

# Introduction

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# About the Michigan Tuberculosis Program Manual

## Purpose

This manual is designed to present the key steps and crucial information needed to perform tuberculosis (TB) control tasks in states in which TB occurs with a low incidence—defined by the Centers for Disease Control and Prevention (CDC) as less than 3.5 cases/100,000 population/year.<sup>1</sup> Where additional or more detailed information is available, hyperlinks to CDC guidelines and other resources are provided.

The *Michigan Tuberculosis Program Manual* is based on a template created by an advisory group convened during CDC Task Order #6. The advisory group developed the template's format and created its content by reviewing other TB control manuals, current CDC guidelines, and needs in the four low-incidence states of Idaho, Montana, Utah, and Wyoming.

## Audience

The audience for this manual includes local public health nurses, outreach workers, physicians, and public health officers; Indian Health Services (IHS) staff; physician consultants; private sector physicians; infection control nurses in hospitals and other facilities; disease intervention specialists; state epidemiologists; and state TB program staff.

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# How to Use This Manual

## Portable Document Format

This manual is available electronically as a portable document format (PDF) file. To view the PDF file, you will need the free Adobe Reader, available at this hyperlink: <http://www.adobe.com/products/acrobat/readstep2.html> .

## Hyperlinks

When viewing this manual online with an Internet connection, you can go directly to underlined Web addresses by clicking on them.

## Cross-References

When viewing this manual electronically, you can go directly to other sections or topics in the manual by clicking on text next to this icon:



## Forms

Required and recommended forms are available on the Michigan Department of Community Health TB website at [www.michigan.gov/tb](http://www.michigan.gov/tb) or at the Michigan Advisory Committee on the Elimination of Tuberculosis website at [www.michigantb.org](http://www.michigantb.org). This icon alerts you that forms are available:



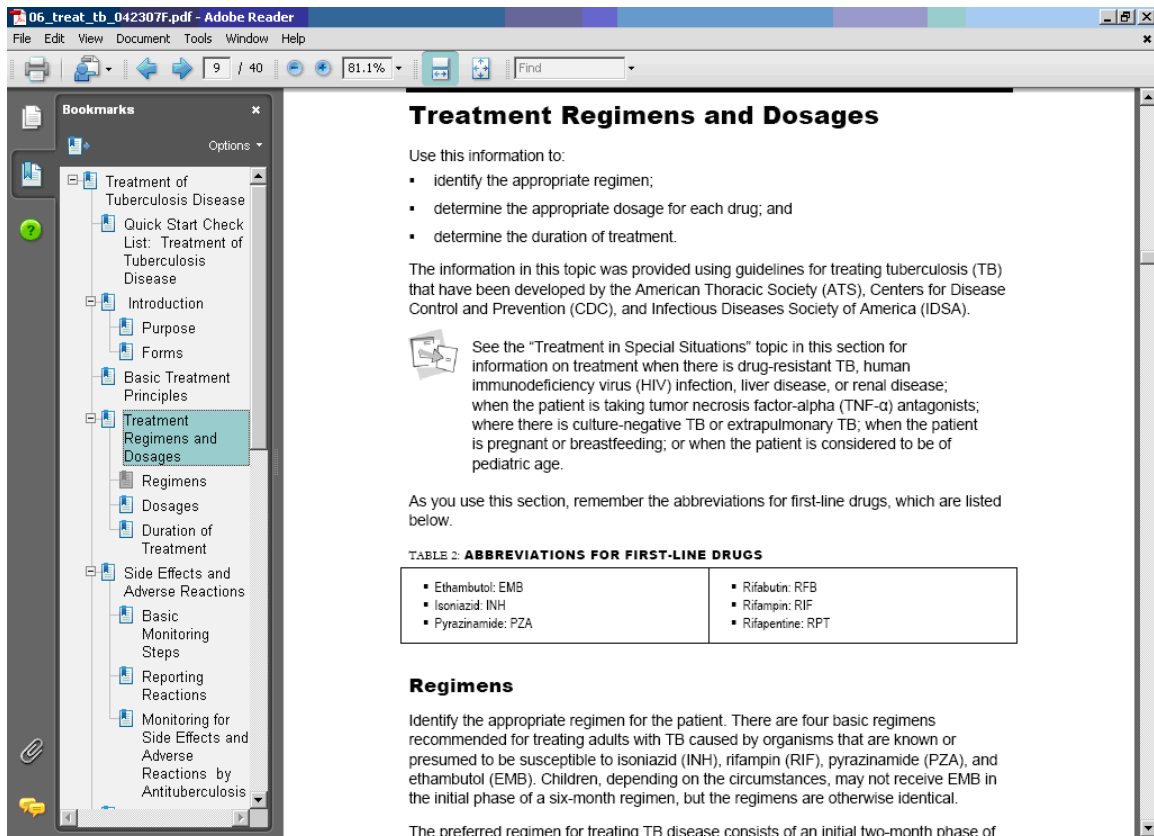
# Bookmarks

In PDF files, you can use bookmarks to go quickly to a section or topic. If the bookmarks are not visible on the left, click the Bookmarks icon or tab on the left of the window.

To view sections and topics in the bookmarks list:

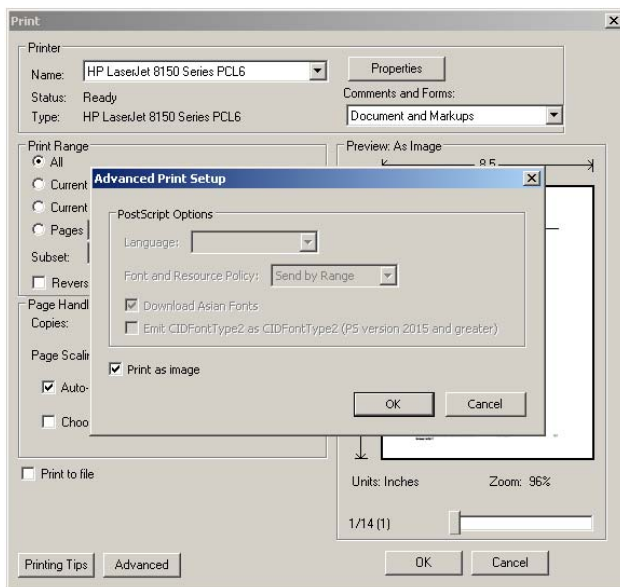
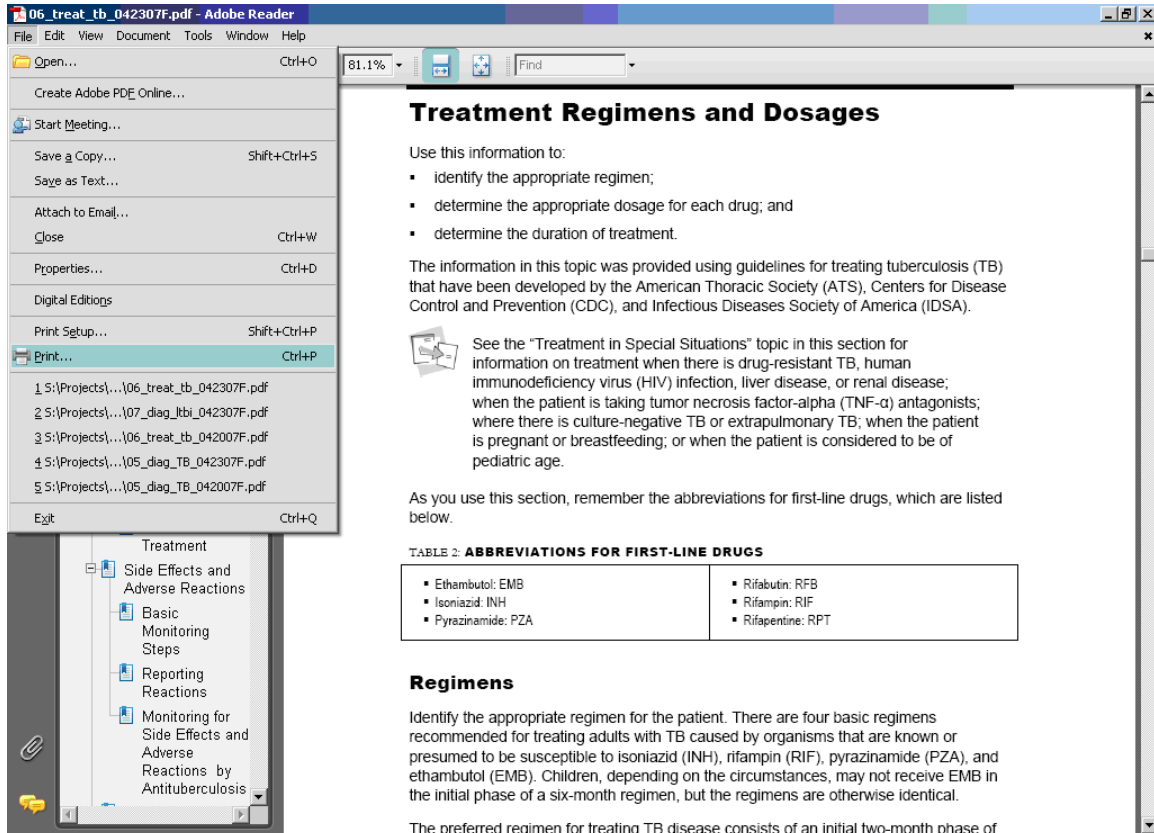
- Click + to see a more detailed list.
- Click – to hide the more detailed list.

