Dear TB Elimination Partners and Supporters:

On behalf of our Volunteer TB Elimination Coordinating Committee, we are pleased to present this ten-year plan to eliminate tuberculosis (TB) in Colorado. The time is now. The goal is well within our grasp.

Beginning in November 2014, a wide net was cast in an effort to engage providers, community partners, local public health, advocates, individuals and others in an audacious undertaking with a simple goal - eradicate tuberculosis across Colorado by 2026. During the next sixteen months, a small, dedicated group accepted the challenge to craft a statewide plan to do just that.

In the pages that follow, you will find six goals with fourteen strategies that represent the best thinking jointly put forth for your consideration by leading TB experts in Colorado. Our thanks to our colleagues across the country who shared with us elements of their state plans, especially those in California who allowed us to use much of their plan in the shaping of Colorado's.

This initial roadmap kicks-off our shared goal of stopping this preventable and treatable disease across Colorado within the next decade. We commit to keeping this plan dynamic and eagerly await its evolution as critical partners join this comprehensive effort in the months and years to come.

Thank you to all the volunteer members of TB Elimination Coordinating Committee (a complete list can be found on page 21). Thank you also to Ellen Brilliant and Apex Consulting for supporting this stakeholder-driven process.

With gratitude and optimism to ending TB in Colorado,

Pete Dupree, MPH
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TB Program Manager

TB Elimination in Colorado: The Time is Now

A 10-year Plan to Eliminate Tuberculosis in Colorado
Submitted by the Volunteer TB Elimination Planning Task Force

December 2016

This plan was developed with input and support from the following partners

Executive Summary:

Tuberculosis (TB) has affected human populations for millennia, and remains one of the most important causes of human disease and death worldwide. The World Health Organization estimates there were 9.6 million new patients with TB disease and 1.5 million TB deaths in 2014. TB remains the leading cause of death from an infection and the leading cause of preventable death in the world. About 30% of people exposed to TB will develop TB infection. Moreover, up to 10% of those infected will develop active TB disease in their lifetime. This sobering reality does not end at the Colorado border. No person should face illness, much less death from this preventable and treatable infection. The identification and treatment of TB patients and prevention of the spread of infection in populations are vital functions of public health agencies including the Colorado Department of Public Health and Environment, county and local health departments and both ambulatory and hospital-based health care providers. In 2016, recognizing the public health imperative for such a service, the United States Preventive Services Task Force (USPSTF) issued a B Grade recommendation for medical providers to screen for and initiate TB infection treatment among higher risk adults to limit the possible progression to infectious TB disease.

A number of factors make control of TB challenging. Initial infection with TB can occur without any clear sign or symptom, and the bacteria can remain dormant for years, even decades before reemerging as a severe and contagious disease, a process occurring among Coloradoans of every age and particularly dangerous to those with immune problems or other chronic medical conditions such as diabetes and HIV. The progression from infection to active disease can be prevented with long courses of antibiotics, and thus one of the fundamental tasks for local public health workers is the identification and treatment of individuals who have tuberculosis infection before they can progress to developing severe or contagious TB disease. While TB diagnosis has traditionally relied on technologies developed early in the 20th century, in the past decade new technologies, in particular the interferon-gamma releasing assays (IGRAs) have emerged allowing for more focused and efficient identification of TB-infected individuals. Similarly, advancements in development of shorter duration treatment regimens have improved rates of completion of TB infection therapy, which result in fewer individuals in a community at risk of TB disease.

These advances, in parallel with continued innovation and commitment from public health agencies and improved access to health care for at-risk individuals has brought rates of tuberculosis infection to historical lows. This trend and improving diagnostic technologies strongly support efforts toward TB elimination in Colorado. While daunting and difficult, this is a worthwhile and important goal. TB elimination is defined as 1.0 case per 1 million people. Currently in Colorado, there is a rate of about 12.0 per one million people. To this end, a working group of Colorado TB stakeholders has developed a 10-year plan that identifies six fundamental programmatic and public health goals essential to the achievement of TB elimination in Colorado by 2026. These goals are based on current TB epidemiology, which shows that most TB results from infection related to underlying infection among individuals with specific risk factors. Within each goal, the Task Force identified essential strategies and key objectives that define the working framework of the 10-year program.

Goal 1: Find and engage individuals and populations at-risk for TB infection

The specific strategies encompassed in Goal 1 focus both current and new data tools to create a detailed epidemiologic profile of the populations in Colorado at highest risk for TB infection. Definitions of high-risk populations include:

- individuals born outside Australia, Canada, New Zealand, the U.S., and Western Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, the Netherlands, Norway, Sweden, and Switzerland; see Appendix B) where there is ongoing community-level transmission of TB
- Individuals spending > 1 month continuously in countries other than Australia, Canada, New Zealand, the U.S., and Western Europe where there is ongoing community-level transmission of TB
- Individuals who visit a country outside Australia, Canada, New Zealand, the U.S., and Western Europe for < 1 month that have known contact to patients or people who are sick with respiratory illness (i.e. volunteers who work at a hospital for a week every year should be tested).
- Individuals, regardless of nativity, who are at higher-risk of progression from TB infection to TB disease due to other risk factors including being diabetic, HIV-positive or a child under 5 years of age that each have epidemiologic TB exposure history.

A key aspect of this goal is the development of formalized strategies for engagement with key community partners, including volunteer agencies for immigrants, local public health agencies, and medical providers in higher-risk communities.

Goal 2: Test those at-risk for TB infection and progression to TB disease so individuals know their status

Building on the profiles developed in Goal 1, the strategies and objectives in Goal 2 focus on continued improvements in the effectiveness and efficiency of finding individuals infected with TB and developing enhanced procedures for identifying infected patients at highest risk of progression to TB disease. Key elements of these strategies include development of screening tools to better assess risk of TB infection and associated disease progression, allowing stakeholders to identify both high-risk populations for screening as well as low-risk populations in whom screening represents poor utilization of resources. Additionally, because diagnostic technologies (IGRAs) are more accurate than skin testing for TB infection, the Task Force identified the widespread adoption of IGRA testing by public health and medical providers as an essential tool to enhance efficiency of the objectives of Goal 2.

Goal 3: Ensure completion of treatment of those diagnosed with TB infection

Prevention of progression to TB disease among TB-infected individuals is one of the fundamental challenges for public health agencies and medical providers; because treatment regimens can be long (up to 9 months) and affected individuals may have additional barriers related to social determinants of health that interfere with consistent long-term engagement with public health or medical providers. The strategies and objectives of Goal 3 will increase the understanding of the specific barriers to TB infection treatment completion faced by Colorado's high-risk populations. These strategies and objectives will facilitate completion of appropriate treatment through use of newer shortened and less burdensome treatment regimens and

engagement with community partners to develop novel strategies to encourage individuals to start and complete TB infection treatment.

Goal 4: Create systematic support for TB prevention

The strategies in Goal 4 derive from the understanding that for TB elimination to succeed, integration of TB prevention and management activities where multiple public and private partners will contribute to the identification of TB-infected individuals, is essential. Identified partners in this integration include school districts, primary care medical providers including key medical specialists, private companies that utilize employees from higher risk demographics, and colleges/universities with high numbers of students from TB endemic countries. The objectives of Goal 4 emphasize the importance of overcoming barriers to effective TB screening through provider education, advocacy for improved insurance coverage for TB prevention and management activities, public and private grant funding, subsidies to allow sliding scale pricing for lab testing, and negotiation with vendors for reduced IGRA costs.

Goal 5: Tailor communication messages to key groups

Stakeholder and community engagement and participation will be critical to the success of the TB elimination campaign. The first objectives in Goal 5 detail development of clear marketing and educational strategies aimed at community services providers in high-risk communities, and medical providers that emphasize key aspects of the campaign including identification of at-risk populations, use of IGRAs and short-course treatment options. Communication and engagement strategies for communities at higher risk for TB infection will also be developed, emphasizing culturally appropriate and tailored messages that encourage individuals to "know their TB status". Finally, the Task Force recognizes the importance of communication and advocacy with governmental policy makers, potential funding agencies and the media.

Goal 6: Integrate emerging technologies/Report and track with on-going evaluation of programmatic effectiveness

The 10-year TB elimination plan will rely heavily on accurate, relevant and comprehensive data to monitor progress toward elimination and identify areas that may need program adaptation or redirected resources as conditions evolve. The strategies in Goal 6 detail the use of existing data sources and the importance of developing new sources to address any identified gaps. Key features of these strategies include increasing the utilization of electronic medical records in use at partner health organizations, integration of existing comprehensive health data repositories, and harmonization of TB documentation procedures across the state. Additionally, the Task Force recognizes that increased use of lab-based diagnostics will facilitate the process of making TB infection a reportable condition to the Colorado Department of Public Health and Environment, which would be a powerful epidemiologic tool for the elimination campaign.

I. Overall goal of the volunteer TB elimination planning Task Force:

In late 2014, a multi-disciplinary group of tuberculosis (TB) staff members at the Colorado Department of Public Health and Environment (CDPHE) and the Denver Metro Tuberculosis Clinic (DMTBC) met to discuss the viability and practicality of developing a TB elimination plan for the state of Colorado. In January 2015 a volunteer TB elimination planning Task Force was recruited from stakeholders throughout the state to develop and recommend strategies for the elimination of tuberculosis (TB) in Colorado. Throughout 2015 and into early 2016, this diverse group of TB subject matter experts and engaged stakeholders met monthly to develop the strategies that would become the basis for the 10-year TB elimination plan for Colorado. Members of the planning Task Force reviewed other state TB elimination plans as well as the latest World Health Organization (WHO) low-incidence country plan to identify lessons learned as well as key activities and strategies toward TB elimination developed by these diverse entities.

There are an estimated 158,000 Coloradans infected with *Mycobacterium tuberculosis (Mtb)* according to 2011-2012 National Health and Nutrition Examination Survey **(**NHANES**)** estimates released in 2015 and most are unaware of their infection, leaving the infection untreated and in danger of progression to active TB disease. Since TB disease and new transmission are at a 30-year low in Colorado and the United States, and public health control measures for identifying and limiting transmission from individuals with active TB are robust, a great public health opportunity exists in Colorado to shrink the pool of TB infection. Innovations in diagnosis and treatment of TB infection, as well as the expansion of health care coverage, now make it possible to more effectively advance TB prevention. Experts believe that expansion of treatment of TB infection can reduce progression to TB disease significantly, averting deaths due to TB, minimizing new transmission and ever-increasing TB-related care and treatment expenses associated with caring for those patients.

II. Guiding principles of the TB elimination plan:

- TB is a preventable disease and, barring instances of extreme drug resistance, is 100% treatable
- People with TB infection will benefit from knowing their status
- Timely diagnosis is vital and early follow-up (including drug resistance testing) must occur for every active TB case
- Data and research informs recommendations and strategies
- Key interventions must be simplified and standardized (e.g. screening tests)
- There must be buy-in from providers regarding screening, testing and treatment considerations
- Community groups representing at-risk populations must be engaged and empowered to educate about the risk of being infected with *Mtb* and progressing to active TB disease
- Investigation of each occurrence of active TB should be conducted to determine if their disease was preventable
- Infection by *M. tuberculosis*—often called latent TB infection or LTBI—can progress to TB disease, so “latent”, which denotes harmlessness, will not be used in its description

III. Volunteer TB elimination Task Force recommendations

The multidisciplinary volunteer TB elimination planning task force is recommending six overarching goals with accompanying strategies and objectives that will drive the strategic and tactical planning and associated activities implemented over the ten-year lifecycle of this TB elimination plan:

Goal 1: Find and engage individuals and populations at-risk for TB infection
Use data-driven epidemiological profiles and surveillance systems to identify those most at-risk for progressing from TB infection to TB disease.

Goal 2: Test those at-risk for TB infection and progression to TB disease so individuals know their status
Evaluate those with positive tests to diagnose and/or exclude active or inactive TB. Recommend treatment based upon the risk of progression to active TB disease.

Goal 3: Ensure completion of treatment of those diagnosed with TB infection
Utilize efficacious short-course therapies when appropriate to achieve treatment completion for TB infection.

Goal 4: Create systematic support for TB prevention
Engage and educate public health, community health partners, and individual health providers to develop a comprehensive, crosscutting system where active referrals and collaboration across disciplines leads to improved patient outcomes.

Goal 5: Tailor communication messages to key groups
Develop and implement simple and clear TB prevention marketing and education strategies for providers and the public alike.

Goal 6: Integrate emerging technologies/Report and track with ongoing evaluation of programmatic effectiveness
To ensure that public health and community health providers are reaching at-risk populations and guiding individuals through TB infection treatment, systems shall be developed to measure progress and defined time-specific targets should be developed to gauge progress and identify opportunities to improve using on-going evaluation of these systems.

Goal 1: Find and engage individuals and populations at-risk for TB infection

The key to this goal is development of epidemiological profiles of the high-risk groups for TB infection and progression to TB disease throughout Colorado. Those epi profiles will inform where resources and activities are directed to engage individuals and populations at-risk for TB infection to begin and complete treatment.

Strategy 1:
Create epidemiologic profiles of populations at high-risk for TB infection and disease and the providers who serve them.

Objective 1a:
Review and research available demographic data on those with TB disease as well as those with co-morbid conditions and/or contributing socio-economic/behavioral factors including, but not

limited to, diabetes, HIV infection, homelessness, incarceration, and those born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand. This will include use of CDC electronic disease network (EDN) alerts of recently arriving immigrants from communities in which there is ongoing TB transmission along with engagement and collaboration with the volunteer agencies (VOLAGs) that support and work closely with individuals who have been designated as having Class B condition due to TB (TB infection needing evaluation for treatment) when they arrive in Colorado.

Activities:

- Develop epidemiological profiles of key at-risk groups to inform placement and direction of future activities
- Collaborate with service providers addressing co-morbid conditions to identify "hot spots" and regions to direct TB prevention and screening services

Objective 1b:

Identify geographic locations of residence, points where high-risk groups are seeking care, primary medical providers in those areas and the main places of congregation. This specific information will allow local public health agencies (LPHAs) and community providers to identify the size and location of high-risk groups and allow health departments to identify access points and to focus testing efforts. It will also enable more efficient targeting of subsets of providers, health plans and practices that provide care to the groups most in need of TB prevention.

Activities:

- Identify and create partnerships with organizations and prominent community leaders, notably the Metro Community Partners Network (MCPN) and organizations within Colorado that support individuals who have recently moved to Colorado
- Use analysis of data on persons born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand who are most at-risk to focus testing and engage members of these communities to begin education efforts and establish connections with leaders within communities
- Create an inventory of organizations providing medical/mental health/social services; find and engage an appropriate contact person for each
- Tailor educational materials on importance of getting tested—using the Know Your Status campaign—and treatment for TB infection to prevent future complications and dangers of co-morbidities like diabetes
- Coordinated World TB Day events

Strategy 2:

Include country of birth as data elements for electronic medical records/intake forms.

Objective 2a:

Encourage providers using electronic medical records (EMR) including Epic (National Jewish Health, St. Joseph's Hospital group, and University Hospital group among others) to add or include the same data field. It is imperative for providers to ask about birthplace/country of

origin to determine potential TB exposure risk and to then trigger TB testing. Other disease control efforts would also benefit (e.g., efforts related to hepatitis B and diabetes).

Activities:

- Use 10 years of CDPHE TB data along with Epic medical record software at DMTBC as pilot to include country of birth in order to identify and track over time high-risk individuals
- Subsequently, additional analyses based on findings

Objective 2b:
Engage vendors of EMR software packages to add "country of origin" or "country of birth" to their respective software. Users of such software have little influence over what fields are included or added to their EMR offerings.

Activities:

- Begin with Epic platform and expand as opportunity allows

Goal 2: Test those at-risk for TB infection and progression to TB disease so those individuals know their status

In pursuance of TB elimination, testing and treatment should extend beyond persons born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand to include other individuals identified to be at an elevated risk of TB infection and/or progression to disease due to co-morbidities. Performing appropriate and thorough medical examination of persons born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand is essential. Identifying all close contacts to every case of active, pulmonary tuberculosis through the contact investigation and being vigilant to ensure all appropriate contacts received adequate and appropriate follow up testing and treatment is equally important.

Strategy 3:
Increase TB testing and treatment of TB infections in all persons born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand at higher risk due to other risk factors as described above.

Objective 3a:
Tailor an existing, easy-to-use screening tool for providers and LPHAs to identify TB risk and prompt testing of and treatment for those found to be at higher-risk for TB infection and progression to TB disease.

Activities:

- Tailor an existing screening tool to suit Colorado's needs
- Establish simple, concise guidelines
- Distribute and train on those guidelines

Objective 3b:
Develop education and awareness campaigns at the community and provider level to encourage understanding and usefulness of the simple screening tool among all clients they serve.

Activities:

- Tap into public relations specialists at state and LPHA levels to create unique and captivating messaging that resonates with respective provider and general public audiences

Objective 3c:
Collaborate with colleges/universities/tertiary educational entities to screen and pay for TB testing of at-risk students.

Activities:

- Review what states including Kansas and Missouri have done to ensure systemic TB screening of at-risk students including persons born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand in their schools
- Draft and present state statute proposal supported by national and state surveillance data seeking TB screening of all at-risk students before beginning classes
- Find legislative "champion" to guide the legislative process
- Seek buy-in from tertiary institutions by highlighting cost (both financial and temporal) of conducting contact investigations on a campus and reviewing surveillance data of TB patients on Colorado college/university campuses

Strategy 4:
Increase the strategic use of interferon-gamma release assays (IGRAs).

Objective 4a:
Standardize use of IGRAs among providers caring for these populations to account for confounding of TST among those with BCG vaccinations.

Activities:

- Create a state recommendation or endorsed protocol on this objective to validate and give weight to standardized use of IGRAs among providers and LPHAs
- Work with colleges/universities/tertiary educational entities to screen and pay for TB testing of at-risk students
- Negotiate bulk discounts from IGRA vendor/s for supplies and/or lab diagnostics

Objective 4b:
Providers who see little TB will recognize the value of screening and then treating patients for TB infection.

Activities:

- Develop and provide education and awareness campaigns for providers to explain the efficacy of and encourage the use of IGRAs in the screening of BCG-vaccinated individuals for TB infection

Strategy 5:
Reduce testing of low-risk populations.

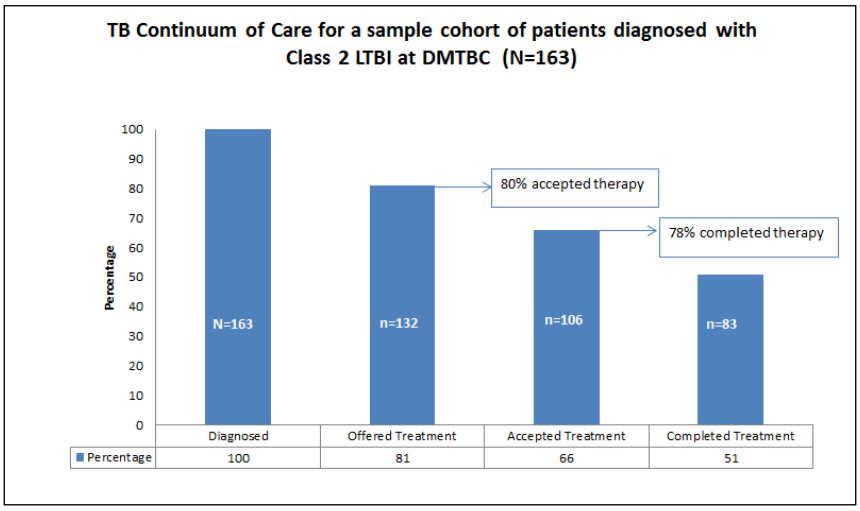
Objective 5a:
Limit TB infection testing to high-risk individuals. Discourage serial testing of low-risk individuals in the workplace including health care settings. This will free up limited resources toward individuals and populations with greater need of such services. Low-risk populations that are routinely screened, such as the annual re-testing of health care workers, should be limited to testing those with new TB exposure risk.

Activities:

- Promote use of the simple risk-assessment screening tool to identify TB risk
- Develop best-practice guidelines that include language on health care worker testing only at time of initial employment and then symptom screening after new exposure risk thereafter as opposed to policy-driven annual testing
- Using these guidelines, educate health care providers and other employers in order to reduce unnecessary serial testing of low-risk individuals

Goal 3: Ensure completion of treatment of those diagnosed with TB infection

In evaluating strategies needed to ensure completion of treatment for those diagnosed with TB infection, it will be important to delineate gaps within the TB infection care continuum and risk factors for not proceeding through the care continuum. The TB care continuum is defined as the following: 1) diagnosis of TB infection 2) offering of TB infection therapy 3) acceptance of TB infection therapy 4) initiation of TB infection therapy 5) completion of TB infection therapy. Patients can be lost at each stage and there may be different reasons for not completing each stage of the care continuum. The Denver Metro TB clinic (DMTBC), evaluates the proportion of individuals who progressed through the TB care continuum.



TB infection therapy was offered to 81% of individuals; 80% accepted treatment; and of those 78% completed therapy (see figure). However, only 51% of those diagnosed ultimately completed TB infection treatment. Of those individuals who did not start

treatment, more than two-thirds were either never offered or did not accept treatment. In all clinic populations, greater emphasis will be placed on ensuring that treatment is offered appropriately as well as understanding and documenting why patients decline therapy.

Strategy 6:
Increase treatment initiation for TB infection and completion of treatment in high-risk populations that already undergo testing.

Objective 6a:
Of those who were not offered TB infection therapy at the Denver Metro Tuberculosis Clinic, half were not offered because they were lost to follow-up. Therefore, additional data are needed to determine why individuals are lost to follow-up after diagnosis of TB infection. TB infection treatment should be offered to all individuals with an estimated risk of developing active TB that is greater than the risk of adverse effects. Estimates suggest that 20% of individuals who are offered therapy will decline. Of those individuals who decline treatment, almost half may not have a specific reason for declining therapy. Therefore, it will be important to determine reasons for declining TB infection therapy to frame targeted interventions at the specific community level. Additional data are needed at the clinic/community level regarding risk factors for not completing therapy, including impact of adverse effects on treatment completion. In addition to allocating resources for additional data collection, this objective calls for allocation of resources for the use of enablers and incentives to support individuals in completing TB infection therapy.

Activities:

- Perform a knowledge/attitudes and practice survey of community-based organizations (CBOs) and community clinics that serve individuals at high-risk for TB infection to identify barriers to offering TB infection therapy and accepting TB infection treatment
- Engage key informants, community leaders and focus groups to tailor education and awareness messages to specific at-risk populations
- Develop a readily accessible toolkit for clinics to evaluate gaps in the TB infection treatment cascade within at-risk populations they serve
- Once gaps are identified, specific strategies to meet those gaps will be developed such as decision tools for providers to offer TB infection therapy, key messaging to increase acceptance of treatment and the use of enablers and incentives, when appropriate, to improve treatment completion

Objective 6b:
Collaborate with federal, territorial, state, and local corrections institutions and agencies, some of them privately owned and operated, to ensure improved TB infection treatment completion rates among the incarcerated in their respective facilities. This should include coordinated linkage to onward care with LPHAs for those patients released from incarceration to decrease incomplete or delayed completion of treatment.

Activities:

- Develop a readily accessible toolkit for correctional institutions to evaluate gaps in the TB infection treatment cascade within their population

- Once gaps are identified, specific strategies to meet those gaps should be developed including decision tools for providers to offer TB infection therapy, guidelines for use of a simple screening tool, and key messaging to increase both acceptance of treatment and completion of treatment

Strategy 7:
Increase implementation of short course TB infection therapy with rifampin for 4 months (4R) and alternatively, isoniazid/rifapentine weekly for 3 months (3HP) to facilitate completion of TB infection therapy.

Objective 7a:
Perform outreach to medical providers who manage or plan to manage TB infection to advocate for and educate on selection of short course TB infection therapy.

Activities:

- Develop a decision tool for providers to identify patients who are candidates for short course TB infection therapy
- Include information about managing drug-drug interactions and adverse effects
- Include information about advantages to patient and provider of 4R and 3HP regimens
- Collaborate with providers to perform audit/feedback of TB infection completion rates stratified by regimen before and after outreach intervention
- Work with community leaders among at-risk populations to identify key messages within the community to increase awareness of shorter course TB infection regimens
- Promote and "normalize" 3HP regimen self-administered treatment so providers are aware of it and default to it over 9 months of isoniazid

Goal 4: Create systematic support for TB prevention

It is necessary to engaging public health, community health partners, and individual health providers in a discussion about a comprehensive, crosscutting system that promotes active referrals and collaboration across disciplines resulting in improved TB patient outcomes. TB infection and disease rarely occur without risk factors for exposure that should suggest "thinking TB" and screening for it. Further emphasis is warranted for individuals with additional medical co-morbidities with risk factors for progression from TB infection to TB disease.

Strategy 8:
Implement prevention partnerships that encompass both private and non-public health providers.

Objective 8a:
Work with school districts (school nurses in particular), pediatricians and youth clinics to reach parents born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand with U.S.-born children to encourage TB screening and testing.

Activities:

- Convene focus groups and key informant interviews with school nurses as well as pediatric and youth clinic staff to gain insights into the health beliefs and health care seeking behaviors of parents born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand with U.S.-born kids
- Convene focus groups and key informant interviews with parents born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand with U.S.-born kids to develop and test messaging aimed at encouraging TB screening and testing
- Once developed, distribute appropriately-messaged educational materials to clinics, primary care offices and schools promoting TB screening and testing
- Supplement these materials with concise guidelines for use of the screening tool and outreach/grand rounds-type events to engage medical providers with details
- Develop active referral networks to TB clinics and other appropriate health care providers when screening of these kids yield positive test results

Objective 8b:

Leverage existing systems by addressing TB risk in primary care assessments. Focus particular attention on the USPSTF Grade B recommendation that primary care clinicians screen adults at increased risk for TB infection to help prevent the progression to active TB. Develop tools and educational opportunities for primary care providers. Engage with medical specialty societies that care for patients who are at risk for TB reactivation (e.g., nephrology, transplant surgery, etc.) Approach and engage medical specialists (nephrologists, rheumatologists, etc.) to promote adoption of TB screening activities using the simple risk-assessment/screening tool.

Activities:

- Highlight and disseminate the USPSTF B Grade recommendation to screen at-risk adults for TB infection to primary care providers, hospitals, and clinics
- Convene focus groups and key informant interviews of primary care physicians, PAs, and nurses to develop messaging for TB risk educational materials
- Access and engage medical societies to seek input and buy-in on these messages and materials from medical specialists specific to use of the risk-assessment/screening tool
- Collaborate with Medicaid-covered diabetes self-management education (DSME) programs
- Collaborate with diabetes clinics to equip each with a simple TB risk-assessment tool
- Develop active referral networks from diabetes clinics to TB clinics for follow-up as part of intake algorithms
- Develop guidelines that encourage TB clinics to be equipped with glucometers for diabetes screenings and to offer active referrals to diabetes clinics as part of intake algorithms

Objective 8c:
Outreach to private employers/companies and their employee health programs that recruit internationally and hire employees born in or spending > 1 month continuously in countries outside Canada, the U.S., Western Europe, Australia, and New Zealand to engage them in education and awareness around TB risk assessments and screening for TB among those employees.

Activities:

- Engage employers in TB 101 education that includes information on lost productivity in workplace during a contact investigation
- With employers, promote the importance of TB testing at time of employment with employees on work visas
- With employers, promote the usefulness of baseline testing and follow-up symptom screening for employees traveling to countries outside Canada, the U.S., Western Europe, Australia, and New Zealand
- Develop simple to understand guidelines touching on the first 3 bullets for distribution to and use by all employers

Strategy 9:
Build capacity of community providers (physicians, nurses, physician assistants, etc.) who serve high-risk populations to carry out TB prevention activities.

Objective 9a:
Pursue public and/or private grant funding. Procure and earmark these federal, state, and/or other funds to incentivize provider buy-in at every step of the TB screening, testing, care and treatment continuum. Identify barriers and address them.

Activities for Consideration:

- Develop a survey to assess provider willingness to incorporate TB screening/testing into their usual preventive screening practices
- Seek grant funding to help incentivize treating at-risk populations for TB
- Tap into available CDC funding

Objective 9b:
Coordinate with other LPHA programs including WIC, DSME, Family Planning, Healthy Communities, Immunization Programs, etc. to identify opportunities for TB screening and referrals of at-risk individuals for which they supply services.

Activities:

- Integrate simple TB screening tool into appropriate venues caring for at-risk individuals
- Support development of active referral system to LPHAs/TB clinics

Strategy 10:
Address and remove where possible existing financial barriers for TB prevention for both patients and providers. TB services should be provided at no cost to patients. Remove TB infection testing and treatment financial barriers by working in partnership with key entities,

including Colorado Medicaid, the state health insurance marketplace, and other health insurance providers highlighting and leveraging the USPSTF Grade B recommendation to screen and test at-risk adults for TB infection. Ensure coverage for all who need TB services.

Objective 10a:
Update current Colorado Medicaid coverage language to include coverage for TB testing of at-risk individuals and treatment of those who test positive for TB infection or diagnosed with TB disease.

Activities:

- Collaborate with Colorado Medicaid to update coverage language
- Highlight and utilize USPSTF recommendation to screen and test at-risk adults for TB infection to support efforts

Objective 10b:
Promoting Affordable Care Act registration will be required among uninsured TB patients who qualify.

Activities:

- Add contract/scope of work language to all CDPHE and Denver Health TB contracts requiring providers and sub-contractors (private, hospital, clinic, LPHAs, etc.) to ask for insurance information and when not covered, offer materials on how to apply for medical insurance at state marketplace
- Collaborate with federally-qualified health centers (FQHCs) to develop requirements to cover TB screening and TB infection treatment for those patients unable to pay and who have no other insurance options

Objective 10c:
Engage providers treating patients who do not qualify for insurance to develop referral process to LPHAs/clinics as needed to ensure continuity of care.

Activities:

- Create system to cover cost of any co-pays with RCCOs and other appropriate entities to ensure treatment regardless of ability to pay
- Highlight and utilize USPSTF recommendation to screen and test at-risk adults for TB infection to support efforts

Objective 10d:
Encourage laboratories to offer sliding scale pricing according to the insurance coverage of TB patients.

Activities:

- Negotiate bulk IGRA pricing with vendors
- Create RFA/RFP seeking lowest IGRA pricing among labs
- Entertain cost-recovery modalities to off-set testing and other diagnostic costs

Goal 5: Tailor communication messages to key groups

Strategy 11:
Develop and implement simple and clear TB prevention marketing and education strategies. Comprehensive TB prevention communication strategies for both providers and the general public are needed and will be a critical component of any successful campaign for elimination in Colorado. A comprehensive TB prevention communication strategy must also reach policymakers and funders.

Objective 11a:
For providers, develop and implement a strategy that promotes clear and simple guidelines for screening, testing and treatment of TB infection. This should be used in conjunction with the simple screening/risk-assessment tool in Objective 3a.

Activities:

- Utilize Regional Training and Medical Consultation Centers resources to tailor, develop, package and launch provider educational activities about the use of IGRAs and shorter-course treatment regimens to make diagnosing and treating TB infection standard practice
- Develop a culturally-appropriate "Know Your Status" social marketing campaign in key languages
- Facilitate implementation of the screening/risk-assessment tool developed in Objective 3a among providers of key at-risk groups identified in Objective 1a by (1) training to use the tool (2) process implementation guidance for adopting the tool and (3) providing a toolkit containing instructions, check lists and forms
- Utilize Regional Training and Medical Consultation Centers resources to tailor culturally appropriate patient information packets for the key at-risk groups identified in Objective 1a and train providers to use them in motivational interviewing (MI) encounters
- Liaise with the Refugee health programs to facilitate optimal provider and patient education using the new tools
- Offer resources to build provider capacity to treat both TB disease and TB infection by implementing regular meetings based on the guided practice model Project ECHO

Objective 11b:
For community members, develop a marketing and education campaign with culturally appropriate messages that resonate with individuals at-risk for TB about the importance of getting tested and treated. This should include, but not be limited to, distribution of materials to community leaders about TB, the TB elimination goals, screening high-risk populations for TB, and services available through LPHAs supporting their respective communities.

Activities:

- Conduct focus group discussions with key at-risk groups identified in Objective 1a to (a) understand knowledge deficits and other potential barriers to TB

screening, (b) identify preferred communication methods for TB information, and (c) pilot test messages
- Identify and collaborate with community partners who are credible with key at-risk groups to help disseminate the tailored and tested messages
- Messages will include instructions on where to get screened for TB and address potential barriers to screening such as stigma and cost

Objective 11c:
Develop an education and awareness campaign targeting communities and their medical providers on the need to use IGRA tests for diagnosing TB in appropriate individuals. Use of IGRAs will aid in evaluating TB testing patterns since it is a lab-based test.

Activities:
- Survey providers to identify any knowledge and resource barriers to IGRA testing among at-risk individuals
- Formulate and implement an action plan to address those barriers
- As part of the provider training package, promote appropriate use of IGRA testing and link providers to necessary testing resources

Goal 6: Integrate emerging technologies/Report and track with on-going evaluation of programmatic effectiveness

Access to and utilization of surveillance data is crucial to the success of TB elimination in Colorado. Decisions should be data-driven and evidence-based with an emphasis on continued evaluation to document progress and allow for adjustments to the plan when necessary. Currently, surveillance related to TB infection is minimal and limited to certain populations (contacts to individuals with active pulmonary TB, B-class immigrants, refugees, incarcerated individuals). Given TB elimination is reliant upon the identification and treatment of TB infection, enhanced systems are needed to measure the prevalence of TB infection in communities, identify both the TB testing practices of providers and the treatments offered by those providers. Emerging technologies and newly validated laboratory diagnostics should be tested and utilized as conditions allow.

Strategy 12:
Create and/or modify existing systems for measuring, monitoring and evaluating TB infection ongoing throughout the life of the plan with full implementation. To ensure that public health and community providers are reaching at-risk populations and guiding individuals through TB infection treatment, systems will be developed to measure progress and time-specific targets shall be developed to gauge progress and identify opportunities to improve and evaluate these systems.

Objective 12a:
Build upon existing electronic surveillance, EMR and other reporting systems to develop mechanisms to measure TB infection prevalence in key populations and measure performance at each prevention opportunity e.g., screening, testing, and TB infection treatment completion.

