US DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Division of Tuberculosis Elimination

Hybrid Meeting of the
Advisory Council for the Elimination of Tuberculosis
June 20-21, 2023

Record of the Proceedings

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ADVISORY COUNCIL FOR THE ELIMINATION OF TUBERCULOSIS
June 20-21, 2023

Minutes of the Hybrid Meeting

The United States (US) Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC), National Center for HIV, Viral Hepatitis, STD, and TB Prevention (NCHHSTP, the Center), Division of Tuberculosis Elimination (DTBE) convened a hybrid meeting of the Advisory Council for the Elimination of Tuberculosis (ACET). The proceedings were held on June 20-21, 2023 beginning at 9:32 AM Eastern Time (ET) on June 20, 2021 and 9:00 AM on June 21, 2023.

ACET is formally chartered under the Federal Advisory Committee Act (FACA) to provide advice and recommendations to the HHS Secretary, HHS Assistant Secretary for Health, and the CDC Director regarding the elimination of tuberculosis (TB). The charter authorizes ACET to make recommendations regarding policies, strategies, objectives and priorities; address the development and application of new technologies; provide guidance and review of CDC's TB Prevention Research portfolio and program priorities; and review the extent to which progress has been made toward TB elimination.

Information for the public to attend the hybrid ACET meeting via webinar or teleconference was published in the *Federal Register* in accordance with FACA regulations and rules. All sessions of the meeting were open to the public.

June 20, 2023 Opening Session

Marah E. Condit, MS
Public Health Analyst, Advisory Committee Management
Office of Policy, Planning, and Partnerships
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Deron Burton, MD, JD, MPH (CAPT, USPHS)
Deputy Director, National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control & Prevention
ACET Designated Federal Officer (DFO)

Robert Belknap, MD
Medical Director, Denver Metro Tuberculosis Control Program, Denver Public Health
ACET Chair

Ms. Condit called the meeting to order at 9:32 AM ET on June 20, 2023 and provided meeting ground rules. She noted that members of the public would have an opportunity to provide comment during the first day of the meeting at 5:00 PM. CAPT Burton welcomed participants and conducted a roll call to confirm the attendance of ACET voting members, *ex-officio* members, and liaison representatives. He explained that ACET meetings are open to the public and all comments made during the proceedings are a matter of public record. He reminded ACET voting members of their responsibility to disclose any potential individual and/or institutional conflicts of interest (COI) for the public record and recuse themselves from voting or participating in these matters.

ACET Voting Member Institution/Organization	Potential Conflict of Interest
Amina Ahmed, MD Levine Children's Hospital at Carolina Medical Center	No conflicts
Robert Belknap, MD Denver Metro Tuberculosis Control Program	No conflicts
Adithya Cattamanchi, MD University of California, San Francisco	No conflicts
Lisa Chen, MD University of California, San Francisco	No conflicts
William Glover, PhD, D(ABMM), MT(ASCP) North Carolina State Laboratory of Public Health	No conflicts
Ann Loeffler, MD Multnomah County Oregon	No conflicts
Lynn Sosa-Bergeron, MD Connecticut Department of Public Health	No conflicts
Kristine Steward-East Advocate for Tuberculosis	No conflicts
Jason Stout, MD, MHS Duke University Medical Center	No conflicts

The roll call confirmed that the 18 voting and *ex-officio* members in attendance constituted a quorum for ACET to conduct its business on June 20, 2023. The roll was called subsequent to each break and lunch, with a quorum established each time throughout the day.

Dr. Belknap welcomed members and participants online and in person, recognizing that it was the first time in 2.5 years that many were able to join in person.

NCHHSTP Director's Report

Deron Burton, MD, JD, MPH (CAPT, USPHS)
Deputy Director, National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control & Prevention
ACET Designated Federal Officer (DFO)

CAPT Burton provided the NCHHSTP Director's Report, beginning with ACET updates. He reported that the ACET Charter was renewed on March 15, 2023, updating the membership to remove vacant *Ex Officio* seats from Centers for Medicare & Medicaid Services (CMS), US Marshalls, Substance Abuse and Mental Health Services Administration (SAMHSA), and the Occupational Safety and Health Administration (OSHA); and to remove liaison seats from the American Medical Association (AMA), the US-Mexico Border Health Commission (BHC) Mexico Section, and the Public Health Agency of Canada (PHAC). CAPT Burton then welcomed new liaison representatives, Special Government Employee (SGE) members, and *Ex Officios*, including the following:

<u>Liaison Representatives</u>

- Association of Asian Pacific Community Health Organizations (AAPCHO): Jeffrey Caballero, MPH, Executive Director
- American College of Occupational and Environmental Medicine (ACOEM): Wendy Thanassi, MD, Medical Director, Workforce Health and Wellness, Stanford Medicine
- We are TB: Kate O'Brien, Community Engagement
- National Health Care for the Homeless Council (NHCHC): Bobby Watts, MPH, MS, Chief Executive Officer (CEO)
- Council of State and Territorial Epidemiologists (CSTE): Andrew Tibbs, Team Lead of Epidemiology, Surveillance, and Research, Division of Global Populations and Infectious Disease Surveillance, Massachusetts Department of Public Health
- RESULTS: Colin Puzo Smith, Director of Communications and Expansion
- Donna Hope Wegener unofficially representing the National TB Controllers Association for this meeting

<u>SGE Members</u>

- Dr. William Glover, Assistant Laboratory Director of Infectious Diseases, North Carolina State Laboratory of Public Health (NCSLPH)
- Dr. Kathleen Ritger, Medical Director, Tuberculosis Program, Chicago Department of Public Health (CDPH)
- Dr. Adithya Cattamanchi, Professor in the Division of Pulmonary and Critical Care Medicine and the Department of Epidemiology and Biostatistics at the University of California, San Francisco (UCSF)

Ex Officios

- Agency for Healthcare Research and Quality (AHRQ): Sheena Harris, MD, MPH, Medical Officer, US Preventive Services Task Force (USPSTF) Program in the Center for Evidence and Practice Improvement (CEPI)
- Bureau of Prisons (BOP): LCDR Stephanie Lanham unofficially representing the BOP for this meeting

CAPT Burton wished farewell to Dr. Bob Belknap, a role he agreed to extend for an additional year. He thanked Dr. Belknap for all of his time and effort, emphasizing that Dr. Belknap had been an extremely dedicated effective leader. CAPT Burton also expressed gratitude to Kristine Steward-East for extending her membership by 180 days. She has served as ACET's TB advocate since 2019.

Regarding ACET letters, CAPT Burton reported that the Drug Shortage Resolution Letter was submitted to CDC on May 30, 2023 and was routed to HHS on June 6, 2023 with a request that it be submitted to CMS and the Food and Drug Administration (FDA) for response.

CAPT Burton discussed the Moving Forward initiative that began in April 2022, where CDC Director Walensky launched a review of the agency. There were 2 components to this review with designated leads for each, the scientific and programmatic review conducted by Mr. Jim Macrae and the structural review conducted by 3 current CDC senior leaders: Dr. Deb Houry, Mr. Robin Bailey, and Ms. Sherri Berger. There were 5 primary recommendations from the structural review: 1) share science and data faster; 2) translate science into practical policy; 3) prioritize public health communications, focusing on the American public; 4) develop a CDC workforce ready to respond to future threats; and 5) promote results-based partnerships.

Under each of these recommendations, there are sub-activities that the agency is moving forward to implement. In particular the agency is beginning to implement first steps, including: 1) elevating the science and laboratory sciences to report to the Director of CDC; 2) improving accountability for delivering timely information; 3) starting a process to make structural changes to incentivize public health action, implementation, and impact at all levels of the organization; 4) creating a new Executive Council reporting to the CDC Director that will determine agency priorities, track progress, and align budget decisions with a bias toward public health impact; 5) creating a 1-stop shop for external partners to navigate the agency; and 6) creating a new Office of Health Equity (OHE) that will promote an equity focus across all of the work that CDC does, as well as how the agency operates. The vision is a CDC that reflects the diversity of America will be better positioned to respond to outbreaks from science to communications.

Policy as a public health intervention can maximize the reach and effectiveness of interventions and provide long-term solutions that lead to behavior change and improve public health. Partnerships help disseminate information to serve as the basis for evidence-based policy and laws. The Policy as a Public Health Intervention Initiative (PPHI) is a multi-pronged and holistic approach to strengthening federal, state, and local environments that leverage evidence-based law and policy to address NCHHSTP's infections. The new policy intervention funding opportunity is titled, *Advancing Policy as a Public Health Intervention to Reduce Morbidity, Mortality, and Disparities in HIV, Viral Hepatitis, STDs, and Tuberculosis* (PS23-0009).[1]

[1] https://www.cdc.gov/nchhstp/funding/pphi/index.html

Awardees of the funding opportunity include Temple University and the National Network of Public Health Institutes (NNPHI). This funding opportunity is designed to assist government and non-government leaders who make decisions in public health to identify, assess, and implement evidence-based policy interventions.

This will be done through 2 distinct components. The first is focused on legal epidemiology. This component leverages emerging methods in coding law and policy over time and cross-sectionally to help learn how policies affect health outcomes. The second component is establishing a robust system of legal technical assistance to aid leaders in navigating complex legal and policy environments, as well as creating and promoting resources in a proactive and reactive manner. In the long-term, NCHHSTP believes that this work will make significant progress toward reducing morbidity, mortality, and disparities among the center's infections and will increase evidence-based policy decision-making.

In addition, the National Center for State, Territorial, Local, and Tribal Public Health Infrastructure and Workforce (NCSTLTPHIW) has a national partnership Notice of Funding Opportunity (NOFO), which supports work with a variety of national partner organizations to inform and educate state-, county-, and local-level public health leaders and legislators on the evidence on which policies work to positively impact public health. Some examples include Syringe Services Programs (SSPs), harm reduction laws and policies, and public health authorities themselves. Through the Policy and Health Equity Partners activity, CDC will inform, educate, and work with partners to navigate complex legal and policy landscapes and integrate health equity approaches into the PPHI.

From February 27-March 23, 2023, NCHHSTP hosted a kick-off meeting for funding opportunity PS23-2302, which is *Accelerating the Prevention and Control of HIV, Viral Hepatitis, STDs, and TB in the US Affiliated Pacific Islands.*[2] This funding opportunity, which is now in its third iteration, is an integrated program across multiple disease areas. The objectives are to: 1) improve efficient use of resources through integration of screening and treatment for HIV, STDs, TB, and viral hepatitis; 2) reduce health disparities; 3) improve health systems infrastructure and service delivery; and 4) reduce incidence of HIV, STDs, TB and viral hepatitis. The program highlights the importance of cross-program and cross-sector collaborations specifically focusing on the following primary strategies:

- Program collaboration and Service Integration in high-priority settings and for populations disproportionately affected
- Surveillance, Data Management, and Reporting
- Workforce Development
- Laboratory Strengthening for reliable and timely delivery of public health laboratory services
- Disease-Specific Prevention and Care including testing, linkage to care, and partner services

CAPT Burton next provided updates for 4 of NCHHSTP's divisions, beginning with the Division of Adolescent and School Health (DASH). In February 2023, CDC and DASH released the *2011-2021Youth Risk Behavior Survey: Data Summary & Trends Report*[3] that provides 2021 data and 10-year trends on key behaviors and experiences among adolescents related to sexual behavior, substance use, experiences of violence, mental health, and suicidal thoughts

[2] https://www.cdc.gov/nchhstp/funding/usapi/index.html
[3] https://www.cdc.gov/healthyyouth/data/yrbs/yrbs_data_summary_and_trends.htm

and behaviors. Each section presents data by sex, race and ethnicity, sexual identify, and sexual contacts. The 2021 data are the first Youth Risk Behavior Surveillance System (YRBSS) data collected since the start of the COVID-19 pandemic. Unfortunately, many of the same behaviors and experiences that were moving in the wrong direction before the pandemic continued to worsen. This is particularly true for female and LGBQ+ (lesbian, gay, bisexual, queer/questioning+) students, especially in their experiences with violence and poor mental health.

There have been improvements in several substance use variables included in the report over the years . However, many students still use substances and the lack of progress in adolescents' use of some substances remains concerning. In 2021, female students and LGBQ+ were more likely than their male and heterosexual peers to engage in every substance use behavior. For instance, 8% of female students were currently misusing prescription opioids, double that of their male peers. LGBQ+ students also were nearly twice as likely as their heterosexual peers to have ever used select illicit drugs and to have ever misused prescription opioids.

Although experiences of bullying at school decreased from 2011 to 2021, all other experiences of violence increased or did not change. Within overall trends, there are substantial disparities for LGBQ+ students and females. There also are disparities by race and ethnicity. For instance, Black and Hispanic students were significantly more likely than Asian, White, and Multi-Racial students to not go to school in 2021 because of safety concerns. LGBQ+ students were about 2 times as likely as their heterosexual peers to be electronically bullied and to miss school because of safety concerns. Female students are experiencing substantial sexual violence, with 18% experiencing sexual violence during the past year.

Nearly all indicators of poor mental health and suicidal thoughts and behaviors increased from 2011 to 2021, with nearly 30% of youth experiencing poor mental health in the past 30 days and 10% attempting suicide. Here again, there are unfortunately striking disparities in the proportion of female and LGBQ+ students having these experiences compared to their peers. There also are differences by race and ethnicity. For instance, Black students were significantly more likely than Asian, Hispanic, and White students to attempt suicide in 2021. Female students were nearly twice as likely as their male peers to feel persistently sad or hopeless and to attempt suicide during the past year. LGBQ+ students were about 2 times as likely as their heterosexual peers to feel persistently sad or hopeless, and nearly 4 times as likely to attempt suicide during the past year.

These data provide just one example of how important YRBS data are for understanding and addressing critical issues among young people. The YRBSS is a system of school-based surveys consisting of the national YRBSS and state, territorial, tribal, and local surveys conducted by education and health agencies and tribal governments with support from CDC. Together, these make up the largest public health surveillance system in the US dedicated to monitoring a broad range of health-related behaviors and experiences among high school students. Several states have discontinued the YRBSS in 2023, limiting their ability to understand and address what is happening in states among their youth. This is concerning and CDC is working closely with states to try to mitigate this. Because national YRBSS sampling and data collection is a distinct process, CDC is still able to collect nationally representative data and tell a national story about adolescent health and wellbeing.

On March 10, 2023, the Division of Viral Hepatitis (DVH) published[4] to expand hepatitis B for all adult patients to at least once in their life. A total of 65 programs representing 31 jurisdictions were selected to receive subawards for strengthening SSPs. These awards focused on areas disproportionately affected by infectious disease and overdose, areas that lack SSP access, areas that lack financial resources for SSPs, and SSPs with smaller operating budgets between $50,000 and $500,000.

The Division of HIV Prevention's (DHP's) flagship health department NOFO PS18-1802, *Integrated Human Immunodeficiency Virus (HIV) Surveillance and Prevention Programs for Health Departments*, has been extended for 17 months to now end on May 31, 2024. PS20-2010, Integrated HIV Programs for Health Departments to Support Ending the HIV Epidemic (EHE) in the US is ending early on May 31, 2024. This early truncated project period does not signal any changes in CDC's commitment to or investment in the EHE in the US initiative. These changes are administrative in nature and have been made in an attempt to better coordinate and streamline future NOFO processes and reduce future burdens to CDC grantees.

CDC grantees used EHE funding to conduct almost 250,000 HIV tests, identifying over 3,000 individuals with HIV. CDC grantees also distributed over 16,000 self-test kits locally. CDC distributed 100,000 free HIV self-test kits to populations disproportionately affected by HIV, including African American and Hispanic/Latino communities and transgender women. Within the EHE treatment pillar, CDC grantees used EHE funding to link 84% of persons newly diagnosed with HIV to medical care within 30 days. A total of 100% of previously diagnosed persons who were not receiving care were provided or referred to medication adherence support. Notably, 3 jurisdictions met the 2025 goal linking 95% of newly diagnosed persons to care: East Baton Rouge, Louisiana; South Carolina; and Harris County, Texas.

In terms of the prevention pillar, the funding CDC allocated to health departments through Category A of the main EHE NOFO resulted in identifying more than 140,000 negative persons, of whom 64% were screened for pre-exposure prophylaxis (PrEP) eligibility. A total of 76% of those screened were eligible for PrEP and over 18,000 people were prescribed PrEP. Notably, 5 jurisdictions met the 2025 goal and were able to link or prescribe PrEP for at least 50% of persons eligible for PrEP. CDC also saw success from its syndemic investments in sexually transmitted infections (STI) clinics and SSPs. EHE funded 26 STI Specialty Clinics in 16 states to meet people where they already receive care. EHE funds also supported 108 SSPs in 57 fixed locations and 51 mobile/outreach locations.

To address inequities and achieve EHE goals, there must be a shared understanding of the barriers to and opportunities for success and it is important to build trust and provide a space to discuss community-led solutions. EHE funding includes a focus on ongoing community engagement. CDC has a number of new funding opportunities that are forward-moving, many of which focus on improving health equity.[5] These include the following:

- Increasing PrEP Use Among Black Cisgender Women in the United States (HerPrEP)
- Telehealth to Support Retention and Adherence to ART
- Long-Acting Antiretroviral Therapy Preferences among Black Women
- Long-Acting Injectables in Non-Clinic Settings

[4] https://www.cdc.gov/mmwr/volumes/72/rr/rr7201a1.htm
[5] https://www.cdc.gov/hiv/funding/index.html

- Rapid ART Initiation in the Emergency Department
- Medical Mistrust among Hispanic/Latino MSM

The Division of STD Prevention (DSTDP) released the 2021 STI surveillance report in March 2023[6] with final 2021 data. Unfortunately, cases for all reportable STIs continued to increase. All of the diseases that are tracked are at historic highs. In 2021, there were increases in chlamydia, gonorrhea, syphilis, and congenital syphilis with 2.5 million total cases of STIs reported. Most notably there have been rapid increases among syphilis and congenital syphilis. In 2012, 2 states, the District of Columbia (DC), and a US territory (representing 7.4% of areas with available data) had a rate of reported primary and secondary reported syphilis ≥ 7.6 cases/100,000 population. This increased to 42 states, DC, and a US territory—accounting for 80% of the areas with available data in 2021.

The congenital syphilis national rate of 78 cases/100,000 live births in 2021 continued to exceed the World Health Organization (WHO) goal of ≤ 50 cases/100,000 live births for elimination of maternal to child transmission. The WHO goal was first surpassed in 2019. Furthermore, almost half of all states are now reporting rates above the WHO goal. In 6 years, the US has gone from 1 state above 50 cases/100,000 in 2016 to 20 states above 50 cases/100,000 in 2021. Looking specifically at cases for congenital syphilis, 5 states spread throughout the West and South accounted for roughly 58% of the 2,855 congenital syphilis cases reported in 2021. The top 5 states include Texas (680 cases), California (518 cases), Arizona (181 cases), Florida (180 cases), and Louisiana (110 cases).

In addition to the flagship NOFO, which has been extended to include a 6th year through 2024, several other recent investments have been made to address the continued STI increases. These new efforts use approaches aimed at distributing resources to geographic areas and populations that are disproportionately affected. They also encourage tailoring interventions, engaging with communities, and supporting programs using a syndemic approach or holistic patient-centered care. An example of a particular effort is the establishment of an STI Impact Research Consortium. Consortium recipients will conduct studies to reverse the persistent and troubling STI trends in reported cases of STIs. Consortium members include a mixture of academic, research, and public health institutions will undertake clinical trials and implementation science research, both aimed at increasing population-focused research.

DTBE Director's Update

Philip LoBue, MD, FACP, FCCP
Director, Division of Tuberculosis Elimination
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Dr. LoBue updated ACET on provisional 2022 TB surveillance data published in the *Morbidity and Mortality Weekly Report* (*MMWR*) in March 2023, recent policy and guidance releases, major selected activities 2023, and challenges. There was a decline in the number of TB cases in the US between 1982–2022. As a reminder, there was a steep decline in TB cases after the resurgence in the late 1980s and early 1990s that started to level off around 2010 or so. The

[6] https://www.cdc.gov/nchhstp/newsroom/2023/2021-STD-surveillance-report.html

cases were decreasing, but at a very slow rate. When the COVID-19 pandemic hit in 2020, there was an unprecedented 20% decrease in cases. While that appears to be multifactorial, even now it cannot be said for certain exactly why that happened. Since that time, there have been increases of about 10% from 2020-2021 and about another 5% increase from 2021-2022. There were about 8,300 in 2022, which is still below what would have been expected if the pre-pandemic trends in cases had continued through 2022. This is still well-above the elimination threshold of about ~330 total cases.

Looking at case rates stratified by 100,000 for non-US-born and non-US-born persons, non-US-born cases account for about 70% of TB cases in the US. There was a slow decrease before the pandemic, a major decrease in 2020, and then an increase in case rates again. The difference is that the case was 0.8/100,000 for US-born persons in 2022, which is close to where the rate would have been expected to be based on the pre-pandemic trends. For non-US-born persons, the case rate was 12.7 in 2020 . This is still below the expected rate based on pre-pandemic trends. Stratifying US-born and non-US-born persons further by race and ethnicity, about 6,000 (70%) of cases were among non-US-born persons and about 2,200 cases were among US-born persons. Major disparities were identified in inequities related to race and ethnicity, regardless of US-born or non-US-born status. About 95% of cases are occurring in non-White person among non-US-born persons and about 75% of cases are occurring in non-White person among US-born persons. This is not particularly different from what had been observed a number of years before the pandemic.

Looking at case rates per 100,000 over time by age groups, there were decreases across all age groups with the pandemic. However, they have not all been the same since 2020. In terms of the most outstanding examples of differences, persons ≥65 years of age experienced a substantial drop in 2020 during the pandemic. This age group appeared to be trending back toward pre-pandemic rates in 2021, but then had another decrease in the case rate from 2021 to 2022. From 2021 to 2022, there was a substantial increase in the cases rates of 28.8% among children 0-4 years of age and 24.1% among persons 15 to 24 years of age. Certainly, this is very concerning in children 0-4 years of age who have only been alive for less than 4 years, meaning that the transmission had to occur within 4 years. Looking at the number of cases over time among children 0-4 years of age and 5 to 14 years of age, there were decreases in 2020-2021 with the pandemic and a rebound in 2022 such that it is slightly above the total number of cases in children compared to the pre-pandemic year of 2019.

In terms of the number of TB cases categorized by years since arrival in the US from 2015–2022, an assessment was done within the categories of <1 year of age, 1-4 years, 5-9 years, 10-19 years, >20 years, and missing data for the years 2015-2019 (average), 2020, 2021, and 2022. In the <1 year of age group, there was a large decrease from the average of 2015-2019 there was a large decrease with the pandemic in 2020 and similar in 2021. However, then there was a rebound in 2022 to almost the pre-pandemic level. This suggests that probably fewer people were entering the US during the pandemic, but the rebound occurred when normal immigration patterns began to resume.

In summary, reported TB cases and incidence rates increased from 2021-2022, but remained lower overall compared with years preceding the COVID-19 pandemic. The US-born incidence rate trend has returned to pre-pandemic trend lines. There is a slightly lower incidence among persons ≥65 years of age and higher incidence in persons ≤4 years of age. There is a higher proportion of TB cases occurring in non–US-born persons who have arrived in the US <1 year prior to TB diagnosis.

With regard to policy and guidance, the guidelines developed for the use of video directly observed therapy (DOT) during the treatment of tuberculosis in the US was published as a Policy Note in the *MMWR* in March 2023. Also included was a supplemental frequently asked questions. An update was developed for online guidance for the use of a Bedaqualine-Pretomanid-Linezolid (BPaL) regimen for the treatment of drug-resistant TB. The initial guidance was based on FDA approval and initial studies that recommended a 1200 mg dose of linezolid. However, some studies suggested that there was increased toxicity at the higher dose and subsequent studies have shown that 600 mg is better-tolerated and seems to perform as well. Therefore, a recommendation was made to decrease the starting dose of linezolid from 1200 mg to 600 mg). The updated guidance also includes additional information on adverse events (AEs).

Some of the major activities underway in 2023 include updating treatment guidelines for drug-susceptible and drug-resistant TB in conjunction with the American Thoracic Society (ATS) ATS and the Infectious Diseases Society of America (IDSA). This is fairly along in the process, with a draft anticipated soon for the group to review. Another major activity is starting the process for the next cycle of the TB prevention and control cooperative agreement for programs and laboratories. This involves the majority of the budget of approximately $70 million, which goes through 5-year cycles. At the end of calendar year 2024, a new cooperative agreement should be in place for the beginning of 2025. This is a fairly long process, which is why it already is underway. In 2020, an updated report was completed of the *Report of Verified Case of Tuberculosis* (*RVCT*) that was deferred. This is the form that everyone uses to report cases of TB in the US to CDC. While the update was delayed due to the COVID-19 pandemic, it is back on track to be completed by the end of 2023 if possible.

Some of the challenges are not surprising, such as level funding with increasing costs that are outside of DTBE's control. There are limitations to what DTBE can do and at some point, that will catch up to the point such that it will have the impact of having to make cuts. This is a challenge that is foreseen for FY24 and beyond. Drug supply issues have been discussed many times for many years. There continue to be ongoing issues with Rifampin, Rifapentine, and more recently Isoniazid. There is not an obvious and easy solution because the problems occur over time, such as the active pharmaceutical ingredients not being available for drugs, manufacturers not being able to make the pills, and problems with the distribution network for getting it to program. All of these issues continue. While the pandemic may have been declared over, TB programs are still recovering from the pandemic response in terms of loss of staff, staff burnout, and loss of trust in the public health system. All of these issues are having a substantial impact on TB programs.

ACET Discussion (CAPT Burton & Dr. LoBue)

Dr. Loeffler asked whether there was a breakdown of the data for individuals who were diagnosed in 2022 in terms of how many people who went through Panel Physician sites came in as being waivered, refugee processes, or never screened.

Dr. LoBue said it was a fair question and if they knew, it would help to answer other questions. Some of this information comes through the Electronic Disease Notification (EDN) system that includes people being screened overseas through immigration or refugee programs who are entering the US. DTBE is working with colleagues in the Division of Global Migration and Quarantine (DGMQ) to assess that. The problem is that other than that, there is not a way of tracking this. One time consideration was given to including a variable in the surveillance system to ask about a person's status at the time of entering the US. For various reasons, it has

not been possible to obtain accurate data. For instance, some states said they were not allowed to collect this information and/or that it would be stigmatizing. It will be possible to acquire some information about what is occurring in the overseas screening program for those who have waivers or are going through the refugee process, but not for other types of visas (e.g., work visas, school visas, undocumented, other special populations, et cetera).

Dr. Thanassi inquired about whether the 24% increase in persons 15-24 years of age was the same causation or different.

Dr. LoBue said it was easier to say this was likely the case with children 0-4 years of age because it had to occur within 4 years and not all of the children are 4 years of age yet. It takes a while to look at genotyping data to get a better handle on the others. At least 3 years of data are generally needed to try to differentiate between recent transmission and reactivation of TB.

Dr. Thanassi asked whether there are any estimates of what percentage of latent TB (LTBI) in the US is treated.

Dr. LoBue responded that there are not good recent estimates of the percentage of treat of LTBI in the US. The prevalence of LTBI in the US has been estimated to be as high as 13 million people. It is difficult to say how accurate that is because it is just a positive TB test that does not indicate whether someone has LTBI. The last time there was a good estimate of the percentage of people being treated was about 20 years ago by the older iteration of the Tuberculosis Epidemiologic Studies Consortium (TBESC) estimated that a high-end estimate would be that about 400,000 people a year were being treated annually in the US. Since that time, it has been unknown.

Dr. Stout asked whether there are any data available on the proportion of cases who were part of a genotypic cluster during COVID versus prior to COVID.

Dr. LoBue indicated that they are assessing this. In terms of percentage of recent transmission pre-COVID versus during the initial part of COVID did not look that different. At this point, it is believed that more years of data will be needed to make a definitive conclusion about this.

Dr. Belknap asked whether there are any intersections or opportunities with the move toward data modernization to make processes easier or smoother for program.

Dr. LoBue replied that that is one of the major issues data modernization is going to assess, though he did not know how the priorities would be selected. While the DTBE system is fairly work-intensive, it is one of the most advanced in terms of comprehensiveness, completeness, and so forth. In other parts of CDC, systems are completely lacking and are based on estimates. He did not know whether the approach would be to deal with systems that are not established and need to be or to revamp systems that already are well-established. In the long-run, the goal for all surveillance at CDC is to try to achieve something that is more efficient and user-friendly. DTBE's issue is not all on one end. They are the receiver of information, not the collector or initial aggregator. To work well, modernization needs to address both ends.

CAPT Burton added that there would be a panel session in the afternoon focused on data modernization during which there would be more opportunity to engage in this discussion.

Dr. Belknap inquired as to what the discussion are pertaining to what needs to be done to regain the public's trust.

Dr. LoBue responded that TB programs are actually very good at public trust in terms of working with patients, getting to know them, and dealing with issues that they have that make their lives difficult beyond just the TB (e.g., housing, transportation, et cetera). Given that TB programs are working with patients for 6 months or more, they spend a lot of time investing in gaining people's trust. The pandemic impacted the public health system in general across the board that were beyond the control of TB programs. Before the pandemic, TB programs were doing a good job and need to continue to do that. Over time, building individual relationships with patients and building patient-centered case management will rebuild trust. Higher level public health trust issues are another aspect.

CAPT Burton added that part of the CDC Moving Forward effort places a lot of emphasis on the agency better communicating its science and recommendations to the public with efforts that are actionable, interpretable, and demonstrate that CDC is relying on the best available evidence and acknowledging where there are limitations to the evidence. In addition, CDC is engaging its partners and other voices in the agency's policymaking and recommendation development. All of these efforts are geared toward rebuilding trust. Simultaneously, CDC wants to be more accountable and to have more transparency in its priorities and processes. That involves the structural realignment to elevate offices to report directly to the CDC Director to ensure that there is accountability at that level as well as through governance boards to help all of the agency's national center stay on track with the priorities of the agency to have that increased transparency.

Dr. Bloom commented that it is important to consider patient-centered versus person-centered care and getting people to even access the services in the first place. This is an area where CDC's broader communications can be so important.

In terms of challenges, Dr. Chen noted that there was flatline funding that could ultimately end up with reductions. A lot of the patient-centered care comes out of people doing it out of the goodness of their hearts. TB folks are a tribe and keep doing it without funds or feedback. People are tired, overworked, and at a breaking point. There has been mass retirement and people are changing jobs. This is very important and must be taken seriously.

Dr. Haley emphasized that when a lot of people on the frontline are taking up slack and not getting increased funding, it is challenging.

Dr. Belknap said he shared these concerns. With the decrease in activities in 2020-2021, staff were deployed elsewhere and positions went unfilled. With increases in TB activity and diagnoses in the US in 2022, with his own program in 2023 well above where they were in 2022, the added stress on a workforce that is depleted and short-staffed is going to create real dangers in terms of the ability to continue. One of the things that has been done well in terms of TB over the years is to address SDOH to the degree possible, which are increasingly recognized as very important across all of public health. A disease-focused approach is recognized as not being optimal in terms of addressing SDOH, given that it misses the fact that what communities are dealing with is so much more complex than the disease. It also is important to consider how to rebuild public health TB as an important component of public health infrastructure and as a model for what should be achieved more broadly beyond TB. Raising awareness is only one element of this.

Ms. Wegener added that another challenge overlayed on top of this is that the drug shortage issue is huge. Controllers and physicians find themselves having to ration healthcare because they do not have the resources to treat everyone. Combined with all of their other challenges, tough decisions are being made and are placing controllers and physicians at a breaking point. TB programs are experiencing a significant public health crisis.

In light of all of this very important discussion, Dr. Stout recalled that in the past there had been some work to assess costs associated with TB cases in the US. However, he has not seen any work on this recently and he wondered whether DTBE is working to try to quantify how much a TB cases costs in 2023 to diagnose and manage from a public health perspective and how that aligns with the available resources provided to TB programs by federal, state, and local governments.

Dr. LoBue indicated that they do update the costs for drug-susceptible TB, various forms of drug-resistant TB, and LTBI. While he was not certain if they were up to 2023, there are relatively recent data. While they know to some extent what the federal contributions are, it has never been possible to get a good handle on state and local contributions.

Dr. Belknap pointed out that there is a challenge in trying to link the costs to cases. Minimum infrastructure is needed to maintain TB such that, with the fluctuation in cases in jurisdictions, it is problematic to try to link too directly to the number of patients diagnosed and treated for active TB or number of contacts diagnosed.

Dr. Thanassi noted perhaps the next step is that consideration should be given to the cost of a missed case as well, which is an extraordinary cost and could be part of the argument that is used.

In terms of the trust issue, Dr. Belknap inquired as to whether there is a way to measure the impact on TB programs. He was thinking about this in terms of contact investigations and the ability to illicit contacts and the willingness of people report contacts. Speaking from his own experience, it became much more difficult during and since the start of the pandemic when people were far less willing to share information on contacts in order to evaluate them and try to diagnose and treat LTBI. He wondered if that was metric that could be evaluated to assess any impacts of COVID-19 on contact investigations.

Dr. LoBue indicated that the data lag approximately 2 years behind. Ideally, it would be beneficial to assess pre-COVID, during COVID, and post-COVID when the data are available. People who are very good at contact tracing in TB do not stop at one conversation. This can be ongoing over months. As they work with a person who sees that the program is helping them, trust is built and they do provide more information. This is a time-intensive long-term commitment. There is never going to be time to have conversations over months with COVID. By that time, 5 generations of transmission have occurred already. Although unfortunately this is not immediately fixable, over time it is possible to re-staff. People who truly are burnt out can be replaced with new people who can be trained to do the work using tried and true approaches that built that trust.

Dr. Loeffler said she thinks about trust as having 2 layers. While they had been discussing individual-level trust, she is excited in her new job to think about COVID, community-based organizations (CBOs), and communities that were disproportionately affected. There are people already who understand that the purpose of the TB program work is to support their individual health, family's health, and community's health, so her hope is that trust will be more rapidly

gained.

Dr. Chen said she thought the outreach to the LBTI program had been a major boost. In terms of another long-view type of analysis, she asked whether there is a way to discern the load of more complex cases with the RVCT data that are being collected. People are living longer and have multiple comorbidities and TB programs are struggling to keep up with that.

Dr. LoBue responded that some of the information over time, such as certain comorbidities certain could be assessed. Measures of complexity are crude when it is not well-understood when something trends, such as COVID. Some of the more complex issues include more advanced disease, drug resistance, smear positivity, et cetera. Beyond drug resistance, clinical findings, and comorbidities that are collected in the surveillance, there are some social factors related to housing and incarceration. Other social factors (income, poverty, job loss, et cetera) are not available. The surveillance system does not collect all of the information that would be needed to provide a comprehensive picture of everything they would like to look at. One problem is that someone has to go collect the information, which is a lot more work. With the Uniting for Ukraine (U4) funding, some programs were able to take advantage pre-existing contracts with groups in communities that were engaged in COVID work. The issue pertains to how long resources will be available to keep these efforts going.

Dr. Haley asked what CDC and partners at a higher level are doing proactively to look at TB across the border in terms of raising awareness that this group is going to be at higher risk for TB, without making it political, in order to build trust, diagnose and treat sooner, and prevent transmission. It was possible to obtain additional resources successfully knowing that people were coming to the US from Afghanistan and the Ukraine. Perhaps that same approach could be used to garner resources because of the added burden that is coming. Those people also deserve to have early diagnosis and early treatment.

Dr. LoBue responded that they can address only the data that are available. There are no data beyond the information related to immigration and refugee screening. No data in the surveillance system differentiate how someone entered the US, so there is not a way to point to that specific population. He clarified that the CDC did not initiate the U4U initiative and that it is not within their power to initiative funding requests such as that.

Dr. Belknap reminded everyone that there is some language in the ACET Biennial Letter pertaining to restoring resources and funding to DTBE to match levels from the past, adjusted for inflation. While that was not exactly what Dr. Haley was suggesting, if more funding resources could be directed toward TB to close the gap that has evolved over time simply as the result of flat funding, that would help. Having funding that is flexible and not directed is also an important modernization need beyond TB as opposed to having extremely specific funding. To the degree that ACET could advise this, it is included in the letter.

Given the case detection gap, Dr. Cattamanchi asked whether DTBE is doing any work to leverage the dramatic expansion in molecular testing and sequencing capacity during the pandemic to repurpose that for expanded molecular testing for TB and drug resistance. That is happening to some extent globally.

Dr. LoBue responded that in terms of molecular testing, they receive molecular epidemiology using whole genome sequencing (WGS) on about 95% of culture-positive cases. In terms of drug resistance, the Molecular Detection of Drug Resistance (MDDR) service at CDC will perform phenotypic and genotypic testing. This is typically done on isolates, but in certain

circumstances can be done on sediments. A number of states do this. The State of California laboratory has a TB Center of Excellence (COE) offers molecular and phenotypic testing. There are a number of low-incidence states that would not be proficient at doing drug susceptibility testing due to the low number of samples they would process, but they can use the California laboratory to do that work. While the testing is available generally, it requires getting the right specimen to the right laboratory as quickly as possible.

Dr. Cattamanchi asked what proportion of cases are actually receiving molecular testing, particularly for resistance.

Dr. LoBue indicated that because the surveillance system with the new RVCT will capture that data, they will have a better idea. This is difficult to know now, though about 50% of the multidrug-resistant tuberculosis (MDR-TB) cases in the US will submit samples to CDC. New York, Florida, and California have this capacity and often are doing their own work and certain other states use those capacities as well. CDC does not have a way to track that right now. Given that Xpert® is currently available, there is no reason why every case in the US cannot get it—understanding that it is more about logistics. These tests do exist, and they are accessible. As the new RVCT gets up and running and there are complete data, it should be possible to determine exactly how many cases are tested.

Dr. Sosa-Bergeron suggested considering opportunities to leverage funding received from other sources. Most of the COVID funding came from the Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases Cooperative Agreement (ELC). There have been supplements for expanding the ability to do sequencing for TB as part of ELC.

Dr. LoBue indicated that because a lot of states are getting sequencing capabilities, all CDC has asked is to be sent the results. The question regards sustainability. If COVID funds go away, states that do not already have those capabilities.

Dr. Chen indicated that their back-up is the central access to the CDC laboratories. This is clearly a case where CDC has been getting increasingly broader accessibility to test what is needed. California has a wonderful laboratory, but at her center, she is hearing what is happening in all of the low incidence states in terms of getting access in a timely way. If there is anything that can be done to augment the work the CDC laboratory is doing, that seems like a clear case of spending money to save money down the road. A core laboratory that can do sequencing for everyone is going to be essential in addressing the ebbs and flows of state funding. She emphasized that she primarily wanted to put a plug in for what a gem the CDC laboratory is. If there ever are funds to help boost that, it would be wonderful.

Dr. LoBue emphasized that unfortunately, everything is a zero-sum game. It is possible to spend money to save money if there is money to spend. There are laboratory cooperative agreements, so money is being invested in the laboratory. The issue is that in order to invest more money in the laboratory, the money has to come from somewhere. It is necessary to find the right balance.

Dr. Belknap pointed out that most of the discussion had centered on what is available to TB programs and through the CDC. A major gap in terms of knowledge and access is getting practitioners who are seeing patients for random symptoms to first think about TB, and making sure that they are accessing the most current, highest quality diagnostic tests at that time. This will never be solved by expanding the CDC central laboratory. Molecular diagnostics are under-utilized outside of TB programs, let alone the access they were discussing within TB programs.

Current ACET Recommendations Update

Philip LoBue, MD, FACP, FCCP
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National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Dr. LoBue reviewed the ACET recommendations back to December 2019, pre-pandemic, through June 2021 and found that the 14 recommendations through June 2021 either were in the Biennial Letter and response (N=13) or are being addressed by an external organization (N=1). Therefore, he opted to focus on 3 more recent recommendations and actions from December 2021 through December 2022 as shown in the table below:

Topic	Recommendation	Actions
Topic: LTBI Campaign Item #: 2021-5 Date: 12/15/2021	Consider the risk for LTBI for other populations and ways to message that risk to populations who would be most impacted, such as: 1) including images of children in mentoring materials; 2) educating practitioners and providers on the importance of treating LTBI in children and adults; and 3) considering expansion of the LTBI Campaign to include others such as incarcerated, shelter, ethnic, and pediatric populations.	• DTBE included more images and information regarding children in the LTBI campaign • DTBE has added a component directed at medical providers • DTBE is willing to expand campaign further, but this requires additional resources that are not currently available
Topic: TB Elimination Alliance Item #: 2022-3 Date 12/14/2022	ACET recommends CDC continue to financially support the work of the TEA, for CDC to evaluate the impact of this work, and to compile and disseminate best practices.	• In 2023, TEA was funded at the 2022 level • DTBE plans to continue funding TEA in the future; amount will depend on DTBE budget • TEA presented a summary of its work, including impact and best practices at a DTBE brown bag session • A written summary is requested as part of TEA's cooperative agreement progress report
Topic: TB Workforce Item #: 2022-4 Date: 12/14/2022	ACET recommends that CDC define the key components of an effective public health TB workforce in the US. ACET recommends CDC: 1) Develop a standard process for evaluation and periodic assessment of the US PH TB workforce; and 2) Consider a cost analysis to sustain the current TB workforce to achieve TB elimination.	• DTBE drafted a definition of the key components of an effective public health workforce: – ACET is requested to review and provide input • DTBE learned NTCA was considering assessing the TB workforce • Engaged in discussions regarding coordination if assessment was to proceed • Initial conclusions: – Dedicated additional financial and human resources are needed to conduct this activity – Neither organization currently has these resources – Concerns expressed about TB programs' capacity to participate and complete the assessment, providing meaningful data to inform future decision-making • Until the aforementioned issues can be resolved, further work by DTBE on this activity is deferred

ACET Discussion

Dr. Sosa-Bergeron emphasized that while a workforce assessment is a burden, it is extremely important and there are resources that could be leveraged. For instance, the Council of State and Territorial Epidemiologists (CSTE) conducts a comprehensive workforce assessment every 3 years. While it is a lot of work, people understand how important this is and are willing to engage in the process when given enough lead time. There are other resources as well, so part of the process would be to assess what is available already that could be adapted for the purposes of the TB workforce specifically.

Dr. LoBue responded that they have information from a number of places that have conducted general public health workforce assessments. The problem is that there is nothing specific to the TB workforce. They have to find someone willing to conduct a TB workforce-specific assessment, but there are no resources to cover the cost of this and it is unlikely that someone would be able to do it for free.

Dr. Sosa-Bergeron stressed that if it is a priority of multiple organizations, there may be a way to get it done for free. She worked for free for 4 years on healthcare worker guidelines because it was important. This is doable if they work with NTCA, CSTE, and others who have done this before.

Dr. Thanassi, ACOEM Liaison, said the occupational workforce is testing for TB all of the time. In terms of the occupational health workforce, every new hire is being tested and every healthcare facility is performing testing. She would argue that they are some of the most knowledgeable people in the nation, handling thousands to tens of thousands of tests every year on employees. Stanford alone performs 35,000 tests every year. The occupational health workforce is very interested in doing something meaningful and participating in public health. They found through the pandemic that the occupational health workforce is like a sub-arm of the public health sector. They delivered COVID-19 vaccines, performed COVID-19 testing, and are poised and ready to help in a major way with the elimination of TB. Workers who are tested are often not treated. If ACOEM can work together with CDC, the funding differential for covering more testing and transferring that to LTBI treatment on arrival in the workplace would include not only healthcare workers, but also every employee in the country (e.g., grocery stores, truck drivers, pilots, coal miners, et cetera). ACOEM is available to help and Dr. Thanassi offered that workforce knowledge base and resource as a topic to discuss moving forward.

Dr. LoBue responded that this is not exactly what is needed now. What is needed is someone to go to TB programs to assess what they have, what is needed, and the gaps. The focus of the task recommended by ACET is conducting an assessment of the TB workforce in the US, which predominantly will be within public health programs and laboratories that work specifically on TB. Occupational medicine does some of that in limited settings, but he noted that Dr. Thanassi mentioned a variety of types of employment for which no one recommends TB testing currently. The assessment needs to be of all aspects of the TB workforce (e.g., surveillance, laboratory, contact tracing, patient management, types of people involved in the work, how many people are required to do this work, et cetera).

Recognizing that the resources are not available, Dr. Belknap noted that the resources that would be needed are fairly vague and requested more specificity. Without knowing the “ask” it will be difficult to move forward. Perhaps there is work that can be done that lays the foundation for being able potentially to do this as things continue to transition. The need to assess the TB workforce with some frequency is not going to go away. The risk is a repeat of what occurred in the 1980s and early 1990s. While that was tied in part to the HIV epidemic, the loss of infrastructure in TB is potentially going to result in a resurgence in TB at some point that is going to cost a lot more to respond to than to prevent.

Dr. LoBue replied that it largely would involve staffing. There also would have to be a commitment from programs to participate in an assessment. While he was sure there are programs, and others such as Dr. Sosa-Bergeron mentioned, that would be happy to engage in an assessment, initial discussions suggested that the majority would not. There would have to be further discussions for clarification about whether there are enough TB programs willing to actively participate in order to collect meaningful information and the cost would have to be determined. The pre-work is probably doable, but a contractual approach might be needed since this would be time-limited work. DTBE can seek some estimates of what this might cost.

On behalf of the TB programs, Ms. Wegener said she thinks there is great interest in this. It is in TB programs’ self-interest to do this. The enormity of the initial ask was what concerned the NCTA leadership. NCTA had plans to redo a capacity survey and an assessment of the TB public health workforce post-COVID similar to what was done in the early days of COVID. The ACET recommendations were much more ambitious and more frequent episodically than NTCA thought they could take on. There is a lot of interest, and this is needed to be able to advocate nationally and at the state level. There are some very good local examples, such as Virginia, where an assessment has been done. However, it takes time. There is not at all a lack of interest. It is matter of trying to prioritize this activity over the NTCA’s other current activities. Some pre-work in partnership with DTBE colleagues certainly could be done. NTCA read the recommendations as needing to be done this Fall and by December, which may have been a misinterpretation on NTCA’s part, but it seemed to be a very ambitious project in a very short timeframe.

Speaking as ACET Chair and for himself, Dr. Belknap clarified that he did not intend that to be the timeline. For this to be feasible and useful, such an assessment needs to be more than a point-in-time survey. There needs to be a process that can be followed and repeated, which is different from anything that has been done previously. Building out that process without trying to tie it to a date was his intent in terms of identifying the minimum necessary components of a useful survey to assess TB workforce capacity in the US, estimating what it would cost, and determining when/where/how it could be implemented. He recalled that during the last ACET meeting, there was discussion about whether the COEs could conduct an assessment of their regions as part of their funding every 5 years. Perhaps that would be enough.

Given that diabetics are known to be 3 times more likely to progress from an infection to active disease, Dr. Benjamin asked where they are in terms of partnering with the American Diabetes Association (ADA) to recommend screening for TB infection of diabetics born in, having lived in and/or worked in countries of high TB prevalence. It seems that this could be incorporated into a standard of care for diabetics and represents “low hanging fruit” in terms of screening for TB infection. An effective partnership with them could result in assistance with this work.

Dr. LoBue indicated that while they have not done this so far, it is something that DTBE can consider. They can check with ADA about their priorities and level of interest. DTBE's main focus this year was on the USPSTF's general recommendation for people at higher risk.

Dr. Benjamin noted that USPSTF's TB recommendation was recently renewed and remains a B recommendation, and a couple of publications point to less than 10% uptake in testing.

Dr. Thomkins noted that while she has been retired since 2018, she recalled that TB testing has been recommended for years for diabetics as the standard of care. Every primary care physician (PCP) and most other physicians are aware that they should be testing diabetics for TB. Whether they are actually doing so remains to be seen.

Regarding the LTBI campaign, Dr. Ahmed expressed appreciation for pediatric populations being included in the visuals. She wondered why including pediatrics required that many resources if it is just an additional patient information sheet. The education sheet asks, "Why should I be tested for inactive TB?" It also could ask, "Why should my child be tested for inactive TB?" They did not partner with the American Academy of Pediatrics (AAP).

Dr. LoBue responded that it was strictly a CDC campaign that was focused on 2 areas that were funded. The current image focuses only on Asian Americans and pediatrics falls within that. Expanding anything related to that campaign is not possible because there is no money. In fact, it is going to come to an end until more funds are available. If more funds become available, consideration will be given to more groups. Any large group like Asian Americans certainly would include pediatrics.

Strengthening TB Public Health Infrastructure: Data Modernization

The Landscape

Erin Sizemore, MPH
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National Center for HIV, Viral Hepatitis, STD, and TB Prevention
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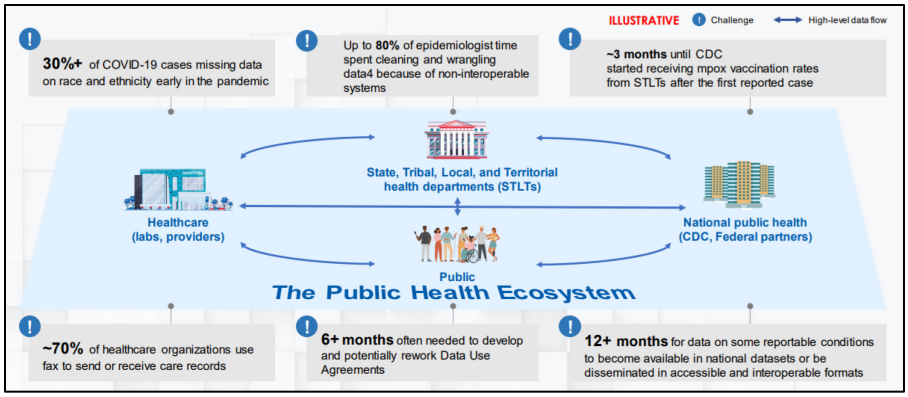
Ms. Sizemore explained that in terms of the landscape, there is an extensive public health ecosystem through which public health data are received and public health activities are performed. All of the data modernization activities and public health data strategies are intended to address challenges experienced across the entire public health ecosystem. Within the CDC, conversations around data modernization have been focused on technical fixes to these challenges. However, this is not just a technical problem. There also are substantial people, process, and policy aspects to these challenges as well. This diagram illustrates how complicated public health work is. While most of the points are COVID-related, the diagram is illustrative of all of the work public health does:



While the Data Modernization Initiative (DMI) is the high-level "big picture." A recent change within the walls of the agency is that CDC is starting to talk more about public health data strategies and less about DMI per se, though DMI underpins this effort. The ultimate goal is to move from siloed and brittle public health data systems to connected, resilient, adaptable, and sustainable "response-ready" systems that can help solve problems before they happen and reduce the harm caused by the problems that do happen. DMI is about connecting people with the information they need faster. State, tribal, local, and territorial (STLT) public health authorities require modern public health information systems that are scalable, flexible, interoperable, sustainable, reusable and intuitive. The need is most acutely felt by STLT partners because of generations of lack of investment. DMI was intended to address some of these issues.

CDC has 5 DMI strategic priorities, which are to: 1) build the right foundation; 2) accelerate data into action; 3) develop a state-of-the-art workforce; 4) support and extend partnerships; and 5) manage change and governance. The priorities align with and transcend into the Public Health Data Strategy (PHDS).[7] While most of the focus to date has been on the first 2 strategic priorities, the other 3 underlie CDC's DMI efforts as well. The 5 priorities map largely to CDC's top priorities for STLTs. The following table briefly describes the CDC DMI strategic priorities and the top priorities for STLTs:

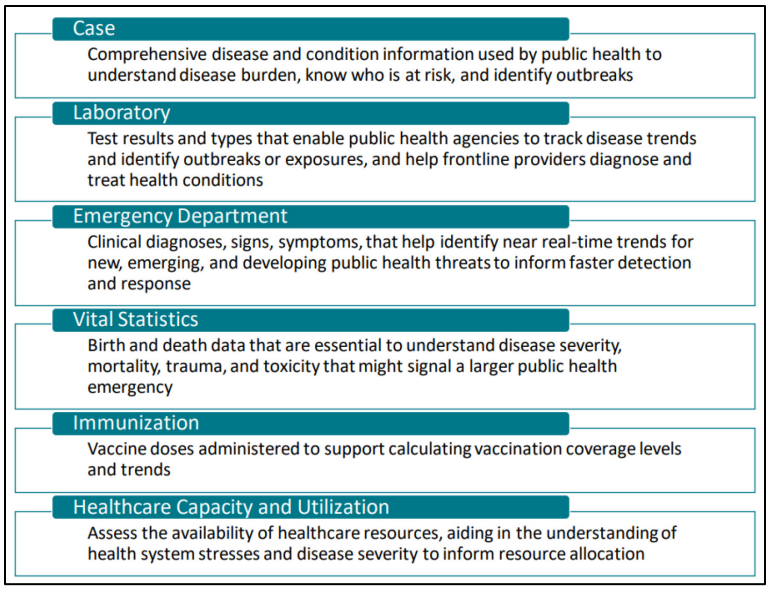
CDC DMI STRATEGIC PRIORITIES	TOP PRIORITIES FOR STLTS
Build the right foundation to increase scalability, flexibility, reusability, sustainability, and interoperability of public health applications and data sources	• Migrate to secure cloud-based services • Upgrade or replace siloed systems • Use modern data processing and analytics tools • Outsource burdensome point-to-point connections to trusted intermediaries
Accelerate data into action by leveraging modern data standards, shared services, and reusable processing approaches that make it easier to link data and more intuitive to troubleshoot issues	• Invest in record linkage capabilities to increase secure data linkages and data completeness • Identify opportunities and barriers to the usage of shared services and cloud
Develop a state-of-the-art workforce equipped with data science and engineering skillsets to be able to leverage modern tools	• Deploy funds to accredited and competency-based trainings to strengthen skills of the existing workforce
Support and extend partnerships to accelerate the exchange and use of data across the public health ecosystem and the identification, development, and use of shared services	• Increase the use of standardized data use agreements • Participate in ongoing engagement, feedback gathering and peer-to-peer learning opportunities
Manage change and governance by implementing modern best practices and guardrails for data and IT procurement, development, and governance	• Leverage shared procurement resources and promote human-centered design • Establish data and IT governance frameworks that empower teams and leaders

[7] https://www.cdc.gov/ophdst/public-health-data-strategy/index.html

Everyone knows that a list of priorities alone is not actually going to change anything, which is where the PHDS comes in. The PHDS is designed to be the plan that will help everyone in the public health ecosystem achieve the ambitious goals of DMI and improve the exchange of core data across healthcare and public health. The PHDS focuses on core data sources and 4 goals that advance public health missions. Ambitious 2-year milestones support the goals and their expected outcomes. PHDS outlines the data, technology, policy, and administrative actions that are essential to exchange critical core data efficiently and securely across healthcare and public health. The strategy is designed to describe a path to reach the DMI goals. While there has been a transition away from discussion of DMI to the PHDS, conceptually they are very similar. The PHDS is simply a 2-year plan with some ambitious milestones.

The PHDS supports partners across the public health ecosystem. The PHDS will help: 1) the public to have greater access to critical information on public health emergencies, risks, trends, and resources; 2) healthcare laboratories and providers to identify and adopt ready-to-use tools that enable easier and faster sharing of critical core public health data; 3) STLTs to prioritize data and technology investments to enable the most critical public health systems to be scalable, flexible, interoperable, sustainable, reusable, and intuitive; 4) CDC programs to streamline ongoing and planned efforts to support measurable and concrete 2-year milestones; and 5) federal agencies understand where and how to access richer public health data on demand to inform decision-making. The ultimate goal of the PHDS is to enable greater response readiness and progress toward health equity.

Core data sources are essential to identify diseases and conditions, detect emerging public health threats, and understand disease burden and severity across different populations. The PHDS focuses on the following core data sources:



There is a lot of focus on these data sources within CDC, with case and laboratory data receiving considerable attention at this time in terms of how to modernize and improve data flows within these specific areas. The PHDS is laser-focused on these 6 core data sources and focuses on 4 major goals that largely align with the priorities of DMI, which are to: 1) strengthen the core public health data; 2) accelerate access to analytic and automated solutions to support public health investigations and advance health equity; 3) visualize and share insights to inform

public health action; and 5) advance more open and interoperable public health data. While these are focused on technological fixes as mentioned earlier, there is a substantial workforce and governance component underlying these because there must be the right staff who are able to do this work, policies that do not block sharing, et cetera. The PHDS also focuses on 4 major goals that advance core public health missions, which are to: 1) investigate and respond; 2) detect and monitor; 3) inform and disseminate; and 4) be response-ready.

For those who have been in public health for a decade or longer, this probably looks like the most current iteration of a series of modernization efforts. However, Ms. Sizemore believes that this effort will be different because of what has been learned through the COVID-19 Pandemic and Mpox. There also is dedicated funding to support, enhance, and strengthen the public health infrastructure, which may be the major driver that makes this effort different. A stronger infrastructure would support the entire public health ecosystem. This includes the people, processes, and technology needed. Therefore, any infrastructure strengthening work must occur across the entire ecosystem in order for there to be true improvements.

There are some specific aspects of infrastructure that CDC is targeting for improvement. There is the *Strengthening US Public Health Infrastructure, Workforce, and Data Systems Grant*[8] through which 107 health departments have received funding across 50 states, 22 cities, 27 counties, 5 territories, and 3 freely associated states. Ms. Sizemore feels that this is the complete underpinnings of how to strengthen the US public health infrastructure by supporting workforce, foundational capabilities, and data modernization. She personally feels that the workforce needs to be bolstered to do any of this work, for which there is a $3 million investment through this grant. Funding from this grant will help to ensure that every US community has the people, services, and systems needed to promote and protect health. The grant creates a foundation for CDC's public health infrastructure work and provides flexibility so that recipients can address their most pressing needs. CDC has awarded $3.84 billion through this funding opportunity, which is a substantial amount of money to focus on building infrastructure versus focusing solely on disease-specific funding. The new budget period began on December 1, 2022.

There also is *Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases Cooperative Agreements (ELC)*[9] funding to strengthen the nation's capacity to respond to domestic infectious diseases. ELC funding began in 1995 with 10 recipients and grew to the current 64 jurisdictions in 2012. The period of performance is 5 years/60 months, so 2023-2024 is the last budget period of the current cooperative agreement. In 2022, approximately $197 million was awarded to the 64 recipients in core funding to continue the crucial work of health departments across the US. The 64 recipients are comprised of 50 states, 6 cities, 5 territories, and 3 freely associated states.

Specific to TB, the connections throughout the public health ecosystem are quite strong due to decades of mission-focused and intentional investments. TB may not have been the most highly funded of any condition in health departments, people have been savvy to interconnect efforts and focus on sharing the principles of data modernization that may have been new to other programs. Many of the basic public health needs related to data sharing between healthcare, STLTs, and CDC are already established and optimized for TB. Ms. Sizemore believes that TB is in the enviable position of being able to test some newer technology to support critical public

[8] Full funding details: cdc.gov/infrastructure/phig/
[9] Full Cooperative Agreement Details: https://www.cdc.gov/elc

health work and answer important questions as well.

Data Modernization in Action

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National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

To provide an example of data modernization in action, Dr. Winglee described how CDC is using data modernization for the Tuberculosis Epidemiologic Studies Consortium (TBESC). The TBESC's mission is to assist TB elimination efforts in the US by designing and conducting epidemiological research studies to answer the most important questions to guide policy and practice. TBESC is now in its third iteration, referred to as TBESC-III. This iteration was launched in October 2021 and is a 4.5-year contract that will end in 2026. Historically, TBESC has been a collaboration between CDC, health departments, and academic institutions. TBESC-III is adding and focusing on primary care clinics.

The TBESC-III aims are to: 1) identify primary care settings serving non-US–born persons at risk for LTBI; 2) collect retrospective and prospective electronic medical record (EMR) data; 3) design and implement clinical care-based interventions to improve performance measures across the LTBI care cascade; and 4) monitor and evaluate intervention performance over time to identify efficient and effective strategies. While TBESC-III sites were required to implement only 1 intervention, every site is implementing multiple interventions. The 4 TBESC-III sites launched in October 2021 that are implementing the interventions and collecting the data include the following:

- Denver Health and Hospital Authority Primary Care working with its affiliated community clinics (PI: Michelle Haas, MD) [Post-meeting editorial note: At the time of the presentation, Dr. Haas was the PI. The PI has since changed to Kaylynn Aiona, MPH].
- Public Health Seattle & King County in collaboration with International Community Health Services (ICHS) (PI: Masa Narita, MD)
- University of California San Francisco (UCSF) Center for Tuberculosis in collaboration with North East Medical Services (NEMS) (PI: Priya Shete, MD, MPH)
- Kaiser Permanente of Northern California (PI: Jacek Skarbinski, MD)

In September 2022, a fifth site was added through a separate contract with RTI International (PI: Carolina Barbosa, PharmD, PhD) to perform a cost-effectiveness analysis. RTI International will not implement any interventions or collect data. Over the course of the TBESC-III Work Plan, the 4 initial sites will design and propose interventions that improve adoption of the following CDC LTBI recommendations to: 1) increase testing of non-US–born populations at high risk of infection; 2) use interferon gamma release assays (IGRAs) for TB testing; and 3) use of rifamycin-based short course treatment regimens for LTBI. Some of the interventions these sites have planned build on some of their work from previous iterations of TBESC.

The primary scientific question for TBESC-III is, “What are the most effective and efficient interventions?” Toward this end, data will be collected in the following 3 data streams:

EMR Data
- These are line listed data on patients
- These data will be used to assess the effect of the interventions
- The focus will be primarily on developing LTBI care cascades for baseline and for each intervention

Implementation, Monitoring, and Evaluation (IM&E) Data
- These are aggregate quantitative and qualitative data
- These data will be used to assess how the interventions are implemented and to help explain why certain effects were identified in the EMR data

Cost Data
- These are aggregate data
- These data will be used to assess the cost-effective of the interventions

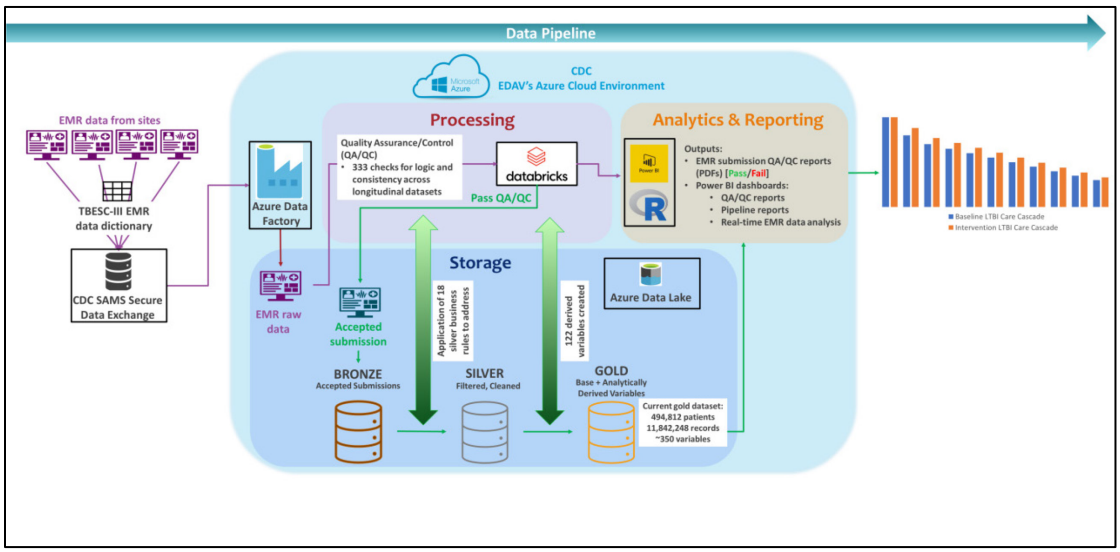
In terms of the timeline, the sites had until October 2022 to implement their first intervention and submit their baseline EMR and LTBI care cascade data. Their baseline cost data were submitted in December 2022. Beginning in March 2023 until the end of the contract, sites are expected to submit EMR and IM&E datasets quarterly and cost datasets every 6 months. The second round of EMR and IM&E data were recently submitted.

This presentation focused on the EMR data, which will be used to assess the impacts of the interventions on the care cascades. Since the award began, a data dictionary was created with 8 data tables (e.g., metadata, patient data, visits, diagnostics, imaging, prescribing, dispensing, and ICD codes). Each site was expected to map their EMR system onto the data dictionary. Most of the tables are expected to have more than 1 row per patient. Across all of the tables, there are 180 unique variables. Sites are required to have at least 10,000 patients per site per year in the subpopulation receiving these interventions. The baseline was required to have at least a 12-month window for patient inclusion, with a full history for any patient who visited a site during that time. After implementing the intervention, sites will be providing quarterly submissions for the rest of the contract. In terms of TBESC-III EMR data analysis needs, a very large dataset is anticipated with millions of records. This cannot be entered into Excel or be reasonably analyzed on a standard laptop. An automated and standardized system was needed, particularly for ingestion, near real-time quality assurance/quality control (QA/QC), and analytics. QA/QC in this context refers to checking to ensure that the data meet agreed upon quality standards, such as making sure there are correct data types without missing key variables, logical consistencies, et cetera. Fast turnaround times and automated routines are particularly important as this pipeline is running quarterly, and the results are needed to identify whether there are any issues that need to be addressed. It is important to realize that EMR data are constantly changing.

In order to develop the TBESC-III data pipeline, research was done to identify the components that would need to go into the pipeline. The result of that project was a high-level architecture to define the needs. In short, systems were needed to collect the data and bring it into CDC. CDC then needed to ingest the data, including running QA/QC to ensure that it meets expectations. After that, CDC assumed the data would still need some preparation such as data cleaning or consolidating the data, and that some additional computation probably would be needed to

create a final analytic set that could then be visualized and presented. After exploring the options for the data architecture needs and based on conversations with CDC's Public Health Informatics Office (PHIO), the CDC's Enterprise Data Analytics and Visualization (EDAV) Platform[10] was selected for the pipeline. EDAV is a cloud-based suit of tools to ingest, store, transform, and visualize the data that is part of CDC's DMI.

At a high level, the EMR data will be mapped by the sites onto the TBESC-III data dictionary and submitted to CDC to be moved through EDAV. Once in EDAV, QA/QC will be run. Once a submission passes QA/QC, it is referred to as the "Bronze Dataset." Standardized cleaning rules are then applied to create a "Silver Dataset. Logic is in place to create analytically-defined variables resulting in a "Gold Dataset" that is used for analyses, particularly generating LTBI care cascades to compare baseline and post-intervention. While this talk largely focused on the EMR data, CDC also is using EDAV to store and analyze IM&E and cost data. This diagram illustrates what the pipeline looks like, which Dr. Winglee described in more detail:



As of June 1, 2023, CDC has ingested 53 submissions with over 116.5 million total records from sample, baseline, and Quarter 1. Quarter 2 came in at the end of the previous week, so these numbers were already on the smaller side, but still in the same range. The largest of the data submissions was over 466 thousand patients and more than 12.9 million total records. Despite these large data sizes, the typical pipeline runtime is about 30 minutes to run all 333 QA/QC checks. This means that CDC is often able to return QA/QC results to a site in less than a business day. A mock dataset was generated for testing with 1 million patients. The runtime with 1 million patients, 2 million visits, and 4 million diagnostics was approximately 1 hour 20 minutes to run the pipeline. That means that as the datasets continue to grow in size as the project continues, CDC anticipates still being able to provide that same business day feedback. Thanks to this pipeline, it has been possible to identify QA/QC issues and address them quickly. Once sites pass, it is possible to quickly visualize the new care cascade with very few manual steps in this process.

[10] https://www.cdc.gov/surveillance/data-modernization/technologies/edav.html

To summarize some of the benefits of the TBESC-III data pipeline, it provides an automated and standardized routine for ingesting, validating, transforming, analyzing, and visualizing the data. Now that CDC and the sites have agreed upon the standard analyses to run, it is possible to reproduce and update the numbers with each submission. There also is an ability to store and rapidly review large terabyte size data, which is important as the project continues and the number of datasets and patients continue to increase in size. A lot of effort also has been placed on documentation of decisions made, how the pipeline runs, and how to access the pipeline. This process allows for near real-time feedback to sites on QA/QC. While CDC cannot put numbers on it, there is agreement that using EDAV has resulted in time and cost savings over trying to build the pipeline from scratch. Given that none of the tools being used are specific to TBESC or TB, the lessons learned can be applied to other projects at CDC. There also are challenges with the TBESC-III data pipeline. It is a new technology, particularly at CDC. Because of the development of the pipeline, tools or capabilities were sometimes offered that were not ready for "prime time." There is a steep learning curve on how to use the new tools. More broadly, using EDAV requires some advanced technical skills to develop, maintain, and update the pipeline.

In conclusion, the anticipated study outcomes are to: 1) increase availability of policy-based screening programs; 2) increase the percentage of non-US–born populations screened for LTBI; 3) increase treatment completion for LTBI; 4) decrease progression from LTBI to TB disease; and 5) decrease the incidence of TB disease in the US.

With regard to the future, Ms. Sizemore said she thought that Dr. Winglee's talk highlighted the interconnections within the DTBE. The DTBE keeps excellent surveillance data and knows so much about people who have TB in the US. Because of the new technologies and EMR data Dr. Winglee and her team were able to bring to fruition, some really important questions that have been answered that could not otherwise be obtained through surveillance data. Within the halls of the DTBE, it is important to note how well everyone works together to build upon each other's learnings. But, there is more to the future. In the words of R. Buckminster Fuller, "The reward for being a good problem solver is to be heaped with increasingly difficult problems to solve." TB has proven itself to be a very good problem-solver in terms of health information systems and connecting things together. As a result of that, there are more problems to solve.

However, many needs remain in terms of TB public health infrastructure and health information systems. Ms. Sizemore shared a few themes for public health infrastructure improvement that include, but are not limited to, the following:

- Surveillance system integration and workforce collaboration to better respond to syndemics within jurisdictions
- Cross-jurisdictional and binational data sharing and how CDC can work with policy to do this more efficiently
- Expanding and enhancing electronic laboratory reporting
- Increasing analytic and data visualization workforce skills and IT system capacities

Ms. Sizemore and Dr. Winglee posed the following questions to begin the discussion for this session:

- What are the biggest challenges?
- Is this a people, process or technology challenge?
- Would infrastructure improvement address your biggest challenges?

- Is more funding the solution?

ACET Discussion

For this discussion, ACET was asked to consider the following question:

1. *What are recommendations to HHS and CDC on TB Public Health Infrastructure presented by the panelists?*

Dr. Stout noted that in terms of the data challenges pertaining to COVID-19, the whole world basically looked at what Lauren Gardner was doing at Johns Hopkins. That became the de facto standard for detailed data information on COVID-19. He asked whether CDC is consulting with people like her who basically did a superior job during COVID to leverage the lessons learned from that experience to apply to TB programs.

Ms. Sizemore indicated that CDC is definitely trying to apply lessons learned. There is the new CDC Center for Forecasting and Outbreak Analytics (CFA) that is directed by Dylan George, and the National Syndromic Surveillance Program (NSSP) works closely with Johns Hopkins Applied Physics Laboratory (APL) to bring in academic experience to leverage lessons learned. In the case surveillance space there is a lot of attention on making data flows more efficient by trying to figure out what minimum set of data are needed for situational awareness or response readiness in terms of how to get that data flow up and running efficiently so that at a bare minimum it will be possible to count the number of cases. In her opinion, some of the advanced analytics work may be better suited outside of CDC. While CDC is good at many things, the current systems within the agency tend to be disparate and there are no data standards across the board. As a result, it is very difficult to combine those data, have them be interoperable, and run models on that. There is an acknowledgement that academic institutions such as Johns Hopkins do this better and CDC could either learn from them and be humbled about the things CDC cannot do and find a way to share the data so everyone can work together.

In terms of challenges, Dr. Narita emphasized that collecting EMR data is very important. However, this is labor-intensive even though the majority of healthcare systems are using EMRs and the data are there. It also is important to remember that LTBI has not become a reportable condition yet, so it is not clear how to address LTBI activities like the TBESC is doing.

Dr. Winglee responded that because she was focused on CDC, she did not highlight what all of the TBESC-III sites are doing. The sites had to map their EMR data onto the data dictionary, which was a months-long effort because every EMR system is different in terms of having different variables, different variable names, caveats to the data, et cetera. This was a huge challenge.

Dr. LoBue added that part of the problem with this is that despite the great work that the TBESC has done and the complications, it is very simple compared to TB surveillance. There are only 4 TBESC sites that are sending the data directly to CDC and there were set criteria pertaining to who could participate. That is so different from the world of surveillance where data go from a provider, to a local health department, to a state health department, to CDC. The locals could be dealing with single practitioners who have no EMRs who call to report a case of TB, sophisticated healthcare systems like Kaiser that may have very specific information, patients could have multiple providers, providers may use multiple laboratories, a case record takes data from multiple sources over time, et cetera. It is not clear whether to even start to address a system like that.

Ms. Sizemore emphasized that this is a case surveillance challenge, especially for conditions like TB. This cannot be done just from a laboratory report. There are efforts underway focused on STLT partners to help them with electronic laboratory reporting in terms of at least getting the labs into their systems. That does not solve the whole problem, because TB does not involve just one laboratory test. There were lofty hopes for electronic case reporting to be able to bring EMR data into STLTs surveillance systems, but those have not worked out as much as everyone thought they would because there is a deluge of data that comes in from an EMR that cannot be parsed to put it where it needs to go into an actual useable data element. Perhaps physicians could be trained differently in how to complete things in EMRs so that it follows through the whole public health ecosystem, but that is probably not a good solution. She does not know whether the idea that public health would be able to leverage a lot of data from healthcare and it would make their lives easier is true or could be a reality. Connecting the various data seems to be an enormous challenge that snippets of DMI are focused on, but there are not a lot of good solutions. There are some interoperability activities related to healthcare that may benefit public health sometimes, but electronic health reporting is not designed with public health as a use case. She struggles with this a lot. Part of the DMI challenge is there was an idea that this should be easier than it is.

Dr. Sosa Bergeron indicated that she is a State Epidemiologist and the ELC Project Director and pointed out that A3 is another source of funding for ELC. Sustaining the funding is very important, but it is all from various funding streams. Even though it is a huge challenge getting more data by electronic laboratory reporting, it is a major advantage for the state to know 3 weeks before a TB case is being discharged. When these efforts are further along, she believes they will be very helpful. At the same time, her challenge and frustration with the DMI and the PHDS has been that it is very high-level. While it is understood that CDC is trying to go to the lowest common denominator, states that are not at that lowest level and are ready to do more, feel stymied. From her standpoint, it would be great if the CDC TB laboratory could submit their data to her not as a PDF because it is huge. This is definitely a long game. While the TBESC work is great, it is a different data system from what states are dealing with every day. The complexity is similar, so consideration should be given to how to adapt that success to what the state and local health departments are doing.

Dr. Ahmed asked when others could anticipate seeing some of the care cascade data, whether there is a place in the database to capture the impact of drug shortages, and how they resolved the issue of getting non-US-born information.

Dr. Winglee responded that they hope to be able to start presenting some of the care cascade data at the end of the year. The baseline ended October 1, 2022 and they are allowing a year for patients to complete treatment. The September 15th due data is considered to be the close-out of baseline. Data on drug shortage challenges are going into the IM&E data. In terms of resolving the non-US-born information, if country of birth is missing in the EMR data, they look at language and/or whether an interpreter is needed. That is not the best proxy, but at least there is a system in place to ascertain whether there is a non-English language preference and then include them in the non-US-born category. Each site has a different process in place to collect that information. The best example NEMS has made a lot of effort to work with their patients to get the “country of birth” variable filled in based on a lot of work with the community. For example, they are even getting regions within China. Other sites have more missingness, so language is being used more.

Dr. Belknap noted that the TB workforce remains a difficulty in that it requires a lot of person time to collect, verify, and submit data in order to have the robust systems that are in place for TB. It is burdensome and is not the most rewarding of work to be chasing that down all of the time, but it is critical for what they do. One of the hopes for TBESC is to identify systems and interventions that would allow for more TB prevention to occur outside of funded US TB programs, such as in primary care where patients are often and hopefully being seen prior to or instead of interaction with public health systems. An acceptable outcome would be able to expand this effort to other organizations outside of TB programs. This will require people, process, technology, and all of the other elements listed.

Dr. Glover said that from his perspective as a laboratorian, there are many challenges around the procurement of infrastructure, data and IT governance, and Data Use Agreements (DUAs). Those are hard areas that take a lot of work and time in order to change systems. Perhaps a white paper on best practices to highlight the ideas should be used to educate people.

Ms. Sizemore said that as someone who never thought she would spend a lot of time reviewing and assessing contracts, she does this a lot and understands. She has been pushing within CDC that since they do have different structures, standard contract language is needed across the board to be successful that includes the minimum set of requirements and a maximum set of expectations. She has not gotten much traction with this, which surprised her. Even more foundational than that is the need for Communities of Practice (CoPs) for people in similar jobs to discuss what they are using and cost. At least within the public health community, this could be useful. There is an effort with the ELC guidance to include more guardrails. There also are efforts to figure out how all jurisdictions can benefit from this investment when CDC is trying to bring up the floor. This area needs some thought leadership coming from one place. There have been some efforts to publish white papers, but time is an issue.

Dr. Ahmed noted that a key group who should be at the table is the NTCA. Consideration should be given to partnering with the NTCA's National Society of TB Epidemiologists.

Dr. Haley pointed out that often white papers and other publications sit on shelves, so consideration should be given to how to go more directly to the user.

In terms of grassroots growth, Ms. Sizemore noted that one of her biggest challenges with DMI over time has been that the majority of the conversations occur at the higher leadership level and no one even asks the people who are struggling with the data about their challenges.

Dr. Loeffler asked whether CDC has spoken directly with Epic. A lot of TB public health clinics and FHQCs use an epic product in a group called OCHIN. They have a lot of funds and her sense is that they do not seem to be engaging in a lot of philanthropy. Perhaps this could be a test case. While that product was created to facilitate billing, it can be used for other data.

Equitable Access to TB Diagnostics

Support for TB Laboratory Testing

Angela Starks, PhD
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National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Dr. Starks reviewed current efforts through CDC to broadly support access to TB laboratory testing; discussed the availability of phenotypic and molecular drug susceptibility testing (DST), especially for new and repurposed drugs; and identified some challenges and potential solutions. In terms of CDC support for testing TB in the US, there are a number of areas for which there is funding and efforts are focused. These include the TB Elimination and Laboratory Cooperative Agreement, Partnerships, CDC's TB Reference Laboratory Services, and Specialty Testing Centers.

The TB Elimination and Laboratory Cooperative Agreement focuses on strengthening public health laboratory services and activities at the state and local levels. This funding is currently granted to 58 awardees that include 50 state public health laboratories, 7 large cities (San Francisco, Los Angeles, San Diego, Houston, NYC, Washington DC, and Philadelphia) and Puerto Rico. Annual funding for the laboratory component is approximately $6.7 million. This funding is distributed using a workload-based funding formula that includes consideration of the number of clinical specimens processed by these laboratories, number of patients from whom reference isolates are received, positive results, et cetera. The intent is to understand the full spectrum of how public health laboratories work across the US. Some are doing more diagnostics testing in their jurisdictions, while others focus primarily on the reference testing that is provided. The range of awards to the 58 awardees is from $35,000 to $636,000. This table provides examples of pre-COVID workload variