

POSITION PAPER • WORKGROUP 2

TUBERCULOSIS TRAINING AND EDUCATION FOR *Public Health Sector*

I. INTRODUCTION

This paper presents the tuberculosis (TB) training and education needs of providers working in the public health sector. In the United States, state and local health departments have legal responsibility for the prevention and control of TB in their communities. They are responsible for surveillance, contact follow-up, outreach programs, training and education, the monitoring and evaluation of TB case management, and especially completion of treatment. In some states, TB control programs also conduct overall planning and development of policy, and provide laboratory and diagnostic services. Through public hospitals and clinics, they also provide direct care and treatment for certain segments of the community's population, often those most vulnerable to infection. Health departments also provide TB education on an ad hoc basis in response to TB cases in schools, workplaces, and other settings. Public health workers are expected to maintain high standards of quality and high levels of expertise.

The goals of the workgroup were to examine the current scope of effort in the public health sector and to develop strategies that could lead to a more comprehensive and coordinated approach to TB training and education that would meet the varied needs and responsibilities of public health providers. In this paper, the workgroup:

- Profiles the target audiences, identifying the job categories in the public health sector that would be appropriate recipients of TB training and education
- Defines issues and problems relevant to TB training and education for the target audiences
- Catalogues programs, models, and organizations that have been successful in reaching these audiences, and resources available for this purpose
- Identifies the target audiences' training needs, as well as the barriers that impede efforts to meet these needs

- Presents strategic objectives, related to the goals of the Strategic Plan, that are designed to address the issues raised

The original version of this paper was prepared for the *National Strategic Plan for Tuberculosis Training and Education* and was published in that document in January 1999. For the current version of the Strategic Plan, the paper has been substantially revised and updated.

II. TARGET AUDIENCES

The target audience addressed by this paper is providers in the public health sector. The term “provider” is interpreted broadly here, encompassing:

- Administrators
- Clerical staff
- Clinicians (physicians and nurses)
- Communicable disease investigators
- Engineers
- Health educators
- Industrial hygienists
- Laboratory workers, including bench technicians
- Outreach workers
- Social workers
- Epidemiologists
- TB register staff

Management staff should also be targeted for TB training and education. Management staff includes:

- Health department leadership and decision makers
- TB laboratory leadership in public health departments
- Nursing and health/medical directors
- TB program managers

Providers in the public health sector have a variety of educational backgrounds, related in large part to their job responsibilities:

Public Health Sector

- *TB control program managers* are generally expected to have masters-level training in public health or equivalent experience; some also have medical professional backgrounds (e.g., medicine, nursing)
- *TB surveillance staff* are a mixed group, ranging from persons with formal public health training in epidemiology and biostatistics to clerical staff, whose core responsibilities include data collection, data analysis, and data entry
- *Communicable disease investigators and outreach workers* range from persons with college-level degrees or training in nursing or other fields to persons with a high school education
- *TB clinical staff* include physicians, nurses, nurse practitioners, and physician assistants
- *TB laboratory staff* include lab directors, managers, analysts, bench technicians, and administrative support staff
- *Other local public health department staff* (including staff from bioterrorism programs) might need to be cross-trained in TB and other communicable diseases

The demographics of the TB public health workforce are currently highly varied, but the need for further diversity still exists. In the U.S., the increasing prevalence of TB in foreign-born persons has resulted in clients from a wider range of cultural and linguistic backgrounds. Whenever possible, public health staff should be composed of individuals from a similarly broad spectrum of backgrounds in order to reflect this demographic trend in their clients.

In addition to TB workers, it is essential to target public health staff who work with high-risk clients in other units, such as HIV/AIDS programs, migrant and refugee health programs, homeless shelters, nursing homes, and correctional facilities. The unique TB training and education needs of providers working with these groups are addressed in other position papers.

III. DEFINING THE ISSUE

Tuberculosis rates and cases declined every year from the early 1950s until the mid-1980s. As TB hospitals closed in the 1960s and 1970s, follow-up and treatment for TB became primarily the responsibility of health departments, although in some areas many patients were increasingly treated in the private sector. Patients who needed inpatient care were sent to general hospitals, and the average period of hospitalization began to decline. In the mid-1970s, as TB incidence continued to wane, many areas became complacent about TB. Many states and cities redirected resources that had been allocated for TB prevention and control to other needs.

Public Health Sector

In the mid-1980s, TB came back with a vengeance. TB cases increased by 20 percent from 1985 to 1992. Outbreaks of multidrug-resistant TB (MDR TB) occurred in hospitals and prisons with high death rates and transmission to healthcare workers.

In 1989, the *Strategic Plan for the Elimination of Tuberculosis in the United States*¹ was published and distributed by the Centers for Disease Control and Prevention (CDC)/U.S. Department of Health and Human Services' Advisory Committee (now Council) for Elimination of Tuberculosis (ACET). This document charged all TB control programs with the mission to eliminate the disease in the United States by the year 2010. It set out strategies for eliminating TB, which were based on the needs and responsibilities of the various groups involved in this effort. Health department TB control program staffs were one of these specified groups.

In 1992 and 1993, Congress substantially increased resources needed to re-establish the public health infrastructure to bring TB back under control. Thousands of additional full-time and part-time public health workers were hired and trained to supplement the existing TB workforce. Public health departments improved TB surveillance and TB outpatient treatment clinics. They also strengthened capabilities for patient treatment and follow-up, contact investigation, and related preventive therapy. Much of the responsibility for TB control fell on the health department leadership, laboratorians, clinicians, nurses, clerical and support staff, and outreach workers. Nationwide, emphasis was placed on better laboratory capabilities and patient follow-up (particularly directly observed therapy [DOT]). In addition, renewed emphasis was placed on improving contact investigation, as well as screening and preventive therapy for high-risk individuals. Consequently, health departments were able to better detect and treat persons with active TB and latent TB infection (LTBI).² TB cases declined every year from 1993.