To go to a section or topic in the bookmarks list, point to its name and left-click.



# Printing

To access the print dialog box, click the File drop-down menu, click Print, and then make your selections in the Print dialog box.



Some printers have older printer drivers that cause spaces to appear in the middle of words. To avoid this problem, select File/Print, click the Advanced button, check Print as Image, and then click OK. If you need further assistance with printing, call the Francis J. Curry National Tuberculosis Center's IT staff at 415-502-5810.

## Icons

Throughout the manual, these icons quickly cue you into important information and other resources:



This warns about high-consequence information you must understand when performing the task.



This signals when you should call to report or to consult on the task.



This highlights special considerations for pediatric patients.



This suggests another relevant area in the manual or another resource that you may want to review.



This alerts you that a form is available for the task.

## Abbreviations

Refer to the list below for abbreviations used in the manual.

ACET	Advisory Council for the Elimination of Tuberculosis
ACH	air changes per hour
AFB	acid-fast bacilli
AIDS	acquired immunodeficiency syndrome
All	airborne infection isolation
ALT	alanine aminotransferase
ARPE	Aggregate Report for Program Evaluation
ART	antiretroviral therapy
AST	aspartate aminotransferase
ATS	American Thoracic Society
BAMT	blood assay for <i>Mycobacterium tuberculosis</i>
BCG	bacille Calmette-Guérin
CDC	Centers for Disease Control and Prevention
CT	computed tomography
CXR	chest radiograph
DNA	deoxyribonucleic acid
DOT	directly observed therapy
DTBE	Division of Tuberculosis Elimination
DTH	delayed-type hypersensitivity
ED	emergency department
EMB	ethambutol
EMS	emergency medical service
ESRD	end-stage renal disease

