

Preventing and controlling tuberculosis along the Mexico-United States border¹

Between 1990 and 1999 the number of tuberculosis (TB) cases reported in the United States of America declined from 25 701 to 17 531, but the proportion of those cases that occurred among foreign-born persons climbed from 24% to 43%. A major share of those foreign-born persons had come from Mexico and Central America, and they included individuals and families entering the United States legally as well as those without permission or documentation. Much of that TB problem is concentrated in the areas of the United States that border on Mexico.

In response to these trends, in June 1999 staff from the United States Centers for Disease Control and Prevention (CDC) convened a meeting of TB control officials from the four states in the United States that share a border with Mexico—Arizona, California, New Mexico, and Texas—to develop a coordinated domestic strategy. That special task force recently produced a report containing background information on the problem as well as proposals for future efforts by United States Government agencies and by state and local programs.

During 1994–1998 approximately 3.9 million legal immigrants entered the United States. Of those immigrants, 16.5% were from Mexico, the leading country of birth for all legal immigrants, and 5% were from the seven countries in Central America. Additionally, an estimated 2.7 million persons from Mexico and Central America live in the United States without documentation of citizenship or visas.

In 1999, Mexico was the country of origin for 23% (1 753) of all foreign-born persons with TB in the United States. Of TB cases among Mexican-born persons, three-fourths were reported from the four states in the United States that border Mexico. In 1999, TB cases among Mexican-born persons represented approximately 25% of all reported TB cases in these four border states.

A variety of factors contribute to elevated TB incidence and complicate TB control efforts along the Mexico-United States border. Mexico has a higher TB rate than does the United States, some 27 cases/100 000 population versus 6.8/100 000. Low socioeconomic status, crowded living conditions, and limited access to health care increase the risk for TB transmission on both sides of the border. Frequent bilateral border crossings and travel within the United States contribute to delays in TB diagnosis and impede treatment completion. Language and sociocultural differences also play a part in de-

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lays in seeking care and influence adherence to treatment. Coordinating TB case management across the international border is complicated, with outcomes compromised among TB patients.

The Mexico-United States border is approximately 2 000 miles long and separates the four United States border states from six Mexican states: Baja California Norte, Sonora, Chihuahua, Coahuila, Nuevo León, and Tamaulipas. Approximately 1 million persons cross the Mexico-United States border daily. Major metropolitan areas straddle the border, including San Diego-Tijuana (population: 4 million persons), El Paso-Ciudad Juárez (1.9 million), Laredo-Nuevo Laredo (0.4 million), Brownsville-Matamoros (0.5 million), and Harlingen/McAllen-Reynosa (1 million). Although they are legally separate cities, these sister cities have become closely integrated binational, bicultural communities that share social, environmental, and economic interests and problems.

Counties in the United States along the border are among the poorest economically in the country. Approximately one-third of the United States families on the border live at or below the poverty line, compared with a national average of 11%, and unemployment rates in the border area are far higher than in the rest of the country. During 1990–1996, as with TB, such other communicable diseases as brucellosis, measles, hepatitis A, hepatitis B, mumps, pertussis, salmonellosis, and shigellosis occurred at higher rates in United States border counties than in nonborder counties.

TB rates among border communities are higher than the rates for their respective states overall. For example, during 1998–1999 the average TB rates per 100 000 population were 22.9 in Laredo, Texas, and 39.7 in Nuevo Laredo, Tamaulipas, compared with 8.7 and 33.1 for their respective states. The TB rate in San Diego County, California, was 10.3/100 000 population, but among Hispanics of predominately Mexican descent the rate was 23.5 cases/100 000 population, higher than the state rate of 12.9 for Hispanics.

The prevalence of drug-resistant TB strains is another concern. Such prevalence is higher in Mexico than in the United States, a fact of special importance for the border areas in the United States. Data reported to CDC during 1993–1998 showed higher drug-resistance rates among Mexican-born TB patients than among TB patients who had been born in the United States, for both a single antibiotic and for more than one antibiotic.

With these circumstances as a background, the report produced by the CDC-led task force work group focused on four primary areas: 1) surveillance needs, 2) case management and therapy completion, 3) performance indicators and pro-

gram evaluation, and 4) research needs. For each of these topics, the work group members identified key problems, objectives, and resources needed to enhance TB prevention and control efforts along the border. The work group's proposals are not intended as directives from the CDC but rather as a starting point for public health practice and TB prevention and control interventions.

SURVEILLANCE NEEDS

To better understand the epidemiology of TB cases along the Mexico-United States border, the task force report stated, surveillance needs should be addressed in two key areas: development of a case definition and a registry for binational TB cases.