In 1995, ACET published and distributed *Essential Components of a Tuberculosis Prevention and Control Program*³ to provide a model for TB control programs and to describe the essential components for elimination of TB in the U.S. This document provides a national standard for the assessment of individual TB control programs by TB control program managers, policy makers, and others who play a role in evaluating TB programs. In addition to defining the essential components of a TB control program, these recommendations emphasize:

- The importance of prioritizing TB control activities
- The coordination of care with other healthcare providers, facilities, and community organizations
- The use of alternative approaches to TB control (e.g., the expanded use of directly observed therapy and directly observed preventive therapy [DOPT])

Public Health Sector

TB control program managers are charged with the task of attempting to incorporate each of the core components into program activities.

The TB picture is changing again. More and more states and individuals are looking to community-based health care providers and clinics, which are increasingly providing TB-related care and prevention services to persons with TB and those at risk for TB. Public health TB program managers and surveillance staff must work with these private providers to fulfill their responsibilities. Despite this trend, most communities, managed care organizations, and other healthcare providers continue to look to health departments for TB clinical expertise, laboratory services, patient follow-up (including DOT), and contact investigation.

The current climate of the public health system cannot be ignored when discussing the environment in which TB control activities are being performed today. Decreasing TB program budgets threaten the ability of state and local health departments to maintain adequate staffing levels and ensure that staff are adequately trained and supervised. Moreover, attention is shifting to newly funded bioterrorism programs. Although these programs may create an opportunity for public health agencies (e.g., they could potentially “upgrade state and local public health jurisdictions’ preparedness for and response to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies”⁴), a crisis for TB programs could result as staff are pulled from the latter to work on the new bioterrorism programs.

Overall, the workers who practice public health are the most important element of our nation’s public health infrastructure and our ability to be prepared for the future. Yet the public health workforce—no matter how dedicated its individual members may be—is unevenly trained in the basic tenets of public health. This has been a long-standing problem in the field, in part because public health is a collective of many other disciplines. The lack of formal training in public health for a large proportion of the public health workforce can only hinder efficiency and progress in the fight against TB.

Furthermore, the U.S. is currently experiencing a nursing crisis that is unlike any of those in the past. The Robert Wood Johnson Foundation, which commissioned a study of the shortage in April 2002,⁵ states that the nursing profession needs to be re-envisioned so that it can emerge from the crisis stronger and in equal partnership with the profession of medicine. In the meantime, public health departments at the state and local levels—and therefore TB control and prevention programs—are negatively impacted. TB nurse positions often remain vacant for months, leaving programs struggling to meet their patients’ needs and their program objectives.

Public Health Sector

It is critical that intervention be developed to address the shortage so that nursing leadership throughout the country can prepare the next generation of nurses to include experience in, and orientation to, the treatment and prevention of TB.

In 1998, the National Academy of Science's Institute of Medicine (IOM) undertook a study sponsored by the CDC to determine the feasibility of TB elimination in the U.S. The report of the study, published in 2000, was entitled *Ending Neglect: Institute of Medicine Study on the Elimination of Tuberculosis in the United States*.⁶ The IOM Committee's intent was to develop conclusions and recommendations regarding: 1) a framework to guide a national campaign to eliminate TB in the United States; 2) region-specific action steps required to work towards that goal; 3) research needs and priorities for national TB elimination; 4) information for healthcare providers and the public regarding the importance of vigilant and continued attention to TB control; 5) health plan (fee for service and managed care) responsibilities for TB prevention and control; 6) federal, state, and local public health policy makers' responsibilities and options regarding infrastructure needs; and 7) strategies for U.S. contributions to worldwide TB prevention and control, leading to worldwide TB elimination. Following are some of the key recommendations with implications for training and education that impact TB program staff:⁷

Recommendation 3.5: To promote a well-trained medical workforce and educated public the committee recommends that:

- The *National Strategic Plan for Tuberculosis Training and Education*, which contains the blueprint that addresses the training and educational needs for tuberculosis control, be fully funded.
- Programs for the education of patients with tuberculosis be developed and funded.
- Funding be provided for government, academic, and non-governmental agencies to work in collaboration with international partners to develop training and educational materials. (page 53, pages 61-121)

Recommendation 5.3: To promote better understanding of patient and provider nonadherence with tuberculosis recommendations and guidelines, a plan for a behavioral and social science agenda should be developed and implemented. (page 123)

There is a need to understand the determinants of behavior of healthcare providers and systems (e.g., health maintenance organizations), as well as the behavior of patients, and to improve methods for predicting and monitoring patient adherence and compliance with therapy, particularly in marginalized populations and immigrants. (page 130)

The chapter entitled "Lack of Knowledge About Need for and Importance of Contact Investigations" stresses three components of contact investigation education: provider education

(including public health), patient education and contact investigation, and the patient–provider relationship (pages 111-112). Attention is drawn to the fact that providers often lack the necessary training and experience to understand the need for a systematic approach to contact investigation. Public education of the patient who has symptoms of TB is important because a patient who have this knowledge are less likely to delay diagnosis, a delay that could result in transmission of the disease to uninfected persons. Also, the patient–provider relationship is often complicated by differences in attitudes and beliefs, as well as differences in social or cultural circumstances. To overcome all of these obstacles, providers need skills in patient assessment, interviewing, counseling, communication, and in the administration, reading, and evaluation of skin tests. (page 113)

CDC’s *Response to Ending Neglect*⁸ describes CDC’s strategy for achieving TB elimination, which takes into account the challenges, advances, and collaborations of the past, and builds on them. In “Section I. Maintain Control of TB,” the objective is to “maintain the decline in TB incidence through timely diagnosis of active TB disease, appropriate treatment and management of persons with active disease, investigation and appropriate evaluation and treatment of contacts of infectious cases, and prevention of transmission through infection control.” Many of the activities proposed as efforts to meet the objectives of the CDC strategy involve education and training. For example:

- Develop guidelines, models, and training materials for developing programmatic capacity to conduct cohort reviews (pages 23-24)
- Ensure that community-based healthcare providers are trained in the diagnosis and treatment of TB disease and latent TB infection (pages 24-25)
- Enhance the capacity of state and local TB control programs to conduct contact investigations, and ensure that infected contacts complete TB treatment (pages 26-27)
- Educate the public and train healthcare providers to maintain excellence in TB services (pages 33-34)

IV. SUCCESSES AND RESOURCES

The organizations, programs, projects, and materials described below are examples of successful approaches and resources for providing TB training and education to the target audiences listed in Section II:

Tuberculosis Education and Training Resource Website

Maintained by CDC, the *Tuberculosis Education and Training Resource Website* is an online searchable database of TB education and training materials and resources currently available for providers, patients, and the general public. It is an excellent place to begin when searching for TB training and education resources. The website evolved from the CDC's print document, the *Tuberculosis Education and Training Resource Guide*, and incorporates the resource inventory compiled for the first Strategic Plan. Listings include resources that apply to particular audiences, including persons who work in the public health field. The website address is:

<http://www.findtbresources.org>

All agencies involved in TB control are encouraged to make regular use of this website, both to list new products they have produced and to ascertain what materials are already available. This participation will make the website an even more effective means of conserving funds, coordinating efforts, and sharing resources. For more information, refer to Attachment C.

