mutual progress for both nations. For business to prosper, legal and political barriers that impede trade must be reduced or eliminated. Healthcare, as a business, has much to learn from this open market mindset.

While NAFTA allows for free trade, it does not allow the free movement of people. The healthcare delivery system is far behind the times, still defining people primarily by their place of birth. This is justified in economic terms such as limited resources, shrinking budgets, and cost-benefit analysis. This way of thinking has gone on for generations and has caused the continued decline in the health status of migrants. We have the power to change, but not until we shift from a national to a transnational orientation. There are two necessary ingredients that are not easy to come by: a new way of thinking, and a better way of behaving. The border provides the perfect environment to put new ideas and actions into practice.

## Solutions

Is ACET's goal to eliminate TB in the U.S. by the year 2010 achievable? If we do not change the way we are doing business, and seriously address the issues of TB on the border and beyond, eradication of TB in the U.S. is highly unlikely. What then is an effective response? The answer is clear: the only effective means of interrupting transmission is prompt and effective therapy for those already sick with TB. Intra-national as well as transnational contact tracing, aggressive therapy, and innovative forms of multinational collaboration are critically needed.<sup>22</sup> This includes aggressive treatment of MDR-TB in resource-poor countries with decision making done in a multinational context.

## International

Because of the high cost of second- and third-line anti-tuberculosis drugs required to treat resistant strains, MDR-TB had virtually only been labeled as untreatable in poor settings. Groups such as Partners in Health and *Socios En Salud* have had extraordinary success in treating and curing patients with MDR-TB in three poor districts in northern Lima, Peru. Their unique, community-based program, in collaboration with local Peruvian health authorities, employs members of the local community to monitor and supervise drug administration in patients' homes. The program has achieved treatment-success rates of over 80% which are significantly higher than those previously reported in the United States, and at a significantly lower cost.<sup>23</sup>

The success in Peru demonstrates that MDR-TB is not an incurable disease. It is a failure to treat, not treatment failure that accounts for the vast majority of MDR-TB deaths.<sup>24</sup> Effective treatment—and effective treatment alone—interrupts the cycle of transmission and will stop the disease.

## Binational

In 1995, the Texas Department of Health took the lead in developing a Binational TB Elimination Campaign. Four U.S. and six Mexican border states came together to address the rising incidence of TB in the border region and hence **Ten Against TB (TATB)** was born. TATB is an international model that recognizes the fact that neither the United States nor Mexico alone can eliminate TB in the border area. It requires collaboration from the public and private sector, as well as from community-based organizations. U.S. and Mexican health care agencies share epidemiological information and jointly track patients as they move from place to place. They share laboratory equipment and pharmaceuticals. Provider education on treatment protocols, especially related to MDR-TB is a part of the program. The areas that TATB strives to work in are: cross-border TB case management tracking, universal use of directly observed therapy (DOT), contact investigations, enhanced laboratory capability, provider information and improved communications among all 10 border states. Programs such as TATB attempt to unite people from different countries to work together for a common goal, although different cultures approach problems in different ways. TB control may require different approaches based on issues such as equitable distribution of resources. Decisions concerning allocation of resources are affected by conflicting priorities and the capabilities of national, state and local programs. Binational and international efforts must start with open-

mindedness, a willingness to understand and appreciate the perspectives of how others define their problems. We need an increased awareness of feelings, interests, and perspectives of people from both sides of the border, to look beyond our own national interest, examine the problem in broad perspective and to take into consideration the implications of parochially-motivated policies and actions. Strategies must include receptivity, flexibility, adaptability and a multinational perspective.

The governments of the United States and Mexico both recognize TATB as a model of binational action and encourage their state health officials to commit and collaborate to strengthen TB prevention and control efforts on the border. The first steps have been taken and the foundation is built. The work of the health care administrators is to learn how to trust and work with colleagues across the border to find solutions to complex problems. The work of the governments is to mobilize funds to allow the job to get done. Programs such as TATB give hope that a solution is possible. It broadens the TB horizon beyond the U.S. border. It opens the door to binational partnerships and stretches our thinking to far away places or TB hotspots.

In addition to **Ten Against TB**, there are several other binational TB efforts which have proven successful.

### *TBNet*

*TBNet* is a comprehensive tracking and referral network that helps provide continuity of care services for mobile populations with active tuberculosis or latent TB infection.

People move between countries, not just between states. We need to find ways to communicate with our partners across the border. Communication can not be simply between health departments or clinics, it must be between nations.

### *Cure TB*

The primary goal of *Cure TB* is to improve continuity of care for tuberculosis patients traveling between the United States and Mexico to assure completion of treatment, decrease transmission and prevent the development of drug-resistant TB.

## *Sister City Projects*

The objective of the Sister City TB projects is to strengthen the capacity of local health departments to manage TB among a binational population. The projects provide a link between the public health departments of towns and cities across the border from one another.

### **National**

On the home front, the first steps we need to take deal with attitude and perception. We need to change the way we think, and we can start by shifting our notion of the border from being a barrier, to that of a bridge. As Martinez suggests, we can see the border "not as a divider, but as a unifier of different styles of life, not as a symbol of rejection, but as one of acceptance."<sup>8</sup>

He describes the border as<sup>25</sup> "...predictable and unpredictable; it divides and unifies; it repels and attracts; it obstructs and facilitates. It manifests such contrary tendencies as conflict and accommodation, poverty and wealth, social rigidity and fluidity, racial animosity and tolerance, and cultural separation and fusion. Mexico pulls from one direction and the U.S. from the other, and while the border exerts a force to separate the two national systems, it also generates a power to bring them together."<sup>26</sup>

It is not a question of whether or not the U.S. and Mexico should work collaboratively, but rather a question of how. Both nations must find the means, and more importantly, the will, to rise above politics, to transcend cultural differences, and to resolve the economic barriers that destroy communication, health and life. We can no longer afford to hide behind walls we build with bricks called budget deficits, cost effectiveness, and limited resources. We are the most powerful nation in the world; we can be the leaders in global eradication of TB. We have the technology, the resources and the power to make the political decisions necessary to move the agenda forward. It's simply a matter of will. We need to remember, that while resources may be limited, equity should never be.



