State of Connecticut

Tuberculosis Elimination Plan

Connecticut Department of Public Health

Tuberculosis Control Program

January 2021

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Executive Summary

The *State of Connecticut Tuberculosis Elimination Plan* (the Plan) is written as part of the Centers for Disease Control and Prevention (CDC) Tuberculosis Control Cooperative Agreement with the Connecticut (CT) Department of Public Health Tuberculosis Control Program (TB Program), under Grant #6 NU52PS910178-01-01. The CDC Tuberculosis Cooperative Agreements help each jurisdiction undertake purposeful activities that move the United States toward the ultimate goal of eliminating TB nationwide.

This Plan is set out in five Sections that describe what tuberculosis is, the TB Program and current TB data in CT, and maps out what the CDC's Division of Tuberculosis Elimination (DTBE) considers to be twelve essential components of a public health tuberculosis prevention, control, and elimination program. In addition, The National Advisory Council for the Elimination of Tuberculosis (ACET) outlined three priority strategies for controlling and preventing TB. These components and strategies for organizing and conducting these components form the basis for this Plan.

Using the Essential Components and the Strategies for TB Elimination, this Plan lays out specific goals and activities that the Program will focus on in the next five years.

I. Introduction

What is Tuberculosis (TB)?

Tuberculosis (TB) has been part of human life for millennia, but it was only in March 1882 when Robert Koch identified and described the bacillus that causes TB, *Mycobacterium tuberculosis*. *M. tuberculosis* is spread when someone with active TB expels these bacteria into the air by coughing, singing, or talking. The disease typically affects the lungs (pulmonary TB) but can also affect other sites (extrapulmonary TB)[1]. Despite great strides in public health improvements, TB research, and antibiotic TB treatments, TB remains "one of the top 10 causes of death worldwide, and the leading cause of death from a single infectious agent (ranking above HIV/AIDS)".[2]

Indeed, according to the World Health Organization's *Global Tuberculosis Report 2020*, an estimated 10 million people were diagnosed with TB in 2019, and an estimated 1.2 million people died from TB.[3] Importantly, approximately 25% of the world's population are estimated to have latent TB infection (LTBI). That is, they are infected with *M. tuberculosis* but have not yet developed active TB disease. Without preventive treatment, however, approximately 5–10% of those infected with *M. tuberculosis* will develop active TB in their lifetime. Progression from untreated LTBI accounts for approximately 80% of TB cases in the United States[4].

The challenge for the United States—and for CT—is to prevent, control, and eliminate TB disease and LTBI, and to track and treat those persons who have LTBI in order to prevent both progression to disease and further disease transmission.

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[1] Global Tuberculosis Report 2020. Geneva: World Health Organization; 2020. License: CC BY-NC-SA 3.0 IGO.
[2] Ibid.
[3] Ibid. Another 200,000 persons died who were co-infected with HIV and TB: These deaths are officially classified as deaths caused by HIV/AIDS.
[4] Sterling TR, Njie G, Zenner D, et al. Guidelines for the Treatment of Latent Tuberculosis Infection: Recommendations from the National Tuberculosis Controllers Association and CDC, 2020. MMWR Recomm Rep 2020;69(No. RR-1):1-11. DOI: http://dx.doi.org/10.15585/mmwr.rr6901a1.

II. Essential Components of a Public Health Tuberculosis Prevention, Control, and Elimination Program

According to the Centers for Disease Control and Prevention's (CDC) Division of TB Elimination (DTBE)[5], the following are the 12 essential components of a TB prevention, control, and elimination program[6]:

1. Role of public health departments
2. Overall planning and policy components
3. Surveillance and reporting of persons with suspected or confirmed TB disease
4. Data management, analysis, and use
5. Program evaluation and quality improvement
6. Laboratory and other testing
7. Identification, management, and treatment of persons with latent TB infection
8. Identification, management, and treatment of persons with TB disease
9. Epidemiologic investigation
10. Training and education
11. Partnerships and collaboration
12. Research

The CT Department of Public Health TB Control Program (TB Program) manages to address all the Essential Components in its regular activities during the course of any given year, as required by the Tuberculosis Elimination and Laboratory Cooperative Agreement between the CDC and the TB Program. CT State statute (C.G.S. Chapter 386g, Sec. 19a-265), the CDC and other federal guidance and support, and key collaborations with local health departments and health care providers also enable TB Program activities to continue and to improve.

[5] National TB Program Objectives and Performance Targets for 2025, https://www.cdc.gov/tb/programs/evaluation/indicators/default.htm, Accessed December 4, 2020.
[6] CDC. Funding opportunity announcement. Tuberculosis elimination and laboratory cooperative agreement CDC-RFA-PS20–2001, Box 1. Atlanta, GA: US Department of Health and Human Services, CDC; 2019. https://www.cdc.gov/tb/education/funding-opportunity-notice.htm

III. Connecticut TB Program

Background

CT is a small state with almost 3.6 million residents (2010 Census). The state is generally considered to be among the more affluent in the country, with higher median household incomes compared to the national median, and a lower proportion of the population living below the poverty line. However, these statistics mask very pronounced socioeconomic and health inequities present in the state.[7] With respect to TB, although CT has lower TB incidence compared to the national average (in 2019, 1.9 per 100,000 CT population vs. 2.7 in the U.S.), rates have plateaued. The TB incidence rate in CT between 2010-2019 ranged between 1.4/100,000- 2.4/100,000.

And yet despite these low numbers, CT's TB cases continue to be both socially and medically complex. CT's risk population for TB is primarily non-U.S. born persons that live in or visit the state. Over the last five years, the vast majority (recently as high as 86.6%) of cases have occurred among non-U.S. born persons, representing many different countries of origin. From 2010–2019, CT saw a total of 667 TB cases. During this period, an average 1.4% of these cases were in children <5 years old, 14.3% in persons ≥65 years old, in diabetic persons (12.3%), and (5.7%) were in HIV-positive persons. All of these characteristics present their own challenges, in addition to TB disease. In addition, during 2010–2019, CT saw 18 multi-drug resistant cases diagnosed in the state—accounting for almost 2.7% of all TB cases.

As a CDC-designated low-incidence jurisdiction (<150 TB cases/year), and given the plateauing of TB incidence rates in CT, attention must shift to the diagnosis and treatment of persons with

[7] Stratton, Alison, Margaret M. Hynes, and Ava N. Nepaul. 2009. The 2009 Connecticut Health Disparities Report. Hartford, CT: Connecticut Department of Public Health. https://portal.ct.gov/-/media/DPH/Office-of-Health-Equity/Health-Disparities-Project-2006-2008/2009-Health-Disparities-Report/2009CTHealthDisparitiesReportpdf.pdf, Accessed December 11, 2020; Healthy Connecticut 2025: State Health Assessment, https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/state_health_planning/SHA-SHIP/HCT2025/CT_SHA_Report_Final060520.pdf, Accessed December 11, 2020.

LTBI. Over the next five years, the TB Program is dedicated to decreasing the incidence of TB disease in the state by: 1) continuing the high level of case management and technical assistance for TB disease patients to ensure completion of treatment and 2) providing tools and resources for increasing the identification and treatment of persons with LTBI.

Mission of the TB Program

The mission of the TB Program is to interrupt and prevent transmission of TB, prevent emergence of drug-resistant TB, and reduce and prevent death, disability, illness, emotional trauma, family disruption, and social stigma caused by TB. To this end, the TB Program works in collaboration with health care providers and local health departments to conduct public health surveillance, screening, treatment, and containment activities for TB disease and LTBI.