Other Training and Education Resources from CDC

Historically, many TB training needs have been anticipated and met by special training programs designed by CDC. In particular, training has been designed and offered for TB program managers. CDC's Division of Tuberculosis Elimination (DTBE) offers the *TB Program Managers Course* annually to TB controllers, program managers, public health advisors, and nurse consultants with programmatic responsibilities at the state, city, and regional (within a state) levels. The purpose of the course is to provide participants with information and the knowledge, skills, and abilities (KSAs) needed to manage a TB prevention and control program, and to assist them in developing a detailed action plan to implement these KSAs at their respective worksites in the form of a planning guide.

Federal funding to health departments was increased in 1992 to hire more public health workers in TB programs. This in turn created the need to develop accurate, effective training products for large numbers of entry-level public health workers. To enhance the effectiveness of TB prevention and control programs in the states by facilitating training for entry-level public health workers on TB transmission, pathogenesis, epidemiology, diagnosis, treatment, and infection control, CDC developed the following two products:

The first product, *Self-Study Modules on Tuberculosis*, which contained five modules, was developed to provide basic information about TB to new, entry-level healthcare workers. These print-based materials provide consistent information to all participants, regardless of the setting in

Public Health Sector

which the modules are used or the differences in the knowledge levels of the local trainers. In 1999, DTBE published four more modules in the self-study series. The topics covered by these modules are: TB contact investigation, confidentiality, TB surveillance and case management in hospitals and institutions, and patient adherence. All nine modules are commonly used training materials in TB programs across the country. Various forms of continuing education credits are available for each of these modules. The modules are also offered as a web-based course, accessible at: <http://www.phppo.cdc.gov/phtn/tbmodules/Default.htm>

The second product, *A Satellite Primer on Tuberculosis*, was a five-session, interactive satellite-broadcast course designed to enhance the information in the self-study modules. It was broadcast in 1995 to 575 downlink sites in 47 states, reaching over 6,000 participants. This course was developed through a collaborative process. The collaboration included the University of Alabama at Birmingham School of Public Health; the Division of Tuberculosis Elimination and the Division of Media and Training Services of the Centers for Disease Control and Prevention; and the Alabama Department of Public Health. A videotape version is still available.

CDC has also produced a *Core Curriculum on Tuberculosis*. This curriculum is revised and updated on a regular basis (currently in its fourth edition). Continuing education credits are available for this curriculum as well.

CDC has developed other education and training resources, including TB elimination workshops, TB infection control products, Mantoux testing products, patient education materials, a contact interviewing course, and provision of education and training technical assistance.

CDC regularly publishes American Thoracic Society (ATS)/CDC and CDC/ACET statements and guidelines on diagnosis, treatment, and control of TB, as well as slide sets and other print materials, such as articles from *Morbidity and Mortality Weekly Report* (MMWR), reports, and fact sheets. Recent guidelines, which are useful in initiating training efforts, include: *Treatment of TB* (2003); *Environmental Infection Control in Health Care Facilities* (2003); *Progressing Toward Tuberculosis Elimination in Low-Incidence Areas of the United States* (2002); and *Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection* (2000).

CDC also provides training and education through its website. Many publications are available for viewing and downloading, and print versions may be ordered online. The website address is: <http://www.cdc.gov/tb>

TB Education and Training Network

One outcome from the first round of strategic planning for TB training and education in 1998 was the recommendation to establish a network of persons involved in planning, producing, providing, and promoting activities and materials in this area. As a result, the CDC-sponsored TB Education and Training Network (TB ETN) was established in 2001. With more than 400 members, TB ETN is helping to build a cadre of TB educators and trainers with improved skills and abilities, knowledge of available resources, and ability to serve as a resource for high-priority needs, such as TB outbreaks and implementation of new guidelines. TB ETN sponsors annual meetings and workshops on health education, training, and communication issues, and has established the TB-Educate Listserv to aid communication and build community among those involved in TB education and training. For more information, refer to Attachment C.

Model TB Centers

In response to the resurgence of TB in the mid-1980s, CDC began funding three Model TB Centers in 1994. Since that time the Model TB Centers—the Francis J. Curry National Tuberculosis Center (California), the Charles P. Felton National Tuberculosis Center at Harlem Hospital (New York), and the New Jersey Medical School National Tuberculosis Center (New Jersey)—have developed many resources for training public sector providers, including:

- ***Training courses*** that target all public sector TB providers and staff, including physicians, nurses, case managers, communicable disease investigators, surveillance staff, program managers and supervisors, and outreach staff. For jurisdictions that have dedicated training staff, courses are sometimes developed in a train-the-trainer format in an effort to build the training capacity of state and local TB program staff
- ***Print materials***, such as handbooks, manuals, and self-study modules for healthcare providers; TB information cards, posters for physicians on TB treatment regimens; guidelines for implementing DOT and DOPT, improving contact investigation performance, diagnosing latent TB infection, and preventing *M. tuberculosis* transmission in institutional settings; and training materials for numerous target audiences, including school nurses
- ***Distance-learning products*** in various formats (CD-ROM, videos, web-based interactive modules) addressing such topics as TB contact investigation, confidentiality, adherence to treatment, infection control, engineering controls, quality assurance, and clinical issues
- ***Telephone consultation*** by TB experts for public and private healthcare providers

TB Controller Associations

The National TB Controllers Association (NTCA) holds an annual meeting for the national TB control community. Widely attended, it offers a significant opportunity for professional development of TB program staff. Recent conference themes include maintaining the momentum with TB case management and treatment; program evaluation; and contact investigation and outbreaks. The National TB Nurse Consultant Coalition (NTNCC), which meets annually during the NTCA meeting, also provides educational opportunities for its constituents.

Some regional TB controllers groups—such as California’s, the Northeast’s and Southeast’s—have been in existence for some years. A number of new groups have recently emerged, including Four Corners, Midwestern, Southwest, Northern Rocky Mountains, and Great Lakes. In addition to the coordination and networking activities of these groups, some offer annual opportunities for their members to participate in training and education activities.

Tuberculosis Curriculum Coordinating Center

The national TB Education Consortium is based at the University of California San Diego School of Medicine and has been funded by the National Heart, Lung, and Blood Institute of the National Institutes of Health for five years as the Tuberculosis Curriculum Coordinating Center (TCCC). The TB Education Consortium is a collaborative group of 26 partner schools and over 30 partner organizations initiated in the fall of 2003. Participants are focusing on curriculum development and improvement in health care professional schools throughout the U.S. (programs that provide basic education for students of medicine, nursing, pharmacy, public health, respiratory therapy, medical technology, and physician assistance programs). Curriculum development includes innovative web-based technology as one way of disseminating information, as well as more traditional methods, such as abstracts and presentations at professional meetings and publications in appropriate journals.

National Jewish Medical and Research Center

The National Jewish Medical and Research Center has traditionally trained expert TB clinicians and is known worldwide for its TB training. The Center provides training for fellows, residents, medical students, and postdoctoral candidates; offers a lecture course on TB on a regular basis; and provides a telephone consultation service for physicians. It also serves as a training ground, providing extensive opportunities for fellowships for post-degree candidates. The Center offers a training course on TB clinical management that is attended by many health department clinicians.

State and Local TB Programs

State and local health departments and TB programs offer a variety of opportunities and resources for TB training and education. Some states (e.g., Indiana, Mississippi, New York, and Washington) hold annual or other regular TB conferences or symposia. California provides contact investigation and interview training throughout the state on a regular basis.

A number of states provide technical assistance on TB control to all counties. For example, Washington State TB program staff—which include a physician consultant, three nurse consultants, and three outreach workers—provide TB technical and program consultation services to 34 local health jurisdictions, each of which has independent authority related to TB prevention and control. Program evaluation and recommendations regarding TB case management and treatment of LTBI are offered to local health jurisdictions, schools, clinics, long-term care facilities, correctional facilities, homeless shelters, and other public and private agencies in the state. Consultation is provided to local health TB program staff in planning, implementing, and evaluating TB programs, and in distributing nursing services according to local needs. In addition, ongoing quality assurance services are provided to ensure that practice standards for TB case management and contact investigation are met (the program initiated a cohort review process—based on New York City’s model—in May 2003).

Likewise, the Florida Bureau of Tuberculosis and Refugee Health provides direct technical assistance and professional consultation in the prevention and control of TB to all county health departments, the professional community, public organizations, and the citizens of Florida. Headquarters staff comprise multilevel disciplines to offer nursing consultation, field services support, technical assistance, surveillance, epidemiology, data management, outbreak response, educational materials, and appropriate referrals to its constituents.

The New York City Bureau of TB Control conducts training for entry-level public health advisors when needed. This extensive four-week course prepares the TB field worker to conduct all TB field-related activities.

Many state and city health departments have used the *Self-Study Modules on Tuberculosis* and similar products, or have developed their own training programs for public health staff, particularly New York City and the larger western and southern states. Some states and cities effectively use TB case conferences and cohort reviews as training mechanisms for clinical, nursing, and outreach staff.

A number of states offer training courses, interviewing classes, and conferences. Examples include:

- California's Interviewing Skills for TB Professionals course
- Illinois' Immunization and Infectious Disease Conference
- Massachusetts' TB Today course
- Mississippi State TB Conference
- North Carolina's Tuberculosis-Respiratory Disease Institute
- South Carolina's TB Today course
- Skin testing certification courses offered by various states

Resources for Laboratorians

TB lab testing has been viewed as specialized or different from other lab testing because TB takes longer to grow than other bacteria, methods are different from those used for other bacteria, and safety procedures are more stringent to protect the worker from these Class III pathogens. As TB diagnosis has been decentralized, so has the testing. This has resulted in more microbiology generalists performing specialized testing and a broader population being involved with laboratory reporting issues. Several years ago, CDC restructured its training branches and no longer consistently offers specialized bench training in mycobacteriology methods.

In some states, the laboratories look to infection control organizations such as Association of Practitioners of Infection Control (APIC) to do in-services. In other states, such as California, the National Laboratory Training Network (NLTN) has offices in the state laboratory building. There is a statement of support for NLTN's work and TB training for laboratorians in the state's *State Plan for Elimination of TB*. The Association of Public Health Laboratories (APHL) has also helped increase TB laboratory capacity.

The NLTN (sponsored by APHL and CDC) trains lab staff. Their subsidiaries, Area Laboratory Training Alliances (ALTA), group the country into areas. Training of many kinds (from slides that can be viewed in the workplace up to and including wet lab courses) is available. ALTAs specialize and support each other to broaden offerings.

Driven by the May 2000 IOM report on TB and by increasing imperatives for high-quality, cost-effective lab services in an environment of declining case rates and shifting public health priorities across the U.S., APHL and CDC commissioned a Task Force on the Future of TB Laboratory Services to define and address the laboratory issues critical to TB laboratorians, public

health officials, and health care providers. The primary goal of the task force is to improve TB control through optimal use of laboratory services and effective reporting and tracking of information. This purpose is to be achieved by using basic principles of good laboratory and clinical practice to guide the creation of specific benchmarks for jurisdictions to follow, thereby ensuring that state-of-the-art methods are efficiently utilized to deliver timely and high-quality TB lab services to providers and health departments.

Other Training and Education Resources

Other professional organizations that offer TB training and educational opportunities through their annual meetings include ATS, the International Union Against TB and Lung Disease, the American Lung Association (ALA), the Infectious Disease Society of America, the American Academy of Pediatrics, and the American College of Chest Physicians.

New technologies, including CD-ROMs, videos, satellite down-link equipment, and video and audio conferencing, are available. There are knowledgeable and capable TB staff and medical consultants in many states and localities who provide telephone and ad hoc consultation. TB experts are willing to speak at conferences. In some instances, local affiliates of the ALA serve as a resource and help keep TB on the agenda.

V. NEEDS AND BARRIERS

Current information shows that many jurisdictions conduct some training. According to the NTCA, however, the capacity for training and education in many local and state TB programs remains inadequate despite the resources that exist. As resources are scarce, training activities frequently are targeted to small numbers of participants and carried out on an occasional, rather than an ongoing, basis.

In 1998, the membership of NTCA and the National TB Nurse Consultants Coalition (NTNCC) were surveyed as part of the planning process for the first Strategic Plan. In 2001, the three Model Centers sponsored a second TB training and education survey, identifying NTCA members and TB programs (state and big-city) across the country as respondents. As part of the 2003 strategic planning process, another survey on TB training and education, fielded as a brief, web-based questionnaire, was sent to members of NTCA and NTNCC, as well as to subscribers of the TB Educate Listserv. The survey's objective was to present an overview of the national state of TB training and education and to provide data comparable to the earlier surveys when possible. A

report from the survey results is included in this document as Attachment B. Results of the 2003 survey relevant to this position paper were as follows:

- Respondents reported a high utilization of classroom-style lecture with print and video as supporting elements
- Respondents believed that in only a few key audiences are a majority of individuals receiving appropriate TB training and education
- Respondents believed that penetration of TB training and education is strong among TB program audiences, but they think that significant percentages of important external audiences are not being reached—despite the general availability of core TB topics
- Half of the responding NTCA and NTNCC members were aware of the Strategic Plan, and only a quarter of them reported using it

Recent program research has led to new programmatic innovations, which, while having great potential for improving TB programs, provide new challenges for the training and education of the public health workforce. For example:

- There is increasing emphasis on program evaluation for the purposes of continuous quality improvement, accountability, and the building of the science of public health. However, many public health practitioners have little knowledge of evaluation principles and limited training or experience in planning and implementing program evaluation activities.
- Likewise, there is an increasing emphasis on the use of data and research to better understand what works best to improve the public's health.⁹ The need exists to strengthen ability of TB control staff to evaluate effectiveness, accessibility, and quality of personal and population-based health services.
- Lastly, there is an increasing emphasis on developing consistent standards for public health agencies and professionals.¹⁰ This issue is highly relevant for the TB community because few, if any, TB-specific competencies and performance standards have been developed nationally for TB staff and providers. Although some state and local health departments do have standards, many do not. The absence of guidelines diminishes the impact of TB training and education efforts, at both the individual and program levels.

As mentioned earlier, few if any core competencies have been developed for specific professional groups. The development of such guidelines by a national advisory group, and their integration into public health TB programs, could have a tremendous effect on training and education outcomes. Educational activities could then be developed using the defined core competencies as a framework for developing curricula for particular audiences.

Public Health Sector

Additionally, the planners of training activities may fail to take advantage of existing materials and resources, usually because they are unaware that these resources are available. A number of activities and resources have been developed to address this lack of awareness, including the TB ETN, TB Educate Listserv, CDC's *Tuberculosis Education and Training Resource Website*, and regular updates via conferences, newsletters (e.g., *TB Notes*), and mailings of materials to TB programs.

Another critical issue is the lack, at the state and local level, of skilled trainers who have time dedicated to education and training. Most TB control programs do not have professionally trained health education staff to lead training and education activities for their own staff or for local private providers. When such activities do occur, they are often developed and conducted by staff who have competing, frontline responsibilities in TB control. In such circumstances, training may be assigned a lower priority and have a lower level of quality than it should.

Solutions may require regional support. The need for regional support may be especially great among programs that are small, that are located in low-incidence jurisdictions, or that are experiencing high staff turnover. Also, regional support for on-site training of TB program staff could enable programs to provide local training to private-sector healthcare providers regarding such matters as improvements in TB diagnosis, case reporting, targeted testing, and treatment needs. The enhanced access to educational materials and technical assistance has been positive, but resources for direct, face-to-face training are still needed.

Three immediate solutions present themselves as means of making on-site training available. The first is to continue the development of the TB ETN. This network has the potential to enhance the capacity of designated training and education staff in TB control programs. Enhanced local capacity, in turn, supports local staff and underpins educational outreach to private physicians and other providers likely to need TB training and education.

A necessary and complementary solution is to increase the funds allocated to TB programs for training and education. With additional money, TB programs, especially those in small or low-incidence jurisdictions, would be better able to concentrate staff resources on training needs without sacrificing other aspects of ongoing TB control.

The third potential solution is to expand the Model Center system to accommodate all regions of the U.S. (similar to the 13 regional STD/HIV Training Centers located throughout the country). Expansion would allow Model Center staff to travel in narrower geographic areas, supplementing regional training by delivering on-site training to staff in the field. The NTCA has recommended

that the CDC review and consider this model, which they see as a worthy one because so many TB control programs do not have the funds to send staff to off-site training.

Beyond an immediate expansion of the Model Centers as a resource for on-site training, further enhancement of the system should be considered. NTCA has recommended that there be an external review of Model Centers to define the TB training and education needs in the U.S. and the role of the Model Centers in this process. It was suggested that the review should assess TB education and training in comparison to the training provided on sexually transmitted diseases and HIV through the National Network of STD/HIV Prevention and Training Centers, in order to identify useful methods and potential areas of collaboration.

Finally, the need for expanded availability of medical expertise and consultation must be addressed. A number of “warm-line” services currently exist to provide clinicians with phone, fax, or e-mail access to TB experts when detailed treatment questions arise. These efforts should be quantified and expanded, in consultation with NTCA and NTNCC. As with other forms of TB training and education, medical consultation should be regionalized through a combination of federal and multi-state initiatives to provide better access to and more efficient utilization of clinical, epidemiological, and other technical services.