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## *Official United States and Mexican Tuberculosis Protocols*

One of the first steps necessary to work effectively with binational TB patients is to compare the official TB protocols of each country. This is important whether working with a patient directly on the border or with a patient in the interior of either country. Knowledge of the official protocol provides a framework for understanding what a patient may have been told about the disease, which tests may have been run, and what treatment was most likely given. It is important to remember that the information provided in this chapter is the *official* protocol; how closely the protocol is adhered to is a purely local matter. It is essential to find out from patients how much they know about their own treatment and, when possible, to communicate with the original healthcare provider. In many cases, TBNet and Current TB may be able to assist in doing this. More information about these programs is found in Chapter 6 of this manual.

The following material was originally developed by Miguel Escobedo, MD, from the Texas Department of Health, Region 9-10, and Fernando Gonzales, MD, MPH, from Project Junto. It was later updated by José Moreira from the Texas Department of Health, Office of TB Elimination, and Elsa Villareal from the Nuevo León Department of Health.

## Comparison of the Diagnosis and Treatment of Tuberculosis: Mexico and United States

	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
<b>WHO IS RESPONSIBLE FOR TB?</b>		
	TB is a Ministry of Health responsibility where priorities are established for the nation and budgeting is centralized.	TB is a State Health Department responsibility where each state sets priorities and budget.
<b>VACCINATION</b>		
<b>bacille Calmette-Guérin (BCG) vaccination</b>	Two doses: 1st dose given shortly after or within one year of birth, 2nd dose given at 4-5 years of age (before entering elementary school). Unvaccinated children can be immunized until age 14.	Limited use: <ol style="list-style-type: none"> <li>1) Children with a negative PPD skin test who cannot be placed on preventive therapy but have continuous exposure to people with untreated or ineffectively treated active disease;</li> <li>2) Children who have continuous exposure to patients infected by organisms resistant to INH and RIF and cannot be removed from the exposure;</li> <li>3) Health care workers exposed to INH and RIF patients.</li> </ol>

	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
<b>CASE DEFINITION</b>		
	<p>A TB case may be:</p> <p><b>Confirmed:</b> with AFB smear, histopathology, or MTB culture.</p> <p><b>Unconfirmed</b> diagnosed by clinical criteria.</p>	<p>A <b>bacteriologically confirmed case</b> is defined as a patient with a positive culture for MTB.</p> <p>A <b>clinical case</b> is defined as in individual with symptomatology and if pulmonary, X-ray findings which are also compatible with active TB. Chest X-ray and symptomatic improvement during therapy must be documented.</p>
<b>DIAGNOSIS</b>		
<p><b>Latent TB infection, tuberculin skin test reaction (TST)</b></p>	<p>Use 0.1 ml of RT-23 2 TU or PPD-S 5 TU</p> <p>Induration read in mm 72 hours after injection:</p> <p>5mm, for newborns;</p> <p>10mm, for general population.</p>	<p>Use 0.1 ml of 5 TU PPD</p> <p>Induration read in mm 48-72 hs after injection:</p> <p>5mm, for HIV+ persons, recent contacts of TB patients, or persons with organ transplants and other immunosuppressed patients;</p> <p>10mm, for children younger than 4 years of age, recent immigrants from high prevalence countries, injection drug users, residents</p>

	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
Active Disease	<p>AFB smear +</p> <p>PPD is recommended as valuable diagnostic aid, useful in differential diagnosis among &lt;15 yrs old children without previous BCG vaccination, on high risk for progressing to TB disease: eg., new born to under 4-5 years of age, undernourished, immunocompromised, HIV + or AIDS patients.</p> <p>Vaccinated children PPD &gt;18 mm induration = positive active TB</p>	<p>and employees of high-risk congregate settings, and persons with high-risk medical conditions;</p> <p>15mm, for general population.</p> <p><i>M. tuberculosis</i> culture+</p>

### TREATMENT OF LATENT INFECTION

	<p>For contacts &lt;5 years with or without BCG, give 6 months, daily, INH at 10mg/kg without exceeding 300 mgs per dose;</p> <p>For asymptomatic, young (5-14 years) household contacts to infectious TB who have not received BCG vaccination, give 8 months,</p>	<p>Irrespective of age, infected persons who are considered to be at high risk for developing active TB should be offered treatment for latent TB infection.</p> <p>Give 9 months, daily, INH, or</p> <p>Give 9 months, twice weekly, INH with directly observed therapy.</p>
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	<b>MEXICAN PROTOCOL</b>	<b>OFFICIAL U.S. PROTOCOL</b>
	<p>daily, INH;</p> <p>For HIV contacts or persons with other immunocompromising conditions over 15 years of age, give 12 months, daily, INH.</p>	