Case definition

No standard surveillance definition for a binational TB case is in use by border TB control programs. Using a uniform case definition would enable standardized data collection and increase accuracy in data analysis and comparison. The binational TB case definition would foster collaboration with Mexico's programs and public health providers.

The work group proposed defining a binational TB case as one that meets the case definition for active TB disease used by either Mexico or the United States, as well as one of two other criteria: 1) optimal case management requiring communication or collaboration with TB control programs or health care providers on the opposite side of the border, such as by transferring clinical or laboratory data, referring a patient for treatment completion, or sharing information for contact investigation or 2) the case-patient is a contact of a binational TB case-patient or is the TB source case-patient for contacts on the opposite side of the Mexico-United States border.

Registry of binational TB cases

United States TB control programs along the border identify locally defined binational cases in their own TB registries, but none of the programs maintains local or statewide electronic records for these cases. An electronic registry of binational TB cases available to all programs would enhance documentation of the number of TB cases not included in the annual TB morbidity count; facilitate sharing of up-to-date clinical data, such as prior anti-TB drug treatment; and improve case management of binational TB cases.

The work group indicated three options for developing a unified registry of binational TB cases: 1) CDC's TB Information and Management System (TIMS), which is comprehensive software for surveillance, patient management, and program evaluation that state health departments in the United States use to report TB surveillance data to CDC; 2) an Internet-based system, perhaps modeled on a fully operational existing system such as OpenEMed (formerly known as TeleMed); or 3) existing binational program databases, such as CURE-TB or TB Net.

The work group proposed that the CDC should work with TB control programs in the United States and Mexico to verify the need for a unified registry of binational TB cases as well as to determine if an existing system could be modified for broader use and interfaced to reliably and securely share information, or if a new system should be developed. State and local TB control programs, the work group said, should collaborate with one another and CDC to determine: a) the feasibility of creating and maintaining a secure registry of binational TB cases, b) responsibilities to share for maintaining and updating the registry, and c) the best mechanisms for data sharing, security, and use. The state and local TB control programs should also collaborate with one another and CDC to determine: a) the type of database template to use, b) the primary function of the database (e.g., surveillance, case management, or both), and c) the key database variables to be included for the binational TB cases.

CASE MANAGEMENT AND THERAPY COMPLETION

Optimal TB case management includes prompt disease diagnosis, close monitoring of medical regimens, assurance of adherence to treatment, and identification and evaluation of close contacts. These strategies are particularly difficult when case management must be coordinated across an international border. In the immediate Mexico-United States border area, case management involves substantial numbers of persons moving across the border as often as daily, and TB patients living on one side of the border having their disease diagnosed or treated in the adjacent country.

Finding and managing active TB cases

Mexican and United States citizens cross the border for TB diagnosis and treatment without routinely notifying health departments of either

country of their origin or destination. Additionally, immigrants from Mexico and Central America who do not have documentation of citizenship or visas are not screened for active TB. Case management can be compromised when there are these kinds of gaps, changes in treatment, and a failure to share clinical and diagnostic information, perform timely contact investigations, and promote therapy completion.

The work group proposed that the CDC review privacy laws and clarify what case-specific information for clinical care can be shared among health departments and private health care providers in the United States and Mexico. The work group also proposed a number of steps for state and local TB control programs. One of the steps was to develop new or strengthen existing partnerships with counterpart health departments in Mexico in order to report and refer for case management active TB case-patients and close contacts who cross the Mexico-United States border. Another recommendation was to facilitate partnerships with health care providers on both sides of the Mexico-United States border such as with agreements for timely reporting of active TB cases, treatment outcome evaluations to improve completion of therapy, educational material distribution, and training sessions to help private health care providers improve their recognition of TB symptoms and their evaluation of symptomatic persons. A third recommendation was for state and local programs to establish links with physicians who evaluate immigration applicants and with community-based organizations to conduct case-finding activities and to provide information on local TB services.

Funding to provide direct services

Ensuring treatment completion for active TB disease should be a priority for TB control programs. In addition, treating latent TB infection is cost-effective in reducing the burden of disease and limiting future spread of TB infections. Nevertheless, it can sometimes be difficult for publicly funded TB programs working in the border region to be reimbursed for their assistance to binational TB patients, because of limitations in United States Government rules. For example, current regulations of the United States Health Care Financing Administration (HCFA) stipulate that in the case of persons without documentation of citizenship or visas that only emergency care can be reimbursed. The work group proposed that the CDC should collaborate with HCFA to explore amending Government regulations, so as to permit funding for TB treatment to cure for this group of persons.