Structure of the TB Program

The TB Program consists of the following staff members: a TB Controller-Medical Director, a TB Program Manager, a Supervising Epidemiologist-Senior Case manager (who is also a nurse), two Epidemiologist-Case Managers, one Epidemiologist/Data Analyst, one State Refugee and Immigrant Health Coordinator, and a Health Program Associate (handling TB medications management/contract monitoring). One of the Epidemiologist/Case Managers manages reimbursements for uninsured and underinsured patients ("TB Billing" activities). The majority of TB Program staff in the program have worked in the TB Program for over 6 years, three staff members for over 10 years.

TB Program staff participate in weekly staff update meetings, weekly "Epi Work Group" meetings, monthly Case Management meetings, and semi-annual Cohort Reviews. In pre-COVID-19 pandemic times, close physical proximity of offices promoted casual and continuous communications. During the COVID-19 pandemic, MS Teams and other electronic meeting and communication platforms ensure that TB Program staff have cooperative and consistent means for case reporting, case management, data integrity and analysis, and administrative oversight. In addition, TB Program staff at all levels have close contacts with, and regular outreach to,

local health departments, TB care providers, and direct patient contact, all of which are hallmarks of the small CT TB Program.

The Program is integrated into the TB, HIV, STD, and Viral Hepatitis Section, which in turn is part of the Preparedness, Local Health, TB, HIV, STD, and Viral Hepatitis Branch. The TB Program is also physically located next to the Infectious Disease Section. The CT Electronic Disease Surveillance System (CTEDSS) is the Maven platform database used for most infectious disease surveillance at DPH, including for TB disease. An MS Access-based data system (TRIMS) is used to maintain LTBI case data, genotyping, and selected reporting tools. Refugee and immigrant data are kept in another MS Access-based system, which will soon be migrated to CTEDSS. Measures for handling of data security and confidentiality, as well as document retention, are covered in the Section's Data Security and Confidentiality Policies and Procedures document. This annually updated document must be reviewed and signed every year by all TB staff.

The Dr. Katherine A. Kelley State Public Health Laboratory serves as the reference laboratory for TB testing in the state. Staff include a Principal Microbiologist, a Supervising Microbiologist and two Microbiologists. Services provided include: smear and culture reflex testing; culture confirmation of *M. tuberculosis* accomplished by MALDI-TOF and DNA probe; GeneXpert® nucleic acid amplification testing (NAAT) on all new sputum smear positive specimens (and smear positive bronchial alveolar lavage specimens), as well as smear-negative specimens as requested; drug-susceptibility testing; QuantiFERON Gold-Plus testing; and receiving and shipping specimens for molecular detection of drug resistance (MDDR) and genotyping.

The TB Program and State Public Health Laboratory staff frequently collaborate with and use resources external to CT, including the New York State Wadsworth Laboratory, the CDC's DTBE Reference Laboratory for MDDR testing, Michigan Department of Health and Human Services Laboratory, and CDC's Infectious Diseases Pathology Branch for testing of fixed specimens where TB is suspected, and genotyping. Monthly meetings between the TB/STD/HIV Lab staff and Section Program managers foster continual collaboration.

Activities of the CT TB Program

The TB Program works closely with local health authorities, home care agencies, providers of medical care, the Department of Correction, and drug treatment facilities to assure that the Program mission is accomplished. Through a combination of state and federal funding, the TB Program provides anti-tuberculosis medications for patients to clinicians; reimburses clinicians for TB diagnostic treatment and prevention services for the un- and underinsured; provides consultation on TB case management and screening to local health departments, prisons, convalescent/nursing homes, schools, universities, hospitals and other health care providers; and convenes the CT Advisory Committee to for the Elimination of TB (CACET) to help develop state-specific guidelines for TB treatment and prevention. In addition, the TB Program regularly works with the Global Tuberculosis Institute at Rutgers, The State University of New Jersey for TB trainings, and for medical consultations when needed.

Program activities include, but are not limited to:

- Identifying all persons diagnosed with TB or suspected of having TB by required reporting from health care providers, local health authorities and laboratories.
- Collecting and reviewing information about the risk factors for TB.
- Conducting drug sensitivity testing to ensure appropriate treatments are prescribed.
- Monitoring treatment to assure that drug treatment is properly prescribed and that patients ingest their medication as prescribed.
- Providing directly observed therapy (DOT), directly observed preventive therapy (DOPT), and electronic DOT (eDOT) to ensure patients complete treatment.
- Collecting and reviewing information about contacts exposed to infectious individuals to assure that contacts are tested and evaluated and offered therapy so that they do not develop TB disease.
- Offering TB skin testing and QuantiFeron testing, HIV antibody testing, clinical evaluation and DOPT to high-risk individuals, particularly those with HIV infection, to prevent the development of active TB disease.

- Offering free TB disease medications and free LBTI medications (through selected outlets) to un- or underinsured persons, as the payor of last resort.
- Monitoring the evaluation and treatment of refugees and immigrants who enter the state with an overseas designation of Class B1/B2 TB.

VI. Strategies for TB Prevention and Control

The National Advisory Council for the Elimination of Tuberculosis (ACET)[3] has outlined three (3) priority strategies for controlling and preventing TB:

1. Identification of, and completion of treatment for, persons with active TB disease in order to render their condition noninfectious;
2. Finding and screening persons who have had contact with persons with active TB disease to determine: 1) whether they have active TB themselves; 2) whether they have been infected with *M. tuberculosis*; or 3) for children and other persons at high risk, whether they require window prophylaxis (preventive treatment of presumed TB infection during the time that it would normally would take for a tuberculin skin test [TST] or interferon gamma release assay [IGRA] to become positive after exposure) and whether to administer treatment; and
3. Screening, testing, and treatment of other selected persons and populations at high risk for LTBI and subsequent active TB disease to detect persons who can most benefit from treatment for LTBI, which is essential for TB elimination because of new immunosuppressive drugs and therapies used for different illnesses, immigration from areas where TB is endemic, and diminished knowledge and reduced recognition of TB by clinicians as a result of decreased incidence.[8]

This Plan focuses on these three priority strategies for controlling and preventing TB. Goals and activities for each of the three strategies are based on: 1) current TB epidemiology in CT, 2) CDC

[8] Coe B, Nilsen DM, Will L, Etkind SC, Burgos M, Chorba T. Essential Components of a Public Health Prevention, Control, and Elimination Program: Recommendations of the Advisory Council for the Elimination of Tuberculosis and the National Tuberculosis Controllers Association. MMWR Recomm Rep 2020;69(No. RR-7):1-27. DOI: http://dx.doi.org/10.15585/mmwr.rr6907a1

DTBE's National TB Indicators Project (NTIP)[9]; and 3) the nationwide Healthy People 2030 objectives for TB[10].

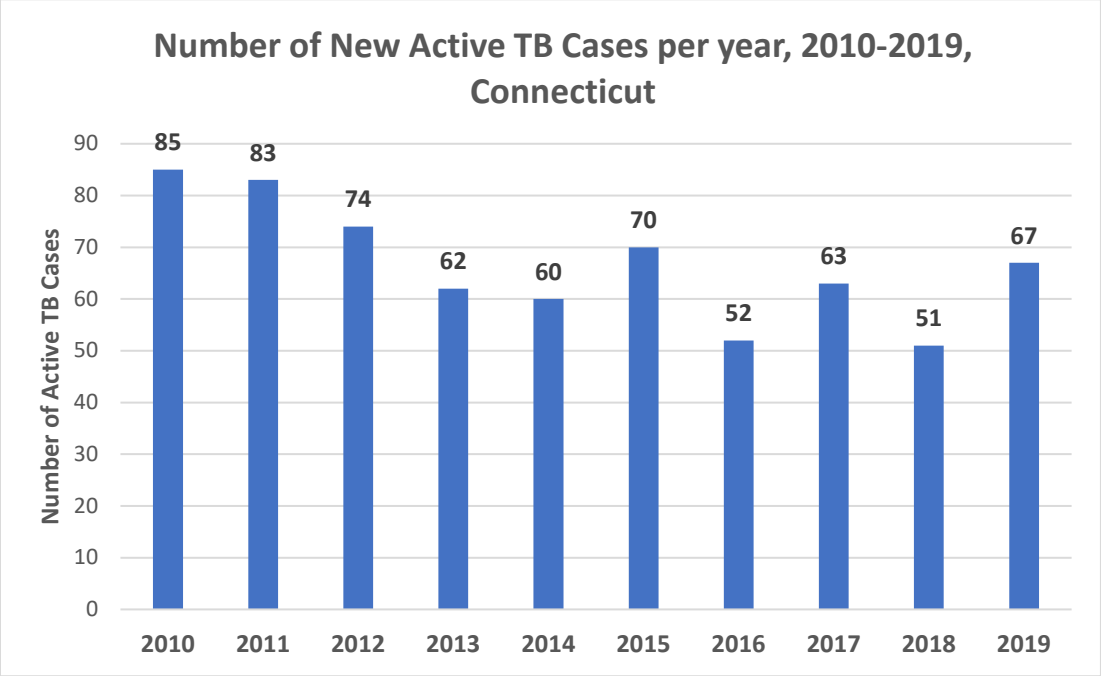
1. Current TB Epidemiology in Connecticut

The data cohort used for this plan are persons with confirmed TB disease counted towards CT's morbidity count for the years 2010–2019.

TB Incidence

Figure 1 shows the number of newly-diagnosed active TB cases per year in CT, from 2010-2019.[11] During this time, the median number of new diagnoses of TB in CT was 65 cases per year. From 2010-2019, there was a 21.2% net decrease in the number of persons diagnosed with active TB disease in the state.

Figure 1.



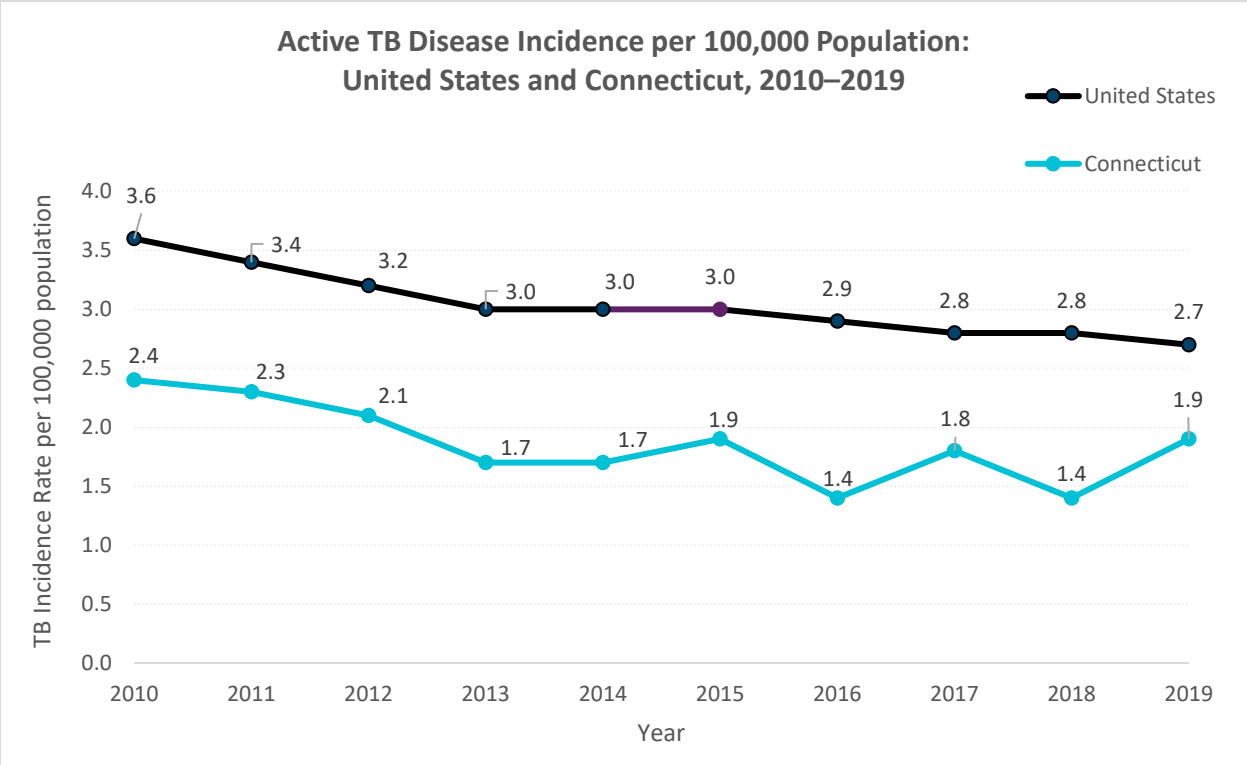
[9] National TB Program Objectives and Performance Targets for 2025, https://www.cdc.gov/tb/programs/evaluation/indicators/default.htm, Accessed December 4, 2020.

[10] Healthy People 2030, Objectives and Data, Infectious Disease. https://health.gov/healthypeople/objectives-and-data/browse-objectives/infectious-disease/reduce-tuberculosis-cases-iid-17, Accessed December 4, 2020.

[11] Data compiled by CT DPH TB Program, accessed January 25, 2021.

Figure 2 shows the gradual decrease in TB case rates in both the U.S and in CT from 2010-2019. During this period, the U.S. median active TB incidence rate was 3.0 per 100,000 population; CT's rate was 1.85 per 100,000 population. The current national TB elimination goal rate is <1.0 active TB cases per *1,000,000* population.

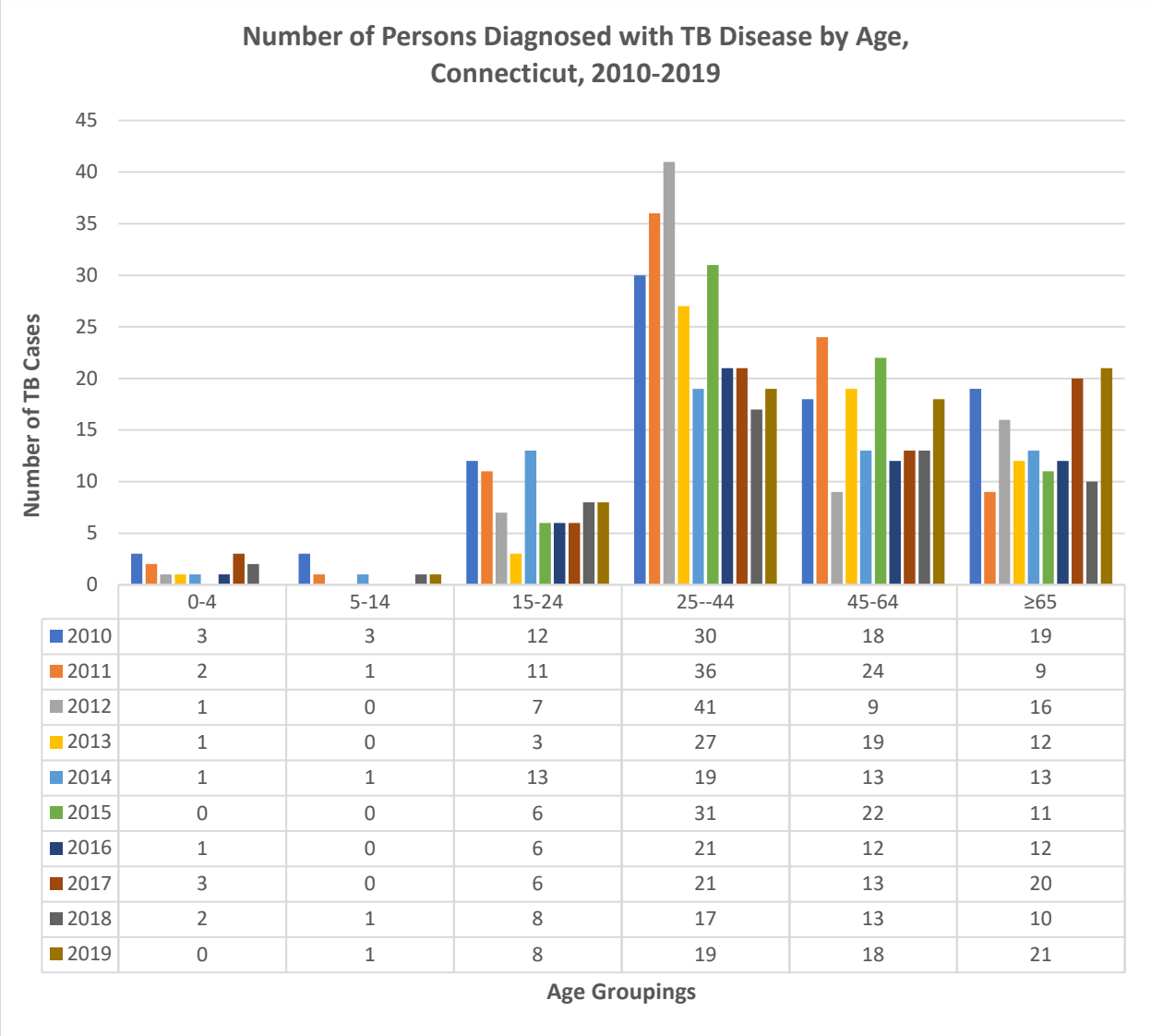
Figure 2.



Demographics: Age

Figure 3 shows the age categories of active TB disease patients during 2010–2019. On average, approximately 1.4% of patients diagnosed with TB in CT were <5 years of age and 0.7% were between the ages of 5–15 years. The age range of 25-44 years of age accounted for an average of 26.2% of CT's cases during this period; persons 45-64 years of age averaged 16.1% of TB cases, and those ≥65 years old accounted for an average of 14.3% of CT's TB cases.

Figure 3.



	0-4	5-14	15-24	25--44	45-64	≥65
2010	3	3	12	30	18	19
2011	2	1	11	36	24	9
2012	1	0	7	41	9	16
2013	1	0	3	27	19	12
2014	1	1	13	19	13	13
2015	0	0	6	31	22	11
2016	1	0	6	21	12	12
2017	3	0	6	21	13	20
2018	2	1	8	17	13	10
2019	0	1	8	19	18	21

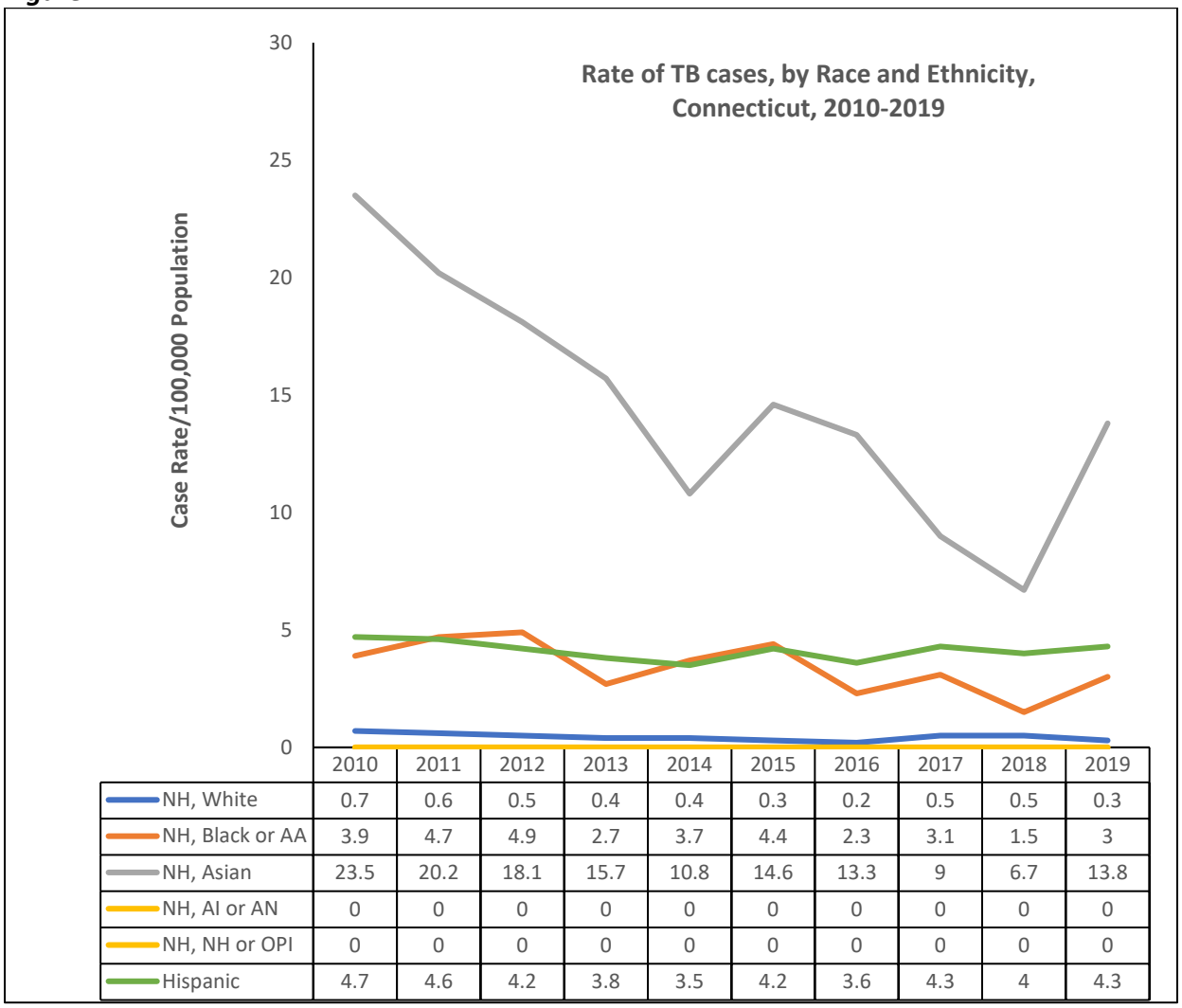
Demographics: Race and Ethnicity[12]

In CT, TB disproportionately affects minority populations. **Figure 4** shows that during 2010-2019, the median TB case rate for Non-Hispanic White persons was 0.45 per 100,000 population. This is in stark contrast to the median case rates for non-Hispanic Asian persons

[12] The abbreviations of race and ethnicity categories used in Figure 4 are as follows: NH (Non-Hispanic), AA (African American), AI or AN (American Indian or Alaska Native), NH or OPI (Native Hawaiian or Other Pacific Islander), Hispanic (Hispanic or Latino).