### TREATMENT OF ACTIVE DISEASE

	<p><b>Intensive phase</b></p> <p>60 doses of Rifater and Ethambutol (EMB) over 10 weeks, then;</p> <p><b>Maintenance phase</b></p> <p>45 doses of Rifamate over 15 weeks.</p>	<p><b>Induction phase</b></p> <p>INH, RIF, PZA, and EMB daily for 8 weeks or daily for 2 weeks then twice weekly for 6 weeks, then;</p> <p><b>Continuous phase</b></p> <p>INH, RIF daily or twice or three times weekly for 16 weeks.</p>
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### TREATMENT OF DRUG-RESISTANT DISEASE

<b>Prevention:</b>	<p>TB cases must receive standard DOT chemotherapy.</p>	<p>Follow recommendations of the American Thoracic Society, the CDC, and the Infectious Disease Society of America for TB control; ensure quality TB case management to include periodic case review, assessment and analysis; DOT for all TB cases/suspects to ensure all prescribed TB drugs are taken; obtain consultation for patients with lab confirmed DR to any first-</p>
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	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
<b>Diagnosis:</b>	Perform culture and drug susceptibility testing to all suspected drug-resistant cases and to all positive smear contacts.	line TB drugs, for any complicated TB case/suspect or if patient remains symptomatic or smear or culture positive after 3 months of therapy; Never add one drug at a time to a failing regime.  Bacteriologic or histologic exam with laboratory confirmation by a positive TB culture for <i>M. tuberculosis</i> with drug susceptibility testing reporting drug-resistance.
<b>Treatment:</b>	Defined by the corresponding Drug-resistance State Committee; guarantee provision of all drugs needed for the duration of treatment; 100% on DOT; Contact investigation of all contacts.	If resistance to any first-line drugs is demonstrated, seek expert consultation for drug regime and individualized case management recommendations; follow patient closely with clinical assessments and frequent sputum examinations to evaluate response to therapy and to detect the emergency of further drug resistance; All patients with drug-resistant TB should be given DOT.

	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
<b>Evaluation:</b>	Clinical and bacteriological follow-up each month and culture each 6 months.	Clinical and bacteriological follow up each month or as recommended by the expert consultant. Periodic chest x-rays as determined for each individual case.

**DIRECTLY OBSERVED THERAPY**

	<p>According to official Mexican protocol, TB treatment should fall under <i>tratamiento estrictamente supervisado</i> (Strictly Supervised Treatment) or treatment which is administered by a health care provider (or community worker trained by a health care provider) who confirms that the medicine has been swallowed and ingested in order to guarantee completion of treatment.</p>	<p>DOT means that a healthcare worker or other designated individual watches the patient swallow every dose of the prescribed drugs. DOT should be considered for all patients because it is difficult to reliably predict which patients will be adherent. Even patients who intend to take their medicine might have trouble remembering to take their pills every time. All patients should be considered for DOT. However, there are certain groups of patients for whom DOT is often the best option regardless of local completion treatment rates. These groups include:</p> <ul style="list-style-type: none"> <li>• Patients with drug resistant TB</li> <li>• Patients receiving intermittent therapy</li> </ul>
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	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
		<ul style="list-style-type: none"> <li>• Persons at high risk for non-adherence, such as:               <ul style="list-style-type: none"> <li>- Homeless or unstably housed patients</li> <li>- Persons who abuse alcohol or illicit drugs</li> <li>- Persons who are unable to take pills on their own due to mental, emotional, or physical disabilities</li> <li>- Children and adolescents</li> <li>- Persons with a history of non-adherence.</li> </ul> </li> </ul>

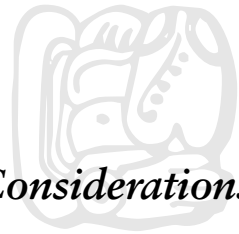
**CONTACT INVESTIGATION**

	<p>Symptom screening (clinical &amp; epidemiological);</p> <p>Bacilloscopy (smear) on “coughers”;</p> <p>Chest X-ray on symptomatics AFB smear positive adults, and in all symptomatic children under 15 years of age.</p> <p>Limited use of PPD is recommended:</p>	<p>Symptoms, PPD, and occasionally CXR screening;</p> <p>Smear/culture on individuals with abnormal chest X-ray, whether symptomatic or not;</p> <p>Chest X-ray screening on symptomatic PPD reactors and children under 4 years of age regardless of PPD status.</p>
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	OFFICIAL MEXICAN PROTOCOL	OFFICIAL U.S. PROTOCOL
	<ol style="list-style-type: none"> <li>1) considered valuable in differential diagnosis among &lt;15 yrs old children without previous BCG vaccination;</li> <li>2) in high risk for progressing to TB disease: eg. new born under 4-5 years of age, undernourished, immunocompromised, and HIV + or AIDS patients;</li> <li>3) in health care workers at risk.</li> </ol>	





### *Special Considerations*

Official U.S. and Mexican TB protocols only cover a portion of the issues related to effective TB management. In this chapter we discuss other key areas of TB treatment in more depth in order to further assist providers working with binational TB patients.

The first section of this chapter focuses on the issue of testing and treatment of latent TB infection (LTBI). This text originally appeared as an article written by Charlie Nolan, MD for MCN's *Streamline* publication in May-June, 2000. The reason we have chosen to place additional emphasis on this issue is because LTBI is an area in which there often a great deal of confusion among providers.

The second section of this chapter is excerpted from "The Treatment of Tuberculosis in Adults and Children" which originally appeared in the *American Journal of Respiratory and Critical Care Medicine*. This section deals with a number of important issues related to TB care including extrapulmonary TB, TB in pregnancy, and TB in children. We have included this section because it provides useful guidance when working with unique situations that may not be covered in standard TB recommendations.