Ensuring TB patient care while in the custody of the Immigration and Naturalization Service

In 1996 approximately 5 million immigrants were living in the United States without documentation of citizenship or visas. As with legal immigrants, Mexico was the leading country of origin for undocumented foreign-born immigrants, accounting for an estimated 54% of the total number. More than half of the undocumented immigrants were living in just two of the border states, California and Texas. In 1996 the United States Immigration and Naturalization Service (INS) detained and then expelled more than 1.6 million undocumented immigrants.

Although the exact proportion of INS detainees with TB is unknown, the rate of active TB disease among Mexican-born persons without documentation of citizenship or visas may be higher than Mexico's national average, according to some researchers. The majority of detainees are housed in local jails and state prisons, each of which has its own TB screening policies and relationships with TB control programs. Detainees are transferred frequently between facilities, and certain facilities might not transfer medical records containing TB status information. Another barrier to TB patient care while in INS custody is the lack of communication among TB control programs, federal agencies, and local and state facilities that house INS detainees. The resulting lapses in treatment can lead to continued TB transmission and development of drug-resistant TB.

The work group recommended that the CDC meet with the INS and other federal agencies to discuss problems related to TB patients in INS custody, and possible areas for collaboration among the INS and local, state, and federal correction agencies. State and local TB control programs, the work group said, should create liaisons with local INS officials in order to work on a number of areas, including providing educational materials on TB to personnel who work directly with detainees, ensuring timely reporting of active and suspected TB cases, establishing referral systems to increase continuity and completion of treatment, and providing medical consultation as needed.

PERFORMANCE INDICATORS AND PROGRAM EVALUATION

TB testing among border populations

Unlike immigrants to the United States who have citizenship or visa documentation, upon entry undocumented immigrants are not screened for TB

disease, human immunodeficiency virus (HIV) infection, and other health conditions that influence the risk for progression from latent TB infection to active disease. Targeted testing of specific populations at high risk is one strategy for finding and treating binational patients who arrive in the United States with active TB disease or who are at risk for progression to active disease. Among the priority groups for targeted testing and completion of treatment are: a) persons with HIV infection, diabetes, or other medical conditions that increase the risk for active TB disease and b) medically underserved persons such as incarcerated individuals or persons from areas of low socioeconomic status. And while this targeted testing is important, of even greater importance is identifying, evaluating, and treating to completion the close contacts of infectious TB patients. Screening of populations at low risk is strongly discouraged.

The work group recommended that state and local TB control programs establish working relationships with health care providers that serve targeted populations (e.g., managed care organizations, HIV clinics, migrant health clinics, and correctional facilities) in order to evaluate the effectiveness of those providers' testing and treatment practices. State and local programs should also seek partnerships with schools, work sites, and community-based organizations so as to evaluate and improve the testing of recent immigrants and treatment-completion rates for those persons with active TB disease.

Laboratory support

Sharing laboratory data regarding binational TB patients whose disease was diagnosed in Mexico should be a critical component of case management for TB patients in the United States. In addition, laboratory data for binational TB patients should be linked with United States surveillance data. Transfer of laboratory data among programs requires a secure, confidential information system. Some Mexican border health departments lack the laboratory facilities, equipment, and infrastructure to confirm diagnosis of TB bacteriologically. Collaboration between Mexican and United States laboratories could increase Mexico's expertise in diagnosing TB disease and enhance quality control.

The work group proposed that the CDC should work with state and local TB control programs to develop key variables for reporting laboratory data; these variables should be incorporated in the proposed registry of binational TB cases. The CDC should also continue working with the Mexi-

can National Public Health Laboratory Program and the border states in the United States and in Mexico in order to build laboratory quality and proficiency testing. For state and local TB control programs the work group recommended collaborating with the CDC to strengthen TB diagnostic capabilities in Mexican border states, with an emphasis on improving smear microscopy and culture capability consistent with Mexican TB control policies. Suggested support activities included improving quality control, training technicians, and identifying funding resources for equipment.

Contact tracing

While critical, contact tracing for binational TB patients can be difficult. The task can be made more complex by patients' reluctance to divulge contacts, even to bicultural outreach workers. Binational patients often fear the stigma of disease. They are also afraid of such social and legal repercussions of a TB diagnosis as a loss of housing, employment, and income, or legal action against persons without citizenship or visa documentation. Also possibly interfering with public health interventions are immigrants' lack of experience with or understanding of preventive health models, their cultural beliefs regarding causes of TB other than a germ-based etiology, and their use of herbal products or other self-medication approaches to treatment.

Deficiencies in communication among public health jurisdictions can hinder contact investigations, especially across international borders. Protocols for contact tracing differ between Mexico and the United States. As a result of all these factors, the traditional concentric-circle contact-tracing model may be ineffective in identifying close contacts.