(14.2/100,000 population), for Hispanic persons (4.2/100,000 population) and for Non-Hispanic Black or African Americans in CT (3.4/100,000 population).

Figure 4.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
NH, White	0.7	0.6	0.5	0.4	0.4	0.3	0.2	0.5	0.5	0.3
NH, Black or AA	3.9	4.7	4.9	2.7	3.7	4.4	2.3	3.1	1.5	3
NH, Asian	23.5	20.2	18.1	15.7	10.8	14.6	13.3	9	6.7	13.8
NH, AI or AN	0	0	0	0	0	0	0	0	0	0
NH, NH or OPI	0	0	0	0	0	0	0	0	0	0
Hispanic	4.7	4.6	4.2	3.8	3.5	4.2	3.6	4.3	4	4.3

Demographics: Birth Status, Countries of Birth

Figure 5 presents the percentage of TB cases among persons born in the U.S. and among non-U.S.-born persons, for people in CT diagnosed with active TB between 2010–2019. During this period the percentage of persons in CT with active TB who were non-U.S.-born ranged between 74.5% and 86.6%. **Figure 6** shows the top ten countries of birth of those persons who were diagnosed with TB disease in CT.

Figure 5.

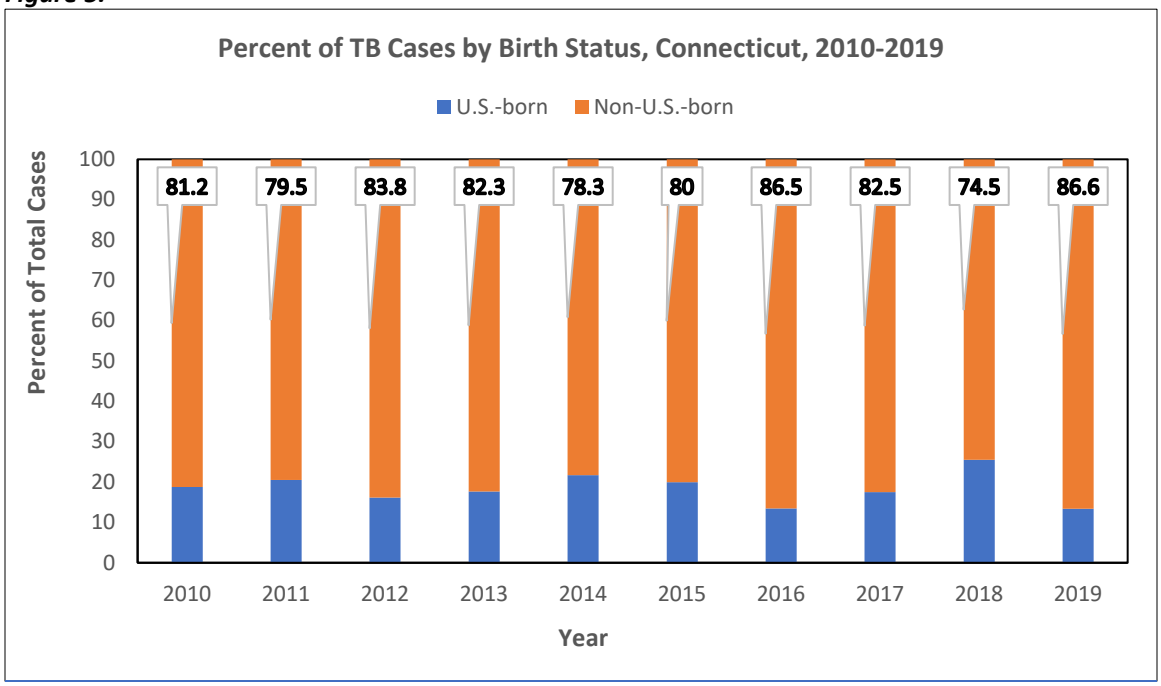
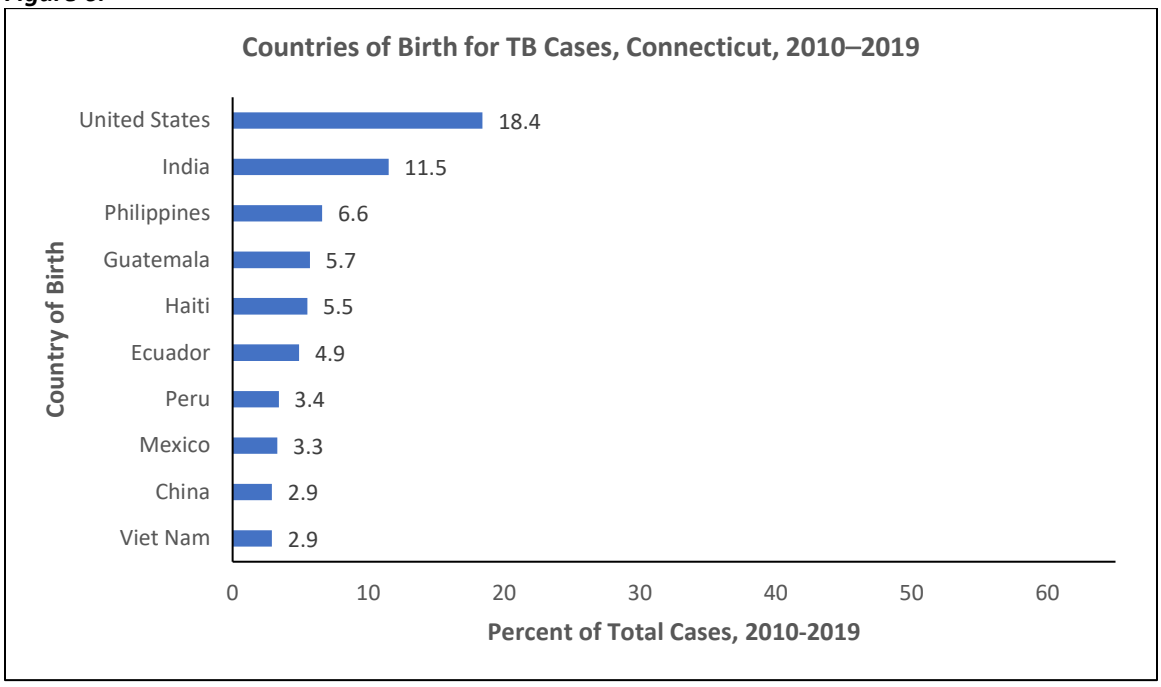


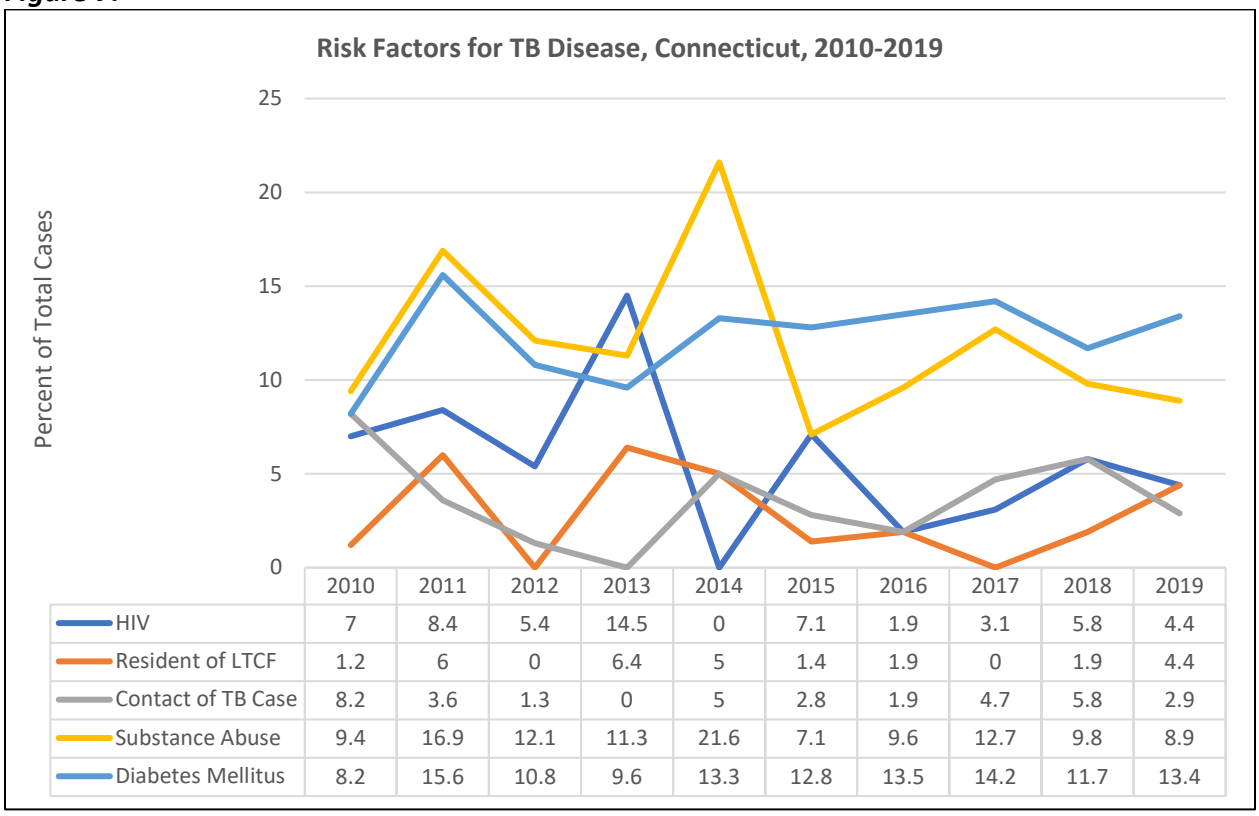
Figure 6.



Risk Factors

Risk factors for TB disease vary by region and state. In CT, **Figure 7** shows the average percent of cases for 2010–2019 with the risk factors most salient to the state's particular context: HIV co-infection (HIV); Resident of a Long-Term Care Facility (LTCF) at the time of diagnosis; Contact of Infectious TB Patient (2 years or less); Substance abuse (within the past year from diagnosis date; including excessive alcohol use, non-injecting and injected drug use); and Diabetes Mellitus. Substance abuse and diabetes mellitus were the most common risk factors identified among persons diagnosed with active TB in CT between 2010–2019.

Figure 7.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
HIV	7	8.4	5.4	14.5	0	7.1	1.9	3.1	5.8	4.4
Resident of LTCF	1.2	6	0	6.4	5	1.4	1.9	0	1.9	4.4
Contact of TB Case	8.2	3.6	1.3	0	5	2.8	1.9	4.7	5.8	2.9
Substance Abuse	9.4	16.9	12.1	11.3	21.6	7.1	9.6	12.7	9.8	8.9
Diabetes Mellitus	8.2	15.6	10.8	9.6	13.3	12.8	13.5	14.2	11.7	13.4

2. NTIP Objectives

The National TB Program Objectives and Performance Targets (NTIP) are promulgated by CDC DTBE every five years. These objectives are used by TB programs around the country to assess and monitor progress toward TB elimination in their jurisdictions. Below is a table that compares the latest two iterations of NITP Objectives.

NTIP Summary Report, Comparison of 2020 and 2025 Objectives[13]

National TB Program Objective	2020 Target	2025 Target
TB Incidence (cases/ 100,000)	1.4	1.3
• U.S.-born Persons	0.4	0.4
• Non-U.S.-Born Persons	11.1	8.8
• U.S.-born non-Hispanic Blacks or African Americans	1.5	1.0
• Children Younger than 5 Years of Age	0.3	0.1
• Known HIV Status	98%	99%
• Treatment Initiation	97%	96%
• Recommended Initial Therapy	97%	97%
• Sputum Culture Result Reported	98%	99%
• Sputum Culture Conversion	73%	83%
• Completion of Treatment	95%	95%
• Turnaround Time—Culture	78%	78%
• Turnaround Time—Nucleic Acid Amplification Test (NAAT)	92%	97%
• Drug-Susceptibility Results	100%	100%
• Universal Genotyping	100%	100%
Objectives on Contact Investigations		
• Contact Elicitation	100%	100%
• Examination	93%	94%

[13] CT TB Program records 2020, Accessed December 4, 2020.

• Treatment Initiation	91%	92%
• Treatment Completion	81%	93%
Objectives on Examination of Immigrants and Refugees		
• Examination Initiation	84%	72%
• Examination Completion	76%	78%
• Treatment Initiation	93%	87%
• Treatment Completion	83%	87%
Reports		
• RVCT	100%	100%
• EDN	93%	93%
• ARPE	100%	100%

3. Healthy People 2030 Objectives for TB

Healthy People 2030 objectives for TB are outlined in this way:

> *"Summary: Although the number of tuberculosis (TB) cases in the United States has decreased over the past 2 decades, progress is slowing down. And millions of people have latent TB infection (LTBI), which can progress to active TB. Efforts to identify and cure people with active TB — and to expand testing and treatment for LTBI — can help reduce cases of the disease nationwide.[14]"*

In short, Healthy People 2030 sets the TB objective as: Reduce tuberculosis (TB) from the baseline of 2017 (2.8 new cases of confirmed TB per 100,000 population), to the 2030 Target of 1.4 new cases of confirmed TB per 100,000 population. This objective is to be reached by, "Maintain[ing] consistency with national programs, regulations, policies, or laws.[15]"

[14] Healthy People 2030, Objectives and Data, Infectious Disease. https://health.gov/healthypeople/objectives-and-data/browse-objectives/infectious-disease/reduce-tuberculosis-cases-iid-17, Accessed December 4, 2020.
[15] Ibid.

V. TB Program Elimination Activities: 2021–2024

Introduction

All activities in this Section VI are intended to be reasonable and actionable over the course of the next four years, given appropriate staffing, funding, and other resources. Though this Plan is being written in the middle of the COVID-19 pandemic, the TB Program expects to manage the majority of these activities as set out below.

Strategy 1: Identification of and Completion of Treatment for Persons with Active TB Disease to Render Their Condition Noninfectious

Goal 1. Ensure consistent procedures for reporting suspect or confirmed cases to the TB Program

Activity 1: With CACET, review and/or revise TB Program diagnostic and treatment guidance documents, including: 1) *Standards of Care for Patients with Suspected and Confirmed Drug-Susceptible Tuberculosis in Connecticut: Reporting, Diagnosis, and Treatment (2/2017)*; and 2) *Prevention of Tuberculosis in Persons Enrolling or Enrolled in Colleges, Universities or Private Residential Schools in Connecticut (4/2012)* .