Needs of Specific Audiences

TB Clinical Staff. One need is comprehensive TB training for all public-sector nurses and physicians, especially in health departments who provide TB care. The training should include:

- Advanced diagnostics
 - Diagnosis of active TB disease (pulmonary and extrapulmonary) and LTBI
 - Laboratory: detail on smears, cultures, susceptibilities; rapid methods and analysis of results; pathology reports
 - X-ray: review of typical and atypical presentations of disease; use and value of CT scans; utility of follow-up x-rays
- Treatment recommendations, including the selection of drugs for treatment of TB disease and LTBI, drug resistance, drug interactions and side effects, DOT strategies and treatment outcomes, and treatment failure
- Other topics, including promotion of patient adherence, infection control practices, contact investigation, case management, skin testing, Bacille Calmette-Guerin vaccination, the role of the health department in TB control, cultural competency, and HIV counseling and testing skills

Public Health Sector

Public Health Nurses. Public health nurses (PHNs) need most of the same information as the TB clinicians, but to a lesser extent. As the most common provider to TB patients in the field, it is imperative that they be well trained in almost all facets of TB care and control. In addition to the topics listed above for TB clinician staff, PHNs need training on:

- High-risk contact investigation and follow-up
- Training and working with communicable disease investigators, outreach workers, social workers, epidemiologists, and other allied health professionals
- Strategies of working with foreign-born populations

Effective TB control increasingly relies on interdisciplinary teams to work with at-risk communities. However, a recent study of the PHN workforce in California found that “the majority of PHN staff and managers are aware of tensions between PHNs and other groups of public health workers based on overlapping duties or role definitions. Staff and managers most often express an awareness of PHN staff tensions with community health outreach workers, communicable disease investigators, and medical assistants.”¹¹ Thus, it is important for the training and education of allied health professionals and PHNs to provide staff with the skills and abilities to function effectively as a team and to recognize the unique skill set that each profession brings to TB control efforts. The study also underscores the need for program managers to clearly define roles and responsibilities to help prevent tensions between co-workers.

TB Program Managers. As successful models for working with managed care continue to evolve, it will be important to create training that will give TB program managers the skills they need to work with the managed care organizations on developing collaborative efforts. With the increase in managed care organizations in the United States, and more persons with or at risk for TB being treated by these organizations,¹² it is essential that TB program managers ensure that the critical components of TB prevention and control are in place to prevent cases from occurring and drug-resistant disease from developing because of inappropriate treatment and follow-up.

Health department TB controllers and program managers need a solid understanding of basic TB transmission and pathogenesis, as well as clinical care and control issues. In addition, they need training and skills in epidemiological principles; biostatistics; risk management; program evaluation, including cohort review process; staff development, including use of paraprofessionals; fiscal management; cultural competency; general program planning; policy development; performance management; strategic planning; and leadership.

It would also be useful for TB program managers to receive training to help them develop skills in coalition building and in public awareness and communications activities directed toward the general public and policy makers.

Communicable Disease Investigators. Communicable disease investigators (CDIs) play an increasingly prominent role in TB control programs nationwide. Since some TB programs hire CDIs to conduct contact investigations and other field activities, CDIs are key players on the TB control team.

Few formal CDI training programs exist for CDIs working in TB control. Instead, most learn on the job, shadowing their colleagues and supervisors. Standardized CDI curricula that match the CDI professional scope of practice are needed and should include a rigorous field component. Suggested topics to include are:

- Introduction to public health
- Introduction to epidemiology
- TB 101 (e.g., transmission and pathogenesis, diagnosis and treatment)
- The role of the CDI on the TB control team
- Ethics and confidentiality
- Outbreak investigation
- Phlebotomy and tuberculin skin testing certification (where permitted by law)
- Introduction to health care delivery and financing
- Infection control
- Public health and the law
- Interviewing techniques to identify and locate TB contacts
- Field investigation strategies and field safety
- HIV counseling, testing, and referral
- Patient education
- Adherence-enhancing interventions
- Cultural aspects of TB control

California is one state that is working to promote the use of CDIs in TB control programs. The state TB program's plan is to standardize and improve the public health education and training of CDIs working on TB control through the following activities: development of core competencies and practice standards; developing training curriculum and materials; developing tools and methods for promoting ongoing assessment and development of knowledge, skills and abilities; and developing a plan for promoting, implementing, and sustaining the training and use of CDIs

Public Health Sector

in California TB control programs. The products from this initiative could benefit TB control programs throughout the country that have an interest in developing the role of CDIs.

Outreach Workers. Outreach workers play a critical role on the TB control team and their impact can be maximized by ensuring that all members of the team understand and respect this role.

In an evaluation of TB outreach workers, both outreach workers and their supervisors were asked what knowledge and skills they felt were essential to the effectiveness of outreach worker activities. These included:

- Knowledge of TB
- Knowledge of TB case management
- Confidentiality
- Treatment side effects and when to report them
- Communication skills
- Knowledge of laboratory and packing requirements for shipping lab samples
- Knowledge of local health care and social service systems
- Knowledge of the patients' language and culture
- Knowledge of other diseases and how they relate to individual patients¹³

Health Educators. Health educators play a critical role on the TB control team. To carry out their role effectively, health educators must have strong presentation and training skills, as well as knowledge of:

- Systematic health education planning processes
- Development of educational materials, and adaptation and modification of existing materials
- Training and education resources and how to access them
- Methods for conducting evaluations of training programs

Laboratories. The APHL/CDC Task Force on TB laboratory services recognizes that there is great variation in the need for laboratory services among the nation's TB-diverse state and local jurisdictions. These needs must be identified and addressed in specific jurisdictional strategic plans, created by states and local programs with guidance developed by the Task Force, and using a systems approach. The aim is to ensure that laboratorians are appropriately trained in such areas as quality and proficiency of laboratory services; appropriate use of new technologies; development of repositories of isolates and fingerprinting capability; timely flow of information

Public Health Sector

in all directions (provider, public health, laboratory); clinical TB; and appropriate use of TB laboratory testing.

Elements of a jurisdiction's plan would be subject to an ongoing performance assessment that uses specific outcome measures developed by the Task Force. These might include items such as definitions of appropriate turnaround times for smears, cultures, and drug susceptibility testing; appropriate uses of nucleic acid amplification test; and criteria for using molecular epidemiologic tools like DNA fingerprinting. Another criterion should require that all MDR TB susceptibility testing be performed by lab analysts who have been trained to perform both primary and secondary drug susceptibility testing.