#### Section I

##### **Targeted Testing and Treatment of Latent Tuberculosis Infection: New Recommendations from The American Thoracic Society and the Centers for Disease Control and Prevention**

Isoniazid for 6-12 months has been the mainstay of preventive therapy of tuberculosis infection in the United States for more than 30 years. However, isoniazid preventive therapy has been limited because of poor adherence due to the relatively long duration of treatment required and because of concerns about toxicity. Consequently, there has been interest in the development of shorter alternative regimens. During the past decade, several studies of "short-course" preventive treatment for TB in persons with human immunodeficiency virus (HIV) infection have been published<sup>1-4</sup>. The results of these studies, and an in-depth analysis of prior studies of isoniazid<sup>5</sup> form

the scientific basis for a substantial revision in recommendations for screening and preventive therapy for persons with tuberculosis infection recently published <sup>6</sup> by the American Thoracic Society (ATS) and Centers for Disease Control and Prevention (CDC). These recommendations have particular implications for medical providers who serve migrant workers, and for that reason are summarized in this newsletter.

Included in the recommendations is an important change in nomenclature. The phrase “treatment of latent tuberculosis infection (LTBI)” is recommended instead of the conventional terminology, “preventive treatment of tuberculosis infection” because it most accurately describes the intervention in which drug therapy is administered to terminate a tuberculosis infection in its latent phase. Likewise, the phrase “targeted tuberculin testing” is recommended to replace the term “screening,” because it emphasizes the fact that tuberculin skin testing should be used in a highly specific manner, for only high risk persons and populations of persons, rather than used widely as a screening test.

Targeted tuberculin testing for LTBI is a strategic component of TB control that identifies persons with an increased risk of TB who would benefit by treatment of LTBI, if detected. Persons with increased risk for TB include

- (1) persons recently infected with *Mycobacterium tuberculosis*
  - recent close contacts of persons with infectious TB
  - recent immigrants (i.e., within the last 5 years) from high prevalence countries
  - tuberculin skin test converters, and
  - children <4 years of age or infants
- (2) those who have clinical conditions that are associated with an increased risk for progression of LTBI to active TB
  - HIV-infected persons or those receiving immunosuppressive therapy
  - recent close contacts of persons with infectious TB
  - persons with abnormal chest radiographs consistent with prior TB
  - persons with clinical conditions such as silicosis
  - diabetes mellitus
  - chronic renal failure
  - leukemias and lymphomas
  - carcinoma of the head or neck and lung

- weight loss of > of 10% ideal body weight
- gastrectomy, and jejunoileal bypass
- injection drug users
- residents and employees of high-risk congregate settings (including health care workers with exposure to TB)
- mycobacteriology laboratory personnel

Targeted tuberculin testing programs should be conducted only among persons or groups in the categories noted above, and are not indicated for those without high risk status. An important change in the recommendations is that persons with LTBI who may have been recently infected or are considered to be at high-risk for developing active TB should be offered treatment irrespective of age.

## Changes from Prior Recommendations on Tuberculin Testing and Treatment of Latent Tuberculosis Infection (LTBI)

### Tuberculin Testing

- Emphasis on targeted tuberculin testing among persons at high risk for recent LTBI or with clinical conditions that increase the risk for tuberculosis (TB), regardless of age; testing is discouraged among persons at lower risk.
- For patients with organ transplants and other immunosuppressed patients (e.g. person receiving the equivalent of  $\geq 15$  mg/d of prednisone for 1 month or more), 5 mm of induration rather than 10 mm of induration as a cut-off level for tuberculin positivity.
- A tuberculin skin test conversion is defined as an increase of  $\geq 10$ mm of induration within a 2-year period, regardless of age.

### Treatment of Latent Tuberculosis Infection

- For human immunodeficiency virus (HIV)-negative persons, isoniazid given for 9 months is preferred over 6-month regimens.
- For HIV-positive persons and those with fibrotic lesions on chest X-ray consistent with previous TB, isoniazid should be given for 9 months instead of 12 months.
- For HIV-negative and HIV-positive persons, rifampin should be given for 4 months.

### Clinical and Laboratory Monitoring

- Routine baseline and follow-up laboratory monitoring can be eliminated in most persons with LTBI, except for those with HIV infection, pregnant women (or those in the immediate postpartum period), and persons with chronic liver disease or those who use alcohol regularly.
- Emphasis on clinical monitoring for signs and symptoms of possible adverse effects, with prompt evaluation and changes in treatment, as indicated

Based on the sensitivity and specificity of the tuberculin skin test and the prevalence of TB in different groups, three cut-points have been recommended for defining a positive tuberculin reaction: >5 mm, >10 mm, and >15 mm of induration. For persons who are at highest risk for developing active TB if they are infected with *M. tuberculosis* (i.e., HIV-infected persons or those receiving immunosuppressive therapy, recent close contacts of persons with infectious TB, or persons with abnormal chest radiographs consistent with prior TB), > 5 mm of induration is considered positive. For other groups with an increased probability of recent infection or with other clinical conditions that increase the risk for progression to active TB, >10 mm of induration is considered positive. These include recent immigrants (i.e., within the last 5 years) from high prevalence countries; injection drug users; residents and employees of high-risk congregate settings (including health care workers with exposure to TB); mycobacteriology laboratory personnel; persons with clinical conditions such as silicosis, diabetes mellitus, chronic renal failure, leukemias and lymphomas, carcinoma of the head or neck and lung, weight loss of >10% of ideal body weight, gastrectomy, and jejunoileal bypass; and children <4 years of age or infants, children, and adolescents exposed to adults in high-risk categories. For persons at low risk for tuberculosis, for whom tuberculin testing is not generally indicated, >15 mm of induration is considered positive.

In the ATS/CDC report,<sup>7</sup> treatment recommendations use an adaptation of a U.S. Public Health Service rating system that grades the strength of the recommendation (A, B, or C) and the quality of evidence supporting the recommendation (I, II, or III). Four regimens are recommended for the treatment of adults with LTBI.

Drugs	Duration	Interval	Rating * Evidence	
			HIV-	HIV+
Isoniazid	9 months	Daily	A (II)	A (II)
		Twice-weekly	B (II)	B (II)
Isoniazid	6 months	Daily	B (I)	C (I)
		Twice-weekly	B (II)	C (I)
Rifampin- Pyrazinamide	2 months	Daily	B (II)	A (I)
	2-3 months	Twice-weekly	C (II)	C (I)
Rifampin	4 months	Daily	B (II)	B (III)

- \* A = Preferred  
 B = Acceptable alternative  
 C = Offer when A and B cannot be given
- I = Randomized clinical trial data  
 II = Data from clinical trials that are not randomized or were conducted in other populations  
 III = Expert opinion

The isoniazid daily regimen for 9 months is recommended because prospective, randomized trials in HIV-negative persons indicate that 12 months of treatment is more effective than 6 months, and in subgroup analyses of several trials the maximal beneficial effect of isoniazid is achieved by 9 months<sup>8</sup>. Although a 9-month regimen of isoniazid is the preferred regimen for the treatment of LTBI, a 6-month regimen also provides substantial protection and has been shown to be superior to placebo in both HIV-negative and HIV-positive persons. In some situations, treatment for 6 months rather than 9 months may provide a more favorable outcome from a cost-effectiveness standpoint. Thus, based on local conditions, health departments or providers may conclude that a 6-month rather than a 9-month course of isoniazid is preferred. Both the 9-month and 6-month isoniazid regimens may be given intermittently (i.e. twice weekly). When isoniazid is given intermittently, it should be administered only as directly observed therapy (DOT).

The 2-month daily regimen of rifampin and pyrazinamide is recommended on the basis of a prospective randomized trial of treatment of LTBI in HIV-infected persons that showed the 2-month regimen to be similar in safety and efficacy to a 12-month regimen of isoniazid.<sup>9</sup> Twice-weekly rifampin and pyrazinamide for 2 or 3 months may be



considered when alternative regimens cannot be given. This intermittent regimen should always be administered as DOT. In situations where rifampin cannot be used (e.g., HIV-infected persons receiving protease inhibitors), rifabutin may be substituted.

Rifampin given daily for 4 months is recommended on the basis of the efficacy of a similar regimen in a prospective randomized trial of tuberculin-positive persons with silicosis.<sup>10</sup> This option may be especially useful for patients who cannot tolerate isoniazid or pyrazinamide.

Before beginning treatment of LTBI, active TB should be ruled out by history, physical examination, chest radiography, and, when indicated, bacteriologic studies.

Special considerations for treatment of LTBI apply to the following populations:

- When isoniazid is chosen for treatment of LTBI in persons with HIV infection or those with radiographic evidence of prior tuberculosis, treatment should be given for 9 months rather than 6 months.
- For pregnant, HIV-negative women, isoniazid is recommended. For women at risk for progression of LTBI to disease, especially those who are HIV-infected or who have likely been infected recently, initiation of therapy should not be delayed on the basis of pregnancy alone, even during the first trimester. For women whose risk for active TB is lower, some experts recommend waiting until after delivery to treat.
- For children and adolescents, isoniazid given either daily or twice weekly for 9 months is the only recommended regimen.
- For contacts of patients with isoniazid-resistant, rifampin-susceptible TB, rifampin and pyrazinamide given daily for 2 months is recommended, and for patients with intolerance to pyrazinamide, rifampin given daily for 4 months is recommended.
- For persons who are likely to be infected with isoniazid and rifampin-resistant (multidrug) TB and at high risk for reactivation, pyrazinamide and ethambutol or pyrazinamide and a quinolone (i.e., levofloxacin or ofloxacin) for 6-12 months are recommended. Immunocompetent contacts may be observed or treated for at least 6 months, and immunocompromised contacts (e.g., HIV-infected persons) should be treated for 12 months.

Once patients have been identified as having LTBI, they should receive an initial clinical evaluation. They should also receive follow-up evaluations at least monthly (if receiving isoniazid or rifampin alone) and at 2, 4, and 8 weeks (if receiving rifampin and pyrazinamide). This evaluation should include questioning about side effects and a brief physical assessment checking for signs of hepatitis. Patients should be educated about the side effects associated with treatment of LTBI and advised to immediately stop treatment and promptly seek medical evaluation when they occur.

## Section II

Excerpted from the *The Treatment of Tuberculosis in Adults and Children*. For additional information on TB treatment please refer to the most recent guidance from the American Thoracic Society and the Centers for Disease Control and Prevention. The latest recommendations are available from the CDC website <http://www.cdc.gov/nchstp/tb/> or by calling 404-639-8140

### Extrapulmonary Tuberculosis

The basic principles that underlie the treatment of pulmonary tuberculosis also apply to extrapulmonary forms of the disease. Although there have not been the same kinds of carefully conducted controlled trials of treatment for extrapulmonary tuberculosis as for pulmonary disease, increasing clinical experience is indicating that 6- to 9-month short-course regimens are effective.

Because of insufficient data, miliary tuberculosis, bone/joint tuberculosis, and tuberculosis meningitis in infants and children should receive 12 months of therapy.

Bacteriologic evaluation of extrapulmonary tuberculosis may be limited by the relative inaccessibility of the sites of disease. Thus, response to treatment often must be judged on the basis of clinical and radiographic findings.

The use of adjunctive therapies such as surgery and corticosteroids is more commonly required in extrapulmonary tuberculosis than in pulmonary disease. Surgery may be necessary to obtain specimens for diagnosis and to treat such processes as constrictive pericarditis and spinal cord compression from Pott's Disease. Corticosteroids have been shown to be of benefit in preventing cardiac constriction from tuberculosis pericarditis and in decreasing the neurologic sequelae of all stages of tuberculosis meningitis, especially when administered early in the course of disease.

## **Pregnancy and Lactation**

Untreated tuberculosis represents a far greater hazard to a pregnant woman and her fetus than does treatment of the disease. However, tuberculosis during pregnancy is not an indication for therapeutic abortion. In a pregnant woman with tuberculosis it is essential that effective therapy be given. The initial treatment regimen should consist of isoniazid and rifampin. Ethambutol should be included unless primary isoniazid resistance is unlikely. Although the routine use of pyrazinamide in pregnancy is recommended by international tuberculosis organizations, recommendations for its general use in pregnancy in the United States cannot be made because of inadequate teratogenicity data. Isoniazid, rifampin, and ethambutol all cross the placenta, but these drugs have not been demonstrated to have teratogenic effects. Pyridoxine is recommended for pregnant woman receiving isoniazid. Streptomycin, the only antituberculosis drug documented to have harmful effects on the fetus, interferes with development of the ear and may cause congenital deafness. This toxic potential is presumably shared by kanamycin and capreomycin; however, there is little specific information on the fetal effects of these two drugs. There is not enough information to determine the risk of cycloserine or ethionamide; they should be avoided if possible.

Because the small concentrations of antituberculosis drugs in breast milk do not produce toxicity in the nursing newborn, breastfeeding should not be discouraged; conversely, drugs in breast milk should not be considered to serve as effective treatment for disease or as preventive treatment in a nursing infant.

## **Tuberculosis in Children and Adolescents**

The basic principles of treatment of tuberculosis in children and adolescents are essentially the same as for adults. Nine-month regimens containing isoniazid and rifampin have been demonstrated to have a high rate of success in children and adolescents, and hilar adenopathy has been successfully treated with only 6 months of this combination. More recent studies of 6-month regimens containing pyrazinamide have also produced excellent results with minimal toxicity. There are no data related to the ultrashort 4-month regimen in children and adolescents yet. Therefore, the short-course regimens recommended for adults are also the regimens of choice for children with pulmonary tuberculosis...Follow-up evaluations after successful completion of therapy should be the same as...for adults.

Beyond the basic approach to treatment of tuberculosis in children, there are several important management considerations.

1. Tuberculosis in infants and children younger than 4 years of age is much more likely to disseminate; therefore, prompt and vigorous treatment should be started when the diagnosis is suspected.
2. Primary intrathoracic tuberculosis (parenchymal infiltration, hilar adenopathy, or both, in a child with a significant tuberculin skin test reaction) should be treated in the same manner as pulmonary tuberculosis. However, when drug resistance is unlikely, treatment with rifampin and isoniazid for 6 months supplemented by pyrazinamide in the initial 2 months is sufficient.
3. Because sputum specimens are less likely to be helpful in children, it may be necessary to rely on the results of cultures and susceptibility tests of specimens from the adult source case to 'confirm' the diagnosis in the child and to guide the choice of drugs. In cases of suspect drug-resistant tuberculosis or where adult isolates are not available, the aggressive pursuit of early morning gastric aspirates, bronchoalveolar lavage, or tissue diagnosis may have to be entertained.
4. For the same reason, bacteriologic examinations are less useful in evaluating the response to treatment; thus, clinical and radiographic examinations are of relatively greater importance in children. However, hilar adenopathy frequently requires 2 to 3 years of complete radiographic resolution; a normal chest radiograph is not a necessary criterion for discontinuing antituberculosis drugs.
5. Because it is difficult to monitor for ocular toxicity from ethambutol, this agent is less useful in young children. Streptomycin or pyrazinamide are alternatives.
6. In general, extrapulmonary tuberculosis, including cervical adenopathy, can be treated with the same regimens as pulmonary tuberculosis. Exceptions may be bone and joint disease, disseminated (miliary) disease, and meningitis for which there are inadequate data at present to support 6-month therapy. In these situations, a minimum of 12 months of therapy is recommended.
7. Directly observed therapy is preferable unless there is evidence that the patient or parent will comply with therapy.

### **Management of the newborn infant whose mother (or other household contact) has tuberculosis**

Management of a newborn infant whose mother (or other household contact) is suspected of having tuberculosis is based on individual considerations. If possible, separation of the mother (or contact) and infant should be minimized. Differing circumstances and resulting recommendations are as follows:

1. Mother (or other household contact) who has a positive tuberculin skin test reaction and no evidence of current disease. Investigation of other members of the household or extended family to whom the infant may later be exposed is indicated. If no evidence of current disease is found in the mother or extended family, the infant should be tested with a Mantoux test (5 TU PPD) at 4 to 6 weeks of age and at 3 to 4 months of age. When the family cannot be promptly tested, consideration should be given to the administration of isoniazid (10 mg/kg) to the infant until skin testing of the family has excluded contact with a case of active tuberculosis. The infant does not need to be hospitalized during this time if adequate follow-up can be arranged. The mother should also be considered for isoniazid preventive therapy.
2. Mother who has current disease and is judged to be non-contagious at delivery. Careful investigation of household members and extended family is mandatory. A chest roentgenogram and Mantoux tuberculin test at 4 to 6 weeks of age should be performed on the infant; if these are negative, the infant should be tested again at 3 to 4 months and at 6 months. Separation of the mother and infant is not necessary if adherence with treatment by the mother is ensured. The mother can breast feed. The infant should receive isoniazid even if the tuberculin skin test and chest roentgenogram do not suggest tuberculosis disease since cell-mediated immunity of a degree sufficient to mount a significant reaction to tuberculin skin testing can only develop as late as 6 months of age in an infant infected at birth. Isoniazid can be discontinued if the Mantoux skin test is negative at 6 months of age and no active disease exists in family members. The infant should be examined carefully at monthly intervals. If nonadherence is documented, the mother has AFB-positive sputum (or smear), and supervision is impossible, bacillus Calmette-Guerin vaccine may be considered for the infant. However,

the response to the vaccine in infants may be inadequate for prevention of tuberculosis.

3. Mother who has current disease and is suspected of being contagious at the time of delivery.
4. The mother and the infant should be separated until the mother is judged to be noncontagious. Otherwise, management is the same as when the disease is judged to be noncontagious to the infant at delivery (see preceding paragraph).
5. Mother who has hematogenous spread of tuberculosis (e.g., meningitis, miliary disease, or bone involvement). If the mother has hematogenous spread of tuberculosis, congenital tuberculosis in the infant is possible. If the infant is suspected of having congenital tuberculosis, a PPD Mantoux skin test and chest roentgenogram should be performed promptly, and treatment of the infant should begin at once. If clinical or roentgenographic findings do not support the diagnosis of congenital tuberculosis, the infant should be separated from the mother until she is judged to be noninfectious. The infant should be given isoniazid until 6 months of age at which time the skin test should be repeated. If the skin test is positive, isoniazid should be continued for a total of 9 months.

### **Treatment Failure or Relapse**

Patients whose sputum has not converted after 5 to 6 months of treatment are treatment failures. Susceptibility tests should be obtained on a current sputum specimen. While results are pending, the original drug regimen may be continued or may be augmented by at least three drugs not given previously. The regimen should be adjusted in accordance with the results of the susceptibility tests. Therapy should be administered under direct observation. In contrast to patients who are treatment failures, in patients who relapse after completing a regimen containing isoniazid and rifampin and whose organisms were susceptible to the drugs at the outset of treatment, the organisms usually remain susceptible. Thus, management of these patients generally consists of reinstatement of the regimen previously used. However, drug susceptibility testing should be performed and the regimen modified if resistance is detected. Directly observed therapy should be used.

Patients who relapse after receiving regimens that did not contain both isoniazid and rifampin should be assumed, until proved other-

wise, to have organisms that are resistant to the agents that were used previously and managed accordingly.

### **Use of bacille Calmette-Guérin (BCG) Vaccine**

Bacille Calmette-Guérin (BCG) was derived from a strain of *M. bo vis* attenuated through years of serial passage in culture at the Pasteur Institute in Lille, France. There are many BCG vaccines available, most of which have not been recently studied. The protection obtained from studies of previous vaccines has varied from zero to 80 percent. The most recent large trial, conducted in South India, failed to show a protective effect despite the fact that the vaccines used were believed to be two of the most potent available. Subsequently, however, a large number of nonrandomized studies (case-control and cohort studies) have suggested that BCG vaccine does protect infants and young children from the more serious forms of tuberculosis, although the ability of BCG to prevent adult forms of tuberculosis remains questionable.

Even if vaccines of proved efficacy and safety were available, the potential benefit of BCG vaccination in a nation such as the United States would be small because most tuberculosis occurs in persons who have already been infected. Such persons will not benefit from BCG.

BCG rarely causes serious complications; osteomyelitis and death from disseminated BCG infection have occurred in only one case per million doses administered. The frequency of side effects, most commonly prolonged ulceration and local adenitis, occur in 1 to 10% of vaccines, varying with the vaccine used, the intensity with which adverse reactions are sought, and the population vaccinated. BCG vaccination may cause tuberculin skin test conversion, thus rendering the test less useful. Because of these shortcomings, BCG is recommended only in the following situations.

1. BCG vaccine is strongly recommended for infants and children with negative tuberculin skin tests who: (1) are at high risk of intimate and prolonged exposure to persistently untreated or ineffectively treated patients with infectious pulmonary tuberculosis, cannot be removed from the source of exposure, and cannot be placed on long-term preventive therapy, or (2) are continuously exposed to persons with tuberculosis who have bacilli resistant to both isoniazid and rifampin.
2. BCG vaccination is also recommended for tuberculin-negative infants and children in groups in which the rate of new in-

fections exceeds 1% per year and for whom the usual surveillance and treatment programs have been attempted but are not operationally feasible. These groups include persons without regular access to health care, those for whom usual health care is culturally or socially unacceptable, or groups who have demonstrated an inability to effectively use existing accessible care. In view of the recent outbreaks of multidrug-resistant tuberculosis, these recommendations are currently under review.

Vaccination should be administered only by the route indicated in the package labeling and only in the suggested dose. If a newborn is vaccinated, one half the usual dose should be used. Depressed host immunity (from illness such as HIV infection or therapy with immunosuppressive drugs) is a contraindication to BCG administration.





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There are number of resources available to assist providers in caring for TB patients. Following is a list of resources and contact information.

### ■ Tuberculosis Training and Education Resource Guide

This resource guide was produced by the Centers for Disease Control and Prevention (CDC) National Prevention Information Network (NPIN) and provides information available through NPIN databases and other resources on topics relating to tuberculosis (TB). For more information on NPIN services call 800-458-5231 (800-243-7012 TTY) or visit the NPIN Web site at <http://www.cdcpin.org>.

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The latest TB Guidelines and Recommendations are also available on the American Thoracic Society's website <http://www.thoracic.org>

## ■ County and State Providers of TB Care

The Migrant Clinicians Network has developed a directory of TB Services throughout the United States. Unlike most listings, this directory provides county level services for the entire country. To get a copy of this directory you can contact MCN at 512-327-2017 or [mcn@migrantclinician.org](mailto:mcn@migrantclinician.org).

The directory is also available as an interactive database on MCN's website: <http://www.migrantclinician.org>.

## ■ Clinical Consultation and Technical Assistance

The four centers listed below are all funded to provide clinical consultation and technical assistance in tuberculosis.

### ➤ The New Jersey Medical School National Tuberculosis Center

University of Medicine and Dentistry of New Jersey  
65 Bergen Street  
Newark, NJ 07107-3001  
Phone: 1-800-4TB-DOCS (482-3627)  
Fax: 973-972-3268  
Website: <http://www.umdnj.edu/ntbcweb/tbsplash.html>

### ➤ The Francis J. Curry National Tuberculosis Center

3180 Eighteenth Street, Suite 101  
San Francisco, California 94110-2028  
Phone: 415-502-4600  
Fax: 415-502-4620  
e-mail: [tbcenter@nationaltbcenter.edu](mailto:tbcenter@nationaltbcenter.edu)  
Website: <http://www.nationaltbcenter.edu/>

### ➤ National Jewish Medical and Research Center

1400 Jackson Street  
Denver, CO 80206  
Telephone: 1-800-222-LUNG (5864)  
e-mail: [lunghline@njc.org](mailto:lunghline@njc.org)  
Website: [www.njc.org](http://www.njc.org)

► **Charles P. Felton National Tuberculosis Center at Harlem Hospital**

2238 Fifth Avenue, First Floor

New York, NY 10037

Phone 212-939-8254

Fax 212-939-8259

e-mail: [tbcenter\\_consult@columbia.edu](mailto:tbcenter_consult@columbia.edu)

Website: <http://www.harlemtbcenter.org>

■ **Binational Case Management and Tracking**

► **TBNet**

*TBNet* is a bi-national tuberculosis patient tracking and referral project founded in 1996 by the Migrant Clinician's Network, working with a consortium of public health organizations, and funded by a grant from the Texas Department of Health. Although the program was originally created with migrant farm workers in mind, it is expanding its patient base to include the homeless, prison parolees, or anyone who might be mobile during their treatment.

*TBNet* helps migrant TB patients complete treatment in three ways.

1. *TBNet* supplies TB clinics with wallet-sized portable treatment records for their patients. These records provide a handy summary of a patient's TB treatment and can easily be carried by the patient wherever they go. The information in this record enables other TB clinics to continue the patient's treatment.
2. *TBNet* maintains a central storehouse of enrollee medical records. A patient's health care provider, whether they are in the United States or Mexico, can call *TBNet* on a toll-free line to request an up-to-date copy of the patient's medical record.
3. Migrant patients can also call *TBNet* on the toll-free line for help locating treatment facilities at their next destination. These three systems work together to coordinate the continuous treatment of migrant TB patients.

Since 1996, *TBNet* has enrolled over twelve hundred patients in the program. *TBNet* has experienced a high completion rate in working with patients with active TB. Some patients have moved 4-5 times during treatment. *TBNet* has facilitated the tracking and transfer of records for those patients. At the conclusion of treatment, *TBNet* notifies the enrolling clinic that that patient has completed treatment.

The program operates free of charge to both the clinic and the patient. If you would like more information about *TBNet*, please contact:

*TBNet* Program Manager  
P.O. Box 164285  
Austin, TX 78716  
(800) 825-8205  
tbnet@migrantclinician.org

► **Cure TB**

The primary goal of Cure TB is to improve continuity of care for tuberculosis patients traveling between the U.S. and Mexico to assure completion of treatment, decrease transmission, and prevent the development of drug-resistant TB. Cure TB provides the resources and services needed to exchange clinical information between health care providers treating tuberculosis patients and their contacts who move between the U.S. and Mexico.

Cure TB achieves this goal by informing, counseling and guiding patients directly over-the-phone and facilitates the exchange of clinical information between health care providers on both sides of the border.

Many patients diagnosed with TB travel between the two countries while on treatment and, therefore, both countries have an interest in assuring therapy adherence. Other individuals move permanently to the other country before therapy is completed. In the interest of preventing individual morbidity and the development of resistant strains, as well as

lowering the global burden of TB, assuring continuity of care for these persons is equally vital.

Call 1-800-789-1751 for more information about the program.

► **Sister-City Projects**

The objective of the sister-city TB projects is to strengthen the capacity of local health departments to manage TB among a binational population. The projects link up the public health infrastructure of towns and cities across the border from one another. El Paso/Ciudad Juárez runs *Project Juntos*, the oldest sister-city project along the U.S.-Mexico border for TB care. Other sister city projects exist in Laredo/Nuevo Laredo, San Diego/Tijuana, and other border communities. For further information or referrals for the sister city projects contact the Pan American Health Organization field office in El Paso, TX:

**Pan American Health Organization**

El Paso Field Office, U.S.-Mexico Border

5400 Suncrest Dr., Suite C-4

El Paso, Texas 79912

Phone: 915-845-5950

Fax: 915-845-4361

E-mail: [mail@fep.paho.org](mailto:mail@fep.paho.org)

Website: <http://www.fep.paho.org>