Activity 2: Review and/or revise TB Program surveillance report form documents, including: 1) *Tuberculosis Surveillance Report Form for Initial TB Disease and LTBI Reporting*; 2) *Tuberculosis Treatment and Follow-up Care Report Form*, and 3) Instructions for both report forms, to reflect current best practices and CT-specific needs.

Activity 3: Communicate updates and revisions to providers and local health departments via email messaging, TB Program website, TB Outreach Meetings, TB Clinician Conferences, and other educational or communication platforms.

Goal 2. Expand use of GeneXpert® nucleic acid amplification test (NAAT)

Activity 1: Perform GeneXpert® testing for all initial samples (first sample received) on persons with suspected or confirmed TB disease for the rapid confirmation of active TB diagnosis and rifampin resistance.

Activity 2: For patients placed on respiratory isolation with an initial negative Xpert result, perform a second (2nd) Xpert test to assess possibility of discontinuing respiratory isolation.
Activity 3: Validate Infinity 48 machine for testing and reporting of non-sputum specimens.

Goal 3: Collect and review all CT hospitals' policies for conducting GeneXpert® testing for both first and second sputum/respiratory specimens

Activity 1: Request all current hospital policies—including all hospitals incorporated into newly-organized health systems—for GeneXpert® testing for suspected TB patients.
Activity 2: With CACET, review hospital policies for consistency and best practices for proper use GeneXpert® and other modes of testing, and make recommendations as appropriate.
Activity 2: Communicate any recommendations to providers, hospitals and local health departments via email messaging, TB Program website, TB Outreach Meetings, TB Clinician Conferences, and other educational or communication platforms.

Goal 4. Promote knowledge and use of TB Program Risk Assessment documents

Activity 1: Educate about and promote the use of current TB risk assessment documents, including: 1) *Connecticut Tuberculosis (TB) Risk Assessment (7/2019)*; and 2) *Connecticut TB Risk Assessment User Guide (7/2019)*.
Activity 2: Communicate updates and revisions to providers and local health departments via email messaging, TB Program website, TB Outreach Meetings, TB Clinician Conferences, and other educational or communication platforms.

Goal 5. Ensure that samples are sent to CDC/Michigan for genotyping or whole-genome sequencing

Activity 1: Work within DPH Laboratory and CDC/Michigan protocols to send samples and receive genotyping results in a timely fashion.

Goal 6. Use incentives and enablers during a patient's treatment course to facilitate compliance and completion of treatment

Activity 1: Continue to use and distribute various forms of enablers (including, but not limited to, gift cards and temporary use of TB Program smart phones) to encourage TB treatment uptake and completion.

Goal 7. Ensure treatment completion for those diagnosed with TB disease

Activity 1: Ensure treatment completion for patients eligible to complete treatment within 12 months.

Activity 2: Expand the use of alternative methods of directly observed therapy (DOT) and directly observed preventive therapy (DOPT), including expansion of use of electronic DOT, including provision of phones for local health departments and/or patients.

Activity 3: Utilize alternative treatment regimens that may shorten treatment course, when available.

Activity 4: Screen for diabetes mellitus for all persons with suspected or confirmed TB disease.

Activity 5: Ensure HIV testing is performed for all patients with suspected or confirmed TB disease.

Activity 5a. For patients with TB/HIV co-infection, ensure patient is linked to HIV care.

Strategy 2: Finding and Screening Persons Who Have Had Contact with Persons with Active TB Disease

Introduction

In 2016, the United States Preventive Services Task Force (USPSTF) issued a Grade B recommendation for medical service providers to screen for latent TB infection among asymptomatic adults at risk for TB infection. This recommendation includes risk assessment, screening, and treatment and interventions. The full recommendation may be accessed at https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/latent-tuberculosis-infection-screening#fullrecommendationstart**.**

Tables 1 and **2** identify risk factors for *M. tuberculosis* infection and risk factors for progression to active disease, if infected[16].

Table 1. Risk Factors for *Mycobacterium tuberculosis* Infection

• Close contacts of persons known or suspected to have tuberculosis	• Foreign-born persons from areas that have a high incident of active tuberculosis (e.g., Africa, Asia, Eastern Europe, and Russia)
• Persons who visit areas with a high prevalence of active tuberculosis, especially if visits are frequent or prolonged	• Residents and employees of congregate settings whose clients are at increased risk for active tuberculosis (e.g., correctional facilities, long-term care facilities, and homeless shelters)
• Health-care workers who serve clients who are at increased risk for active tuberculosis	• Populations defined locally has having an increased incidence of latent *M. tuberculosis* infection or active tuberculosis, possibly including medically underserved, low-income populations, or persons who abuse drugs or alcohol
• Infants, children, and adolescents exposed to adults who are at increased risk for latent *M. tuberculosis* infection or active tuberculosis	

Table 2. Risk Factors for Progression of Infection to Active Tuberculosis

• Persons with human immunodeficiency virus (HIV) infection	• Infants and children aged <5 years
• Persons who are receiving immunosuppressive therapy such as tumor necrosis factor-alpha (TNF-α) antagonists, systemic corticosteroids equivalent to ≥15 mg	• Persons who were recently infected with *M. tuberculosis* (within the past 2 years)

[16] Centers for Disease Control and Prevention. Updated Guidelines for Using Interferon Gamma Release Assays to Detect *Mycobacterium tuberculosis* Infection – United States, 2010. MMWR 2010:59(RR-5):[3].

of prednisone per day, or immunosuppressive drug therapy following organ transplantation	
• Persons with a history of untreated or inadequately treated active tuberculosis, including persons with fibrotic changes on chest radiographs consistent with prior active tuberculosis	• Persons with silicosis, diabetes mellitus, chronic renal failure, leukemia, lymphoma, or cancer of the head, neck, or lung
• Persons who have had a gastrectomy or jejunoileal bypass	• Persons who weigh <90% of their ideal body weight
• Cigarette smokers and persons who abuse drugs or alcohol	• Populations defined locally as having an increased incidence of active tuberculosis, possibly including medically underserved or low-income populations

Table 3 outlines the risk factors and estimated risk for the development of active tuberculosis among those persons infected with *M. tuberculosis* compared to persons with no risk factors[17].

Table 3. Risk Factors and Estimated Risk for TB, Relative to Persons with No Known Risk Factor.

Risk Factor	Estimated Risk for TB Relative to Persons with No Known Risk Factor
High risk (testing and treatment for LTBI recommended for all ages)	
AIDS (not on anti-HIV therapy)	110-170
HIV (not on anti-HIV therapy)	50-110
Transplantation (related to immunosuppressive therapy)	20-74
Silicosis	30
Chronic renal failure requiring hemodialysis	10-25
Carcinoma of head and neck	16

[17] LoBue P, Menzies D. Treatment of latent tuberculosis infection: An update. Respirology 15:603-622. DOI: https://doi.org/10.1111/j.1440-1843.2010.01751.x

Recent TB infection (<2 years)	15
Abnormal chest X-ray with upper lobe fibronodular disease typical of healed TB infection	6-19
TNF-α inhibitors	2-9
Moderate risk (testing and treatment for LTBI recommended if age <65 years)	
Treatment with glucocorticoids	5
Diabetes mellitus (all types)	2-4
Young age when infection (0-4 years)	2-5
Slightly increased risk (testing and treatment for LTBI recommended if age <50 years)	
Underweight (<90% ideal body weight; for most persons, this is a BMI of 20)	2-3
Cigarette smoker (1 pack/day)	2-3
Abnormal chest X-ray—granuloma	2
Low risk (testing and treatment for LTBI recommended if age <35 years)	
Infected person, no known risk factor, normal chest X-ray ("low-risk reactor"	1
Very low risk (treatment of LTBI not usually recommended)	
Person with positive two-step ("boosting", no other known risk factor, and normal chest X-ray	0.5

Goal 1. Promote the use of IGRA tests for testing TB infection, as appropriate for CT's high-risk populations

Activity 1: Continue to educate about the appropriate use of IGRA tests (e.g., QuantiFERON®-TB Gold Plus or T-SPOT), for testing for TB infection.