The work group proposed that the CDC should work in conjunction with state and local TB control programs and develop standardized, linguistically and culturally appropriate contact interview questions intended to elicit contact information regarding cross-border social networks and extended family structures. There is also a need for culturally sensitive interview training programs for TB contact investigators that are grounded in studies of hard-to-reach populations. The work group also said that state and local TB control programs should collaborate with community-based organizations serving binational TB patients to determine if contact tracing could be enhanced through techniques used in other screening programs such as the use of nonprofessional community health workers as liaisons and educators.

RESEARCH NEEDS

Identifying strategies to eliminate TB disease

As TB incidence declines in the United States, public health strategies must go beyond traditional TB control measures. These new approaches should include active case finding, targeted testing and treatment of populations at high risk for latent TB infection, and promotion of regional TB control efforts along the Mexico-United States border. Despite advances made during the 1990s, additional applied public health research is needed to identify the best strategies for eliminating TB disease.

This research must address two groups distinguished by their pattern of movement and the health care systems that serve them. The first group consists of binational patients and their close contacts for whom recent or ongoing cross-border travel affects case management, contact tracing, and source-case investigation. The second group consists of patients who acquired TB in Mexico or Central America, and their contacts in the United States, whose case management is less complicated by international travel, but who might migrate between jobs in the service, construction, and agricultural industries in defined patterns within the United States.

The work group proposed the CDC assist state and local TB control programs in analyzing surveillance data and conducting studies to identify trends, opportunities, and knowledge gaps related to binational TB patients. For their part, state and local TB control programs should increase their use of local data and experience in order to advise CDC and state and local authorities regarding the epidemiology of TB among binational populations, practical problems in TB control, and emerging situations that might require attention or action. State and local programs should also work with health care providers in defining the contributions that specific subpopulations make to TB morbidity in their jurisdictions. Also worth assessing is the role of congregate settings (e.g., correctional institutions, shelters, dormitories, migrant worker camps, and hospitals) in facilitating TB transmission.

Areas for additional research

Binational TB case surveillance. Among several other areas needing research, according to the task force work group, was binational TB case surveillance. Although national surveillance data have included ethnicity since 1980 and country of ori-

gin since 1993, these variables do not capture the information needed to determine whether a TB case could be classified as binational. Furthermore, data are not collected routinely regarding the movement of TB patients to, from, or within Mexico, except for the date of entry into the United States. Therefore, determining the TB problem's magnitude, contributions of different groups, or relative risk attributable to specific risk factors is not possible. Without this information, assessing the burden of TB disease by geographic region and targeting prevention and control efforts accordingly is inefficient.

Treatment completion. The mobility of binational patients within the United States and back and forth across the Mexico-United States border complicates the continuity of treatment and decreases the rate of treatment completion. Only limited data regarding the outcomes of binational cases and the factors that contribute to satisfactory outcomes have been published. Also unclear is the extent to which resources should be directed toward developing and evaluating methods to ensure that treatment is completed. Without this knowledge, it is hard to determine which aspects of the clinical and public health management of binational TB cases are beneficial, which aspects should be encouraged, and which aspects should be improved, modified, or abandoned.

SINOPSIS

Prevención y control de la tuberculosis a lo largo de la frontera entre México y Estados Unidos

El número de casos de tuberculosis registrados en los Estados Unidos de América (EE.UU.) disminuyó entre 1990 y 1999, pero la proporción de casos ocurridos en personas nacidas en el extranjero aumentó de 24 a 43%. Gran parte de estas personas habían venido de México y de Centroamérica y entre ellas había individuos y familias que habían entrado en los EE.UU. legalmente, así como otras sin permiso ni documentación. El problema de la tuberculosis en los EE.UU. está concentrado en gran medida en los cuatro estados fronterizos con México: Arizona, California, Nuevo México y Tejas. Como reacción a estas tendencias, en junio de 1999 los Centros para el Control y la Prevención de Enfermedades (CDC) de los EE.UU. organizaron una reunión de los funcionarios responsables del control de la tuberculosis en estos cuatro estados, con el fin de desarrollar una estrategia nacional coordinada. Este grupo de trabajo especial ha elaborado recientemente un documento con información sobre los antecedentes del problema y propuestas para acciones futuras por parte de los organismos gubernamentales de los EE.UU. y de los programas estatales y locales. El informe se centra en cuatro áreas principales: 1) necesidades de la vigilancia; 2) tratamiento de los casos y su cumplimiento; 3) indicadores de rendimiento y evaluación del programa, y 4) necesidades de investigación. El grupo especial de trabajo identificó los problemas clave, los objetivos y los recursos necesarios en cada una de estas áreas para potenciar los esfuerzos para prevenir y controlar la tuberculosis a lo largo de la frontera.