FDA	U.S. Food and Drug Administration
HAART	highly active antiretroviral therapy
HCW	healthcare worker
HEPA	high-efficiency particulate air
HIPAA	Health Insurance Portability and Accountability Act
HIV	human immunodeficiency virus
IDSA	Infectious Diseases Society of America
IGRA	interferon gamma release assay
INH	isoniazid
LTBI	latent tuberculosis infection
<i>M. tuberculosis</i>	<i>Mycobacterium tuberculosis</i>
MDCH	Michigan Department of Community Health
MDR-TB	multidrug-resistant tuberculosis
MDSS	Michigan Disease Surveillance System
MIACET	Michigan Advisory Committee for Elimination of Tuberculosis
MIRU	mycobacterial interspersed repetitive units
MOTT	mycobacterium other than tuberculosis
NAA	nucleic acid amplification
NIOSH	National Institute for Occupational Safety and Health
NNRTI	nonnucleoside reverse transcriptase inhibitors
NTCA	National Tuberculosis Controllers Association
NTM	nontuberculous mycobacteria
NTNC	National Tuberculosis Nurse Coalition
OSHA	Occupational Safety and Health Administration
PAPR	powered air-purifying respirator
PCR	polymerase chain reaction
PI	protease inhibitor

PPD	purified protein derivative
PZA	pyrazinamide
QA	quality assurance
QFT	QuantiFERON®-TB test
QFT-G	QuantiFERON®-TB Gold test
RFB	rifabutin
RFLP	restriction fragment length polymorphism
RIF	rifampin
RNA	ribonucleic acid
RPT	rifapentine
RVCT	Report of Verified Case of Tuberculosis
RZ	rifampin and pyrazinamide
TB	tuberculosis
TIMS	Tuberculosis Information Management System
TNF- $\alpha$	tumor necrosis factor-alpha
TST	tuberculin skin test
TU	tuberculin units
USCIS	U.S. Citizenship and Immigration Services
UVGI	ultraviolet germicidal irradiation
XDR-TB	extensively drug-resistant tuberculosis

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## Purpose of Tuberculosis Control

Tuberculosis (TB) is a bacterial disease caused by *Mycobacterium tuberculosis*. (These organisms are sometimes called tubercle bacilli.) Mycobacteria can cause a variety of diseases. Some mycobacteria are called tuberculous mycobacteria because they cause TB or diseases similar to TB. These include *M. tuberculosis*, *M. bovis*, and *M. africanum*. Other mycobacteria are called nontuberculous mycobacteria (NTM) because they do not cause TB-like disease. One common type of nontuberculous mycobacteria is *M. avium* complex. Tuberculous mycobacteria readily spread from person to person; nontuberculous mycobacteria do not usually spread from person to person.

The goal of TB control in the United States is to reduce TB morbidity and mortality by doing the following:

- Preventing transmission of *M. tuberculosis* from persons with contagious forms of the disease to uninfected persons
- Preventing progression from latent TB infection (LTBI) to active TB disease among persons who have contracted *M. tuberculosis* infection<sup>2</sup>



For information on the transmission of *M. tuberculosis* and on how LTBI progresses to TB disease, see the Centers for Disease Control and Prevention's (CDC's) online course, *Interactive Core Curriculum on Tuberculosis* (2004), at this hyperlink:

<http://www.cdc.gov/tb/webcourses/corecurr/index.htm> .

The four fundamental strategies to reduce TB morbidity and mortality include the following:

1. Early and accurate detection, diagnosis, and reporting of TB cases, leading to initiation and completion of treatment
2. Identification of contacts of patients with infectious TB and treatment of those at risk with an effective drug regimen
3. Identification of other persons with latent TB infection at risk for progression to TB disease and treatment of those persons with an effective drug regimen
4. Identification of settings in which a high risk exists for transmission of *M. tuberculosis* and application of effective infection control measures<sup>3</sup>



For more information on these strategies and the thinking behind them, see "Controlling Tuberculosis in the United States: Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America" (*MMWR* 2005;54[No. RR-12]) at this hyperlink:

<http://www.cdc.gov/MMWR/PDF/rr/rr5412.pdf> .

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# Michigan Laws and Rules on Tuberculosis Control

Michigan laws and rules on tuberculosis (TB) are located on the Michigan Legislature Website <http://www.legislature.mi.gov>



The powers and duties of local health departments relating to tuberculosis control are covered in Sections 333.2451, 333.5117, 333.5203, 333.5205, 333.5207 and 333.5301 of the Michigan Compiled Laws. Requirements for reporting suspected or confirmed cases of tuberculosis are described in 325.171 through 325.173 of the MDCH Communicable Disease Rules.



Contact the Michigan TB Program at (517) 335-8165 for assistance with interpreting laws and rules regarding TB control.

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# Objectives and Standards

## Quality of Care

For tuberculosis (TB) programs, quality of care is measured by objectives and standards. Such objectives and standards are used as yardsticks to direct the program and measure its success.

**Objectives** reflect outcomes or results and program desires. Programs require objectives to define expected outcomes and results for case management activities.

**Standards** are an accepted set of conditions or behaviors that define what is expected and acceptable regarding job duties, performance, and provision of services. The TB control program works to achieve objectives through a series of standards.

In Michigan, TB program objectives and standards are established from the following:

### **State Laws and Regulations**

The Michigan Public Health Code describes the powers and duties of local health departments in controlling tuberculosis within their jurisdiction. The Michigan Department of Community Health Communicable Disease rules describe requirements for reporting suspected and confirmed cases of tuberculosis to local and state health departments.

### **TB Program Agreements, Plans, and Protocols**

The Centers for Disease Control and Prevention (CDC) has awarded a cooperative agreement for tuberculosis prevention and control to the Michigan Department of Community Health. The terms of this cooperative agreement indicate program objectives and performance targets that each recipient is expected to achieve (see Table 1 below). These objectives and targets form the core of the MDCH TB Control Program's goals and objectives for TB control activities in Michigan.

### **National TB Guidelines**

Guidelines for the treatment of latent TB infection (LTBI) and tuberculosis disease have been published by the following entities.

- American Thoracic Society (ATS)
- Infectious Diseases Society of America (IDSA)
- CDC Division of Tuberculosis Elimination (DTBE) guidelines

## National and State Program Objectives

Below are national and state TB program objectives. The CDC program objectives were announced in February, 2009, and are effective for the cooperative agreement period of 2010 – 2015. All objectives are targeted to be achieved by 2015 unless noted otherwise. Under each national objective, there is a state objective established by the Michigan TB Program, based on Michigan’s epidemiology and recent program performance.

Table 1: PROGRAM OBJECTIVES AND PERFORMANCE TARGETS, 2010 - 2015

Indicator		National Tuberculosis Program Objectives and Performance Targets
1	Percent completion of treatment	<p>Increase timely completion of treatment</p> <p>National Objective: At least 93% of patients with newly diagnosed tuberculosis (TB), for whom therapy for 12 months or less is indicated, will complete treatment within 12 months.</p>
2	TB case rate	<p>Decline in TB rates</p> <p><b>a.</b> National Objective: The average yearly decline in TB rates in the US born will be <math>\geq 11\%</math>.</p> <p><b>b.</b> National Objective: The average yearly decline in TB rates in the foreign born will be <math>\geq 4\%</math>.</p> <p><b>c.</b> National Objective: The TB rate in U.S. born will be <math>&lt; 0.7</math> cases/100,000.</p> <p><b>d.</b> National Objective: The TB rate in foreign born will be <math>&lt; 14</math> cases/100,000.</p> <p><b>e.</b> National Objective: The TB rate in U.S.-born black non-Hispanics will be <math>&lt; 1.3</math> cases/100,000.</p> <p><b>f.</b> National Objective: The TB rate in children <math>&lt; 5</math> years of age will be <math>&lt; 0.4</math>/100,000.</p>

National Tuberculosis Program Objectives and Performance Targets		
Indicator		
3	Thorough contact investigations	<p>Improve contact identification, evaluation, and treatment</p> <ul style="list-style-type: none"> <li>a. National Objective: All sputum-AFB-smear-positive TB cases will have at least one contact identified.</li> <li>b. National Objective: At least 93% of contacts to sputum-AFB-smear-positive TB cases will be evaluated for infection and disease.</li> <li>c. National Objective: At least 88% of infected contacts will start treatment.</li> <li>d. National Objective: At least 79% of contacts who start treatment will complete treatment.</li> </ul>
4	Timely laboratory reporting	<p>Ensure timely laboratory reporting</p> <ul style="list-style-type: none"> <li>a. National Objective: These objectives were in review at the time this manual was assembled. Current objectives (2005 – 2009) are that culture identification of <i>M. tuberculosis</i> complex should be reported to submitter and state TB program within 21 days of receipt.</li> <li>b. National Objective: Increase the proportion of culture-positive TB cases with initial drug-susceptibility results reported to 100%.</li> </ul>
5	Treatment Initiation	<p>Ensure timely initiation of treatment</p> <p>National Objective: This national objective is currently under revision. MIACET and the MDCH TB Control Program recommend that all TB patients with positive AFB sputum-smear results should initiate appropriate multi-drug therapy within 7 days of sputum smear result or diagnosis, unless a diagnosis or suspicion of TB can be solidly refuted.</p>

National Tuberculosis Program Objectives and Performance Targets		
Indicator		
6	Sputum Culture Conversion	<p>Ensure timely conversion of sputum culture status</p> <p>National Objective: Increase the proportion of patients with positive sputum culture results who have documented conversion to sputum culture-negative within 60 days of treatment initiation to 61.5%.</p>
7	Data Reporting	<p>Increase completeness of reporting on core data variables</p> <p><b>a.</b> National Objective: Increase the completeness of each core Report of Verified Case of Tuberculosis (RVCT) variable reported to CDC to 99.2%.</p> <p><b>b.</b> National Objective: Increase the completeness of each core Aggregate Report of Program Evaluation (ARPE) variable reported to CDC to 100% in the final report period. (Final ARPE reports are due 2 years after the calendar year in which the case was reported).</p> <p><b>c.</b> National Objective: Increase the completeness of each core Electronic Disease Notification (EDN) system variable reported to CDC to n%. This objective is still being revised by CDC, but MIACET and the MDCH TB Control Program recommend that all variables be completed and reported to CDC for persons entering the U.S. with a class A or B status for tuberculosis.</p>
8	Recommended Initial Therapy	<p>Increase proportion of patients receiving recommended antituberculosis therapy.</p> <p>National Objective: Increase the proportion of patients who are started on the recommended initial 4-drug regimen when suspected of having TB disease to 93.4%.</p>

National Tuberculosis Program Objectives and Performance Targets		
Indicator		
9	Universal Genotyping	<p>Increase the proportion of culture-confirmed cases with a genotyping result reported.</p> <p>National Objective: Increase the proportion of culture-confirmed TB cases with a genotyping result reported to 94%.</p>
10	Known HIV Status	<p>Increase the proportion of TB cases with a known HIV status reported</p> <p>National Objective: Increase the proportion of TB cases with positive or negative HIV test result reported to 88.7%.</p>
11	Evaluation of Immigrants and Refugees	<p>For immigrants and refugees with overseas chest x-rays interpreted as consistent with TB, increase the proportion that are evaluated and treated.</p> <p>National objectives for the following indicators are currently being revised by CDC. MIACET and the MDCH TB Control Program recommend the following performance targets.</p> <ul style="list-style-type: none"> <li><b>a.</b> For immigrants and refugees with overseas chest x-rays interpreted as consistent with TB, increase the proportion who initiate medical evaluation within 30 days of arrival to 90%.</li> <li><b>b.</b> For immigrants and refugees with overseas chest x-rays interpreted as consistent with TB, increase the proportion who complete medical evaluation within 90 days to 100%.</li> <li><b>c.</b> For immigrants and refugees with overseas chest x-rays interpreted as consistent with TB and who are diagnosed with LTBI during evaluation in the U.S., increase the proportion who start LTBI treatment to 80%.</li> <li><b>d.</b> For immigrants and refugees with overseas chest x-rays interpreted as consistent with TB and who are diagnosed with LTBI during evaluation in the U.S., increase the proportion who complete LTBI treatment to 75%.</li> </ul>

National Tuberculosis Program Objectives and Performance Targets		
Indicator		
12	Sputum-Culture Reported	<p>Increase the proportion of TB cases with pleural or respiratory disease that have sputum culture result reported.</p> <p>National Objective: Increase the proportion of TB cases with a pleural or respiratory site of disease in patients 12 years of age or older that have sputum-culture result reported to 95.7%.</p>

Source: National TB Program Objectives and Performance Targets for 2015. Atlanta, GA: CDC Division of Tuberculosis Elimination; January, 2009.

## Standards

Program standards are what the stakeholders of the TB program would consider to be "reasonable expectations" for the program. For TB, standards have been established by nationally accepted authorities, such as the American Thoracic Society (ATS), the Infectious Diseases Society of America (IDSA), and the CDC, and generally recognized TB control experts, such as the National Tuberculosis Nurse Coalition (NTNC) and the National Tuberculosis Controllers Association (NTCA). Many state programs, and some local TB control programs, have established their own standards and objectives for case management.

The standards of care for the medical treatment and control of TB are published jointly by ATS, IDSA, and the CDC. These standards should be available for reference by each TB staff member. The standards are included in the following guidelines:

- ATS, CDC, IDSA. "Controlling Tuberculosis in the United States: Recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America" (*MMWR* 2005;54[No. RR-12]). Available at: <http://www.cdc.gov/mmwr/PDF/rr/rr5412.pdf> .
- ATS, CDC, IDSA. "Diagnostic Standards and Classification of Tuberculosis in Adults and Children" (*Am J Respir Crit Care Med* 2000;161[4 Pt 1]). Available at: <http://www.cdc.gov/tb/pubs/PDF/1376.pdf> .
- ATS, CDC, IDSA. "Treatment of Tuberculosis" (*MMWR* 2003;52[No. RR-11]). Available at: <http://www.cdc.gov/mmwr/PDF/rr/rr5211.pdf> .
- CDC, NTCA. "Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis: Recommendations from the National Tuberculosis Controllers

Association and CDC” (*MMWR* 2005;54 [No. RR-15]). Available at:  
<http://www.cdc.gov/mmwr/pdf/rr/rr5415.pdf> .

- CDC. “Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-care Settings, 2005” (*MMWR* 2005;54[No. RR-17]). Available at:  
<http://www.cdc.gov/mmwr/pdf/rr/rr5417.pdf> .
- CDC. “Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection” (*MMWR* 2000;49[No. RR-6]). Available at:  
<http://www.cdc.gov/mmwr/PDF/rr/rr4906.pdf> .

For additional guidelines, see the Division of Tuberculosis Elimination’s “TB Guidelines” Web page (Division of Tuberculosis Elimination Web site; accessed November 25, 2006). Available at: [http://www.cdc.gov/tb/pubs/mmwr/Maj\\_guide/default.htm](http://www.cdc.gov/tb/pubs/mmwr/Maj_guide/default.htm) .

# Roles, Responsibilities, and Contact Information

## State Tuberculosis Program Staff

Table 2: STATE TUBERCULOSIS PROGRAM STAFF ROLES, RESPONSIBILITIES, AND CONTACT INFORMATION

Roles and Responsibilities	Contact Information
Michigan TB Program Coordinator	Peter Davidson, PhD Michigan Department of Community Health Capital View Building 201 Townsend Street Lansing, MI 48913 Phone: 517-335-8165 Email: <a href="mailto:davidsonp@michigan.gov">davidsonp@michigan.gov</a>
TB Epidemiologist	Andrew Knecht, MPH Michigan Department of Community Health Capital View Building 201 Townsend Street Lansing, MI 48913 Phone: 517-335-8165 Email: <a href="mailto:knechta@michigan.gov">knechta@michigan.gov</a>
Regional TB Nurse Consultant	Gail Denkins, RN, BS American Lung Association of Michigan Michigan Department of Community Health 403 Seymour Ave Lansing, MI 48933 Phone: 517-484-4980 Email: <a href="mailto:gdenkins@alam.org">gdenkins@alam.org</a>
Regional TB Nurse Consultant	Julie McCallum, RN, MPH American Lung Association of Michigan Michigan Department of Community Health 403 Seymour Ave Lansing, MI 48933 Phone: 616-583-0647 Email: <a href="mailto:jmccallum@alam.org">jmccallum@alam.org</a>

## Tuberculosis Consultants

Table 3: TUBERCULOSIS CONSULTANTS' ROLES, RESPONSIBILITIES, AND CONTACT INFORMATION

Roles and Responsibilities	Contact Information
TB Clinical Consultant	James Sunstrum, MD Oakwood TB Clinic Westland, MI (734) 727-1130
MI-ACET Chairperson City of Detroit TB Clinical Consultant	Dana Kissner, MD Division of Pulmonary, Critical Care, and Sleep Medicine Harper University Hospital 3990 John R Detroit, MI 48201 313-745-0895

## Local Public Health Agencies

Table 4: LOCAL PUBLIC HEALTH AGENCIES' ROLES, RESPONSIBILITIES, AND DIRECTORY

Roles and Responsibilities	Contact Information
In Michigan, the local health departments are responsible for tuberculosis prevention and control for their jurisdiction. Many provide primary case management of LTBI and TB cases.	<a href="http://malph.org/page.cfm/18/">http://malph.org/page.cfm/18/</a>

## Private Medical Providers

Table 5: ROLES AND RESPONSIBILITIES OF PRIVATE MEDICAL PROVIDERS FOR TUBERCULOSIS DIAGNOSIS AND TREATMENT

Roles and Responsibilities
Private providers can diagnose and treat persons with TB and LTBI, but they are required to report suspect or confirmed cases as specified in the MDCH Communicable Disease Rules. Local health departments bear ultimate responsibility in assuring appropriate treatment and case management for patients with TB disease, and providers should therefore consult frequently with their local health department when managing a case of suspected or confirmed TB disease.



## Laboratories

The MDCH Bureau of Laboratories provides full-extent TB laboratory testing. For detailed information regarding laboratory testing and services available, refer to the Laboratory Services chapter, or contact the MDCH Bureau of Laboratories, mycobacteriology unit, at 517-335-9637 or 517-335-9636.

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# Resources and References

## Resources

- CDC. "Framework for Program Evaluation in Public Health" (*MMWR* 1999;48[No. RR-11]). Available at: <ftp://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4811.pdf> .
- Division of Tuberculosis Elimination. *A Guide to Developing a TB Program Evaluation Plan* (Division of Tuberculosis Elimination Web site; accessed November 1, 2006). Available at: [http://www.cdc.gov/tb/Program\\_Evaluation/default.htm](http://www.cdc.gov/tb/Program_Evaluation/default.htm) .
- Division of Tuberculosis Elimination. *Understanding the TB Cohort Review Process: Instruction Guide* (Division of Tuberculosis Elimination Web site; accessed November 1, 2006). Available at: <http://www.cdc.gov/tb/pubs/cohort/default.htm> .
- New Jersey Medical School National Tuberculosis Center. *Planning & Implementing the TB Case Management Conference: A Unique Opportunity for Networking, Peer Support and Ongoing Training* (Newark, NJ; 2004). Available at: <http://www.umdnj.edu/globaltb/products/planning&implementing.htm> .

## References

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- <sup>1</sup> CDC. Progressing toward tuberculosis elimination in low-incidence areas of the United States: recommendations of the Advisory Council for the Elimination of Tuberculosis. *MMWR* 2005;51(No. RR-5):1.
- <sup>2</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):14.
- <sup>3</sup> ATS, CDC, IDSA. Controlling tuberculosis in the United States: recommendations from the American Thoracic Society, CDC, and the Infectious Diseases Society of America. *MMWR* 2005;54(No. RR-12):15.