Activities:

- Conduct a gap analysis of both needed and available data for TB infection surveillance in the state of Colorado (including the investigation of data availability through large data systems such as Colorado Health Observation Regional Data Service (CHORDS), Epic, Colorado Regional Health Information Organization (CORHIO) and the all payer claims database)
- Establish relationships and engage medical institutions about the need for better TB infection surveillance to create buy-in for data sharing/access to data systems
- Determine how TB infection testing is documented among medical institutions involved in existing health information exchanges
- Modify current state reporting system to include variables for tracking treatment offer, acceptance, initiation, and completion for local public health agencies. Ensure new system is compatible with EDN and refugee data systems
- Tailor, share, and promote TB risk assessment template
- Tailor, share and promote smart sets/notes through the Epic library to increase tracking of key elements of TB risk by institutions using an Epic EMR (e.g., assessing country of birth, if treatment was offered, and was treatment initiated)

Objective 12b:

Develop and maintain an evaluation plan for TB Elimination activities to promote progress, accountability and continuous quality improvement.

Activities:

- Establish a set of shared goals and measurable targets
- Agree upon feasible timeline for completion of activities

Objective 12c:

Promote optimal use of nucleic acid amplification testing (NAAT) in accordance with CDC recommendations to help achieve the fastest possible diagnosis and treatment of TB disease.

Activities:

- Survey providers to identify current knowledge and practices around ordering NAA test when TB is suspected
- Conduct a policy scan to learn how lab policies may or may not address NAA testing
- Support policy changes to correspond with CDC recommendations
- Partner with labs to facilitate implementation of new processes as needed, addressing financial and other barriers to policy change

Strategy 13:

Pilot and disseminate proven mobile technologies to enhance patient satisfaction and drive down cost of both TB disease case management and to improve TB infection completion rates.

Objective 13a:
Offer video-DOT (V-DOT) and video-recorded-DOT (Vr-DOT) services for TB disease treatment and directly observed preventive therapy (DOPT) and TB infection treatments when appropriate.

Activities:

- Offer V-DOT services to LPHAs managing patients with TB disease
- Offer Vr-DOT services to LPHAs managing patients with TB disease
- Promote use of these services to improve TB infection completion rates where appropriate
- Promote use of text message reminders to improve TB infection completion rates where appropriate

Strategy 14:
Evaluate the feasibility of making TB infection a lab reportable condition to estimate the volume, type, and geographic distribution of TB infection testing. This will help to identify gaps in service in communities where high-risk populations live, but not to track individuals who test positive.

Objective 14a:
Work with the Colorado State Board of Health to update regulations to make TB infection a reportable condition to the Colorado Department of Public Health and Environment.

Activities:

- Develop a Policy Brief presenting evidence in support of this regulation change, tailored to key decision makers
- Implement the CDPHE procedures to petition the Colorado Board of Health for this change

List of Acronyms

3HP	3 months (12 doses) of isoniazid and Rifapentine (TB infection treatment)
4R	four months of rifampin (TB infection treatment)
AIDS	Acquired Immunodeficiency Syndrome
BCG	Bacillus Calmette–Guérin tuberculosis vaccine
CDPHE	Colorado Department of Public Health and Environment
CHORDS	Colorado Health Observation Regional Data Service
CORHIO	Colorado Regional Health Information Organization
DCEED	Disease Control and Environment Epidemiology Division
DMTBC	Denver Metro TB Clinic at Denver Health
DOT	directly observed therapy
DSME	diabetes self-management education program
EDN	electronic disease notification system
EMR	electronic medical record
Epic	proprietary EMR used at Denver Health, National Jewish Health, etc.
FQHC	federally qualified health center
HCW	health care worker
HIV	human immunodeficiency virus
IGRA	Interferon-gamma releasing assay
LPHA	local public health agency
LTBI	latent tuberculosis infection
MDR	multi-drug resistant TB
MCPN	Metro Community Partners Network
NAAT	nucleic acid amplification test
NTCA	National TB Controllers Association
PPD	purified protein derivative
RCCO	Regional Care Collaborative Organizations
SAT	self-administered treatment
TB	tuberculosis
TST	tuberculin skin test; see also PPD
USPSTF	United States Preventive Services Task Force
V-DOT	synchronous video directly observed therapy (see DOT)
Vr-DOT	asynchronous video recorded directly observed therapy (see V-DOT and DOT)
VOLAG	volunteer agency supporting recent overseas arrival to Colorado
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

Appendix A: Volunteer TB Elimination Planning Task Force Members

Theo Abbey, MPH—STI/HIV Disease Intervention Specialist/ family member of TB patient
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Melissa Broudy, RN—TB Program Training and Education Coordinator, CDPHE
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Becky DiOrio, MPH—Chronic Disease Coordinator, Diabetes & Cardiovascular Disease Unit, CDPHE
Sarah Drobek, RN, MPH—Public Health Nurse Larimer County Public Health
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Appendix B: Low Incidence TB Countries--2014