Finally, it is critical for laboratory workers to understand the role they play in the big picture of TB control. They should be invited to basic TB training courses, as other health care workers are, and encouraged to participate in TB program staff meetings, case conferences, and regional or statewide TB meetings. Laboratory training needs include:

- Wet lab training (as opposed to didactic or book-learning techniques)
- Technical training, especially in new methods (including genotyping)
- Risk assessment training for the safe handling of TB in the laboratory

Other Needs

Other types of training activities and resources needed for the public health sector include:

- Sufficient entry-level training and continuing educational updates at least yearly
 - Sufficient ongoing training for experienced staff and supervisors to support new interventions (critical to the effective training of entry-level staff)
 - A comprehensive TB procedure manual (local and national standards)
 - Standardized curricula based on consensus core competencies, including trainer materials and tools, to facilitate training activities
 - Training materials and support geared to providers in low-incidence areas and to those who encounter TB cases only occasionally
 - Resources dedicated to training and education staff and activities
 - Incentives for training, including resources to promote physician training
 - Mandates for states or regions to provide training
 - External funding and assistance for local training
 - Technical assistance in training from Model TB Centers
-

- TB experts to teach in areas where there are no training programs
- A national DOT compliance standard and training to support it
- Curricula and materials to address the challenges of working with the foreign-born population, such as culture and language
- HIV/TB training, counseling and referral

In addition, there are training gaps that should be addressed. While TB case management has become more intensive, surveillance for TB in some instances has become weaker. For example, there are high rates of missing data on many of the risk variables that should be collected on each TB case. More emphasis should be placed on training program managers and surveillance staff in methods for performing good TB surveillance, including active surveillance and validation.

Barriers to TB Training and Education

There are a variety of barriers that impede effective TB training and education for public health workers:

Individual barriers, which can include:

- The perception by many staff that they do not need training
- Lack of time for training or self-study
- Lack of knowledge of how or where to access training
- Competing priorities for providers (e.g., administrative duties, non-TB clinical responsibilities, and new public health priorities, such as bioterrorism)
- Travel restrictions due to funding shortages
- A lack of incentives for training

Institutional barriers, which can include:

- Lack of core competencies or practice standards for individual professional groups working in TB control
- Lack of TB education in medical and nursing school curricula
- Lack of user-friendly TB guidelines and recommendations
- Lack of culturally appropriate training materials
- Lack of curricula that reflect the overall responsibilities and training needs of CDIs in TB control

- Supervision and other QA systems are not fully developed or standardized
- Multiple commitments of programs that deal with infectious diseases (infection control) and communicable diseases
- Lack of a standardized language application (Informatics) that would allow partners in TB control to communicate with each other more effectively
- Inadequate local policies and procedures, which are often outdated and do not consistently reflect or reinforce the implementation of performance standards and new skills obtained from training and education
- Lack of qualified and dedicated TB educators in state and local programs who can devote significant time to TB training and education
- Failure of many local TB training and education opportunities to include competence testing during or at completion of the program
- Duplication of effort
- Decreased funding (result of level funding) for TB programs; training is often first to be cut
- Few private funding sources for TB programs outside of state and federal governments
- Lack of funding for ongoing training, beginning at the entry level
- Lack of regionally located Model TB Centers

There are also barriers to creating new training initiatives. An organization must take the lead and compile new information to develop effective training based on local needs. Specific methodologies might need to be tested and refined, as these are important components of the training development process and should not be overlooked. However, program staff might not have the time, skills, or resources to ensure these activities are effectively implemented.

Another type of barrier occurs when there are conflicting opinions between local TB control experts and the CDC about specific aspects of TB control. While CDC recommendations are based on the best scientific evidence available, they are generally intended to be adapted to local epidemiological experience. The challenge arises in creating training and education materials for a national audience, given these local differences. For example, California has guidelines for interpreting tuberculin skin test results that differ from national guidelines. As a result, TB control programs in California must either disseminate CDC materials that do not reflect state guidelines, which may confuse providers, or they must modify materials to reflect state guidelines, which is labor- and cost-intensive. Additionally, individuals who obtain this information directly from CDC are not made aware of the differences.

Public Health Sector

Copyright restrictions pose a different type of barrier. Some training and educational materials have copyright restrictions, which may limit access to needed materials. Additionally, while many educational materials are now available on the Internet, a large number of local health departments still do not have computers, and therefore do not have Internet access.

Staffing issues. Following the most recent resurgence of TB, there was an increase in TB training, education, and staff in some areas that received additional federal funding. As TB rates have leveled off, so has funding in these areas. TB programs will be expected to use existing funds for educational activities that did not previously exist. Difficulties occur when these funds have already been committed to other local TB program priorities. Additional funding is needed to allow states, cities, and other jurisdictions that do not have professional health educators and organized educational programs the opportunity to establish such activities.

The responsibility for much of today's training of public health workers rests with the key state or big-city TB management team, which typically could include the TB controller, TB medical consultant, nursing consultant, program manager, and chief laboratory TB microbiologist. Most of these individuals have other full-time, non-training responsibilities. They are often too busy to adequately plan, implement, or evaluate training activities for their staff, and they may not have the training expertise to do so.

There is an overall shortage of staff, which impacts training. In many areas, high turnover of local TB-related staff, especially on the front line, necessitates ongoing training. Yet in some large, high-incidence jurisdictions, one full-time staff person is expected to do training and consulting for TB staff and all other providers in the county, both public and private. Without support staff, the trainer has to do all the advertising, scheduling, mailing, copying, arrangement for continuing education units, and preparation of handouts. Because there is no back-up staffing, it is difficult for staff to get time off to attend training activities. Often, staff can participate only if the level of available staffing allows and supervisors approve.

In many states, one-on-one training has been deferred to the supervisor as part of orientation of their staff. Because new employees begin work at various times, training can be inconsistent. Furthermore, supervisors may not possess the appropriate knowledge and skills themselves to model to their staff.