Activity 2: Ensure that HIV testing is performed as part of the QFT collection process.

Goal 2. Ensure completeness of contact investigations

Activity 1: Ensure that each contact's demographic, evaluation, and treatment data are consistently and completely collected and reported to TB Program.

Activity 2: Revise TB Program *Contact Investigation Worksheet (TB-5)*.

Activity 3: Communicate updates and revisions to providers and local health departments via email messaging, TB Program website, TB Outreach Meetings, TB Clinician Conferences, and other educational or communication platforms.

Activity 4: Use Aggregate Reports for Tuberculosis Evaluation (ARPE), 2020-2021 TB Program Evaluation Plan findings (focus: contact investigations), and two previous TB Program evaluations (focus: LTBI and refugees and Class B1/B2 entrants), to identify issues with contact investigation.

Goal 3: Ensure treatment completion for patients diagnosed with LTBI

Activity 1: Establish protocols and processes for TB Program staff follow-up with local health departments and other providers for status of LTBI patients.

Activity 2: Continue the use of approved short-course LTBI regimens.

Activity 3: Expand the use of alternative methods of directly observed therapy (DOT) and directly observed preventive therapy (DOPT).

Strategy 3: Screening, Testing, and Treatment of Other Selected Persons at High Risk for TB Infection and Subsequent Active TB Disease to Detect Persons Who Can Most Benefit from Treatment for TB Infection

Introduction

CT State statute (C.G.S. Chapter 386g, Sec. 19a-265) provides a strong authority and foundation for all TB Program activities. This includes provision of TB safety net care regardless of insurance status. Indeed, the state is considered the payor of last resort for all persons with active TB as well as those persons considered at risk for LTBI and subsequent active TB disease. In addition, the TB Program also focuses on populations in CT who are at higher risk for TB disease and infection. These include persons with HIV co-infection, persons with diabetes, contacts to active TB cases, and immigrants and refugees—especially those with overseas Class B1/B2 TB.

Goal 1. Continue strong support for the TB Billing, TB Medicaid, and TB Medications program activities

Activity 1. Ensure that providers continue to request reimbursement for qualifying services from the TB Billing program as the payor of last resort for persons who are un- or under-insured.

Activity 2. Ensure that the TB Medicaid program is clearly communicated to persons that will benefit from it, and that processes are reviewed and revised as appropriate. [TB Medicaid is a collaboration between DPH and the CT Department of Social Services. This program enables qualified persons to apply for additional funds to cover the costs of TB care.]

Activity 3. To prevent spread and (re)activation of TB, ensure that the TB Program continues to offer free TB disease medications and free LBTI medications (through selected outlets) to un- or underinsured persons, as the payor of last resort.

Activity 4. Review and revise contracts or Memoranda of Agreement with selected TB clinics, local health departments and other providers, which allow the TB Program and its collaborators to reach the most high-risk and vulnerable populations.

Strategy 4: Surveillance Improvements Across All Aspects of TB Data Collection, Monitoring, and Reporting

Goal 1. Ensure operation of Refugee Health model in CTEDSS, and its connection to the TB Active model in CTEDSS

Activity 1: Complete and test Refugee Health module in CTEDSS and ensure connections to TB Active module in CTEDSS.

Activity 2: Explore potential for data downloads from CDC's Electronic Disease Notification System (EDN) into Refugee Health module in CTEDSS.

Goal 2. Create Provider Portals for TB and Refugee Health data

Activity 1**:** Create Provider Portals for TB and Refugee Health modules.

Goal 3: Enhance LTBI surveillance and Prepare for mandatory LTBI Reporting

Activity 1. Revise all LTBI Forms and data collection procedures, including contact tracing forms and procedures

Activity 2. Create LTBI module in CTEDSS and ensure linkages to Refugee Health and Active TB modules in CTEDSS.

Goal 4. Communicate and train providers about new surveillance and reporting procedures for LTBI

Activity 1: Communicate changes to reporting via provider portals and train providers and local health departments via email messaging, TB Program website, TB Outreach Meetings, TB Clinician Conferences, and other educational or communication platforms.

Strategy 5: Public Health Workforce/Human Resource Development

Goal 1. Support and strengthen existing TB public health workforce and ensure continuity of TB expertise in the state

Activity 1: Ensure access to TB educational and training opportunities for medical and clinical providers, in order to maintain and increase TB care provider expertise. [This is especially important for clinics and hospitals who have many providers rotating in and out of clinics, and for providers new to TB, or who have had limited TB training.]

Activity 2: Ensure access to TB educational and training opportunities for regional and local public health department staff, including access to national TB association webinars, DTBE Centers of Excellence trainings, and workshops. [The TB Program has found this to be especially important for those local health department nurses and Health Directors who rarely or infrequently see a case of active TB in their jurisdictions.]

Activity 3: Conduct outreach and provide TB Program led lectures/education to colleges and universities and Schools of Medicine, Nursing, and Public Health.

Activity 4: Continue to convene TB Outreach Meetings twice a year for public health nurses, local health department staff, and other providers of TB care.

Activity 5: Continue to convene Regional/New England conferences for clinicians with GTBI and other Centers of Excellence for TB.

Activity 6: Convene meetings of CACET, and encourage engagement with TB expertise and knowledge base from around the state.

Goal 2. Stabilize TB Program and DPH TB Laboratory Staffing and Activities

Activity 1. Work to stabilize or enhance funding for TB program, laboratory, and surveillance activities.

Activity 2: Update, enhance, and protect current and legacy TB billing activities and database by a) transferring TB Billing database and activities to the appropriate DPH Branch, and b) cross-training DPH personnel in TB Billing and TB Medicaid activities.

Strategy 6: Collaborations

Goal 1. Identify external individuals/agencies who provide healthcare services to populations at high risk

Activity 1: Strengthen existing collaborations, and seek out other potential partners and collaborators for provision of TB care. Such groups and organizations may include, but are not limited to:

For TB Clinical and Case Management TB Activities: Local Health Department, Visiting Nurses Associations, CACET, CDC Centers of Excellence for TB (e.g., Global TB Institute at Rutgers University), DTBE, National TB Controllers Association, Division for Global Migration and Quarantine, New England TB Consortium, Laboratory staff in CT and in New England, and academic institution partners

For TB Education for Communities at High-Risk: Community Health Workers, Hispanic Alliance of Southeastern CT, and School-Based Health Centers

For Refugee Health and Class TB B1/B2 Activities: DSS/DPH; Academic partners, Refugee health providers, refugee resettlement agencies, Federal and State agencies (e.g., FBI, USCIS, ORR, PRM), Local Health Departments, New England Refugee Health Consortium, and national associations (e.g., ARHC)

For TB Billing: TB Medicaid (DSS and DPH), TB care providers and laboratories, DPH Fiscal and Business Office staff

DPH internal partners: Infectious Disease Section; Informatics/IT; Immunizations; HIV/STD/Viral Hepatitis, Diabetes Programs; Office of Health Equity.