Funding and travel restrictions. Limited funding, limited staffing, travel restrictions, and the relatively low priority placed on training are problems at times at all levels: federal, state, and local, in both the public and private sectors. One example is statewide restrictions imposed by a governor's office prohibiting out-of-state travel, which keep health department staff from

attending necessary training. When funding cuts occur, training and related costs are often cut because they are considered less important than providing services or maintaining staffing levels.

Training barriers for laboratorians. Laboratorians also encounter barriers to effective TB training. Key state officials who have funding or decision-making responsibilities do not fully understand the laboratory's role in TB elimination. Laboratorians also have difficulty attending technical training because of travel restrictions.

VI. STRATEGIC OBJECTIVES

The strategic objectives below are suggested as specific steps that can be taken toward the accomplishment of the five broad goals that have been defined for the *National Strategic Plan for TB Training and Education*. Considering the overarching aims of the Strategic Plan and the current state of TB training and education efforts for the public health sector, this workgroup has selected the following objectives as reasonable and feasible priorities for the next five years. They provide a means of beginning to address the issues identified in Section V, Needs and Barriers.

By intention, the strategic objectives do not specify who will do what. Instead, they describe a desired outcome and identify the types of organizations that would need to be engaged if the strategic objective is to be achieved. The workgroup charges the Implementation Committee of the Strategic Plan to secure commitment and action from the necessary agencies during the coming five years.

Strategic Objective 1

Desired Outcome: Development, adoption, and promotion of TB core competency recommendations for state and local TB program staff, and ongoing delivery of TB training and education to these audiences

Strategies:

National TB agencies should work with state and local TB programs to develop consensus core competency recommendations for the following types of TB program staff: DOT outreach workers; disease control investigators; health educators; nurses; physicians; and program managers.

National TB training and education agencies should develop training courses, activities, and materials keyed to the consensus core competency recommendations.

State and local TB programs should adopt the recommendations and make opportunities for staff to receive appropriate training and education.

Strategic Objective 2

Desired Outcome: Increased TB education for medical students, nursing students, and other students planning healthcare careers

Strategies:

National TB agencies should work with national agencies that represent medical schools, nursing schools, and allied health schools to produce and promote local adoption of appropriate and standardized TB curricula and materials for each discipline.

National agencies that represent medical residency programs in internal medicine, infectious disease, family practice, pediatrics, and pulmonology should do the same.

Strategic Objective 3

Desired Outcome: Dedicated training staff in state and local TB programs to regularly deliver TB training and education to the staff of state and big-city TB programs, as well as to external priority audiences

Strategies:

Funders should support dedicated training staff in each state and big-city training program.

TB programs should use dedicated training staff to keep program staff up-to-date and to deliver training and education to local priority target audiences, such as staff in local correctional facilities, HIV programs, addiction programs, homelessness programs, hospitals, and nursing homes, etc.

Strategic Objective 4

Desired Outcome: Support for an expanded national network of training centers

Strategy:

Funders should maintain and expand the Model Center system so that it becomes accessible to TB programs throughout the country.

Strategic Objective 5

Desired Outcome: Support for a centralized planning body to implement the *National Strategic Plan for TB Training and Education*

Strategy:

Funders should provide consistent, ongoing administrative and logistical support to the Implementation Committee of the Strategic Plan and provide for the inclusion of representatives from target groups in addition to representatives from producers of TB training and education.

Strategic Objective 6

Desired Outcome: Support for an expanded international network for TB training and education professionals

Strategies:

Funders should maintain and expand the TB Education and Training Network (TB ETN), an existing network for individuals engaged in TB training and education (described earlier in this paper).

State and local TB programs and other relevant organizations involved in TB training and education should promote participation in the TB ETN by appropriate staff.

Strategic Objective 7

Desired Outcome: Support for a central database of TB training and education resources

Strategies:

Funders should maintain and expand the CDC's *TB Education and Training Resource Website* as an up-to-date searchable database and a printed reference.

National TB agencies, state and local TB programs, and other organizations that produce or use TB-related materials should refer regularly to the *Resource Website* to identify available resources and prevent unnecessary duplication. Similarly, they should contribute to the *Resource Website* by providing the organization that maintains it with details about any materials and resources they develop.

Strategic Objective 8

Desired Outcome: Development and adoption of core competency recommendations for laboratorians

Strategies:

National TB agencies should work with national agencies that represent or influence laboratory staff to develop, adopt, and promote recommendations for core competencies.

National TB training and education agencies should work with national laboratory training and education agencies to develop training courses, activities, and materials keyed to the consensus core competency recommendations.

State and local TB programs should adopt the recommendations and make opportunities for staff to receive appropriate training and education.

Strategic Objective 9

Desired Outcome: Increased presence of cultural competency as an integrated portion of training curricula delivered to TB Program staff

Strategies:

National producers of TB training and education materials should produce, maintain, and make available regularly updated, culturally appropriate materials that address TB issues.

National TB training and education agencies should incorporate cultural competency into training courses.

State and local TB programs should make opportunities for staff to receive appropriate training and education.

VII. CLOSING STATEMENT

The field of TB treatment and control is a unique specialty practice within public health. Care should be taken to assure that training and education programs and materials for this workforce are of high quality and accessible in order to meet the needs of its workers. While great advances have been made in TB training and education in the last decade, resources are still needed to improve TB and laboratory staff education at both state and local levels.

Public Health Sector

A document published in 2003 by the Institute of Medicine, entitled *Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century*,¹⁴ clearly delineates both the role of public health professionals and the need for adequately training this sector of the workforce. This IOM report provides a framework and recommendations for, among other things, strengthening public health practice through redesigned graduate public health education as well as education of the public health workforce. The report says that local health jurisdictions have critical needs for upgrading the skills of staff and for training new professionals, and that addressing these needs falls upon the jurisdictions themselves. The report also clearly states that it is fundamentally the responsibility of the federal health agencies to provide support for these activities, and specifically recommends that funding be increased to support the training and education of the public health workforce. An influx of this type of funding could significantly impact the country's progress toward TB elimination, and should be seriously pursued, and advocated for, by organizations such as NTCA, NTNCC, ACET, the National Coalition to Eliminate TB (NCET), and other public health organizations that share a vested interest in this effort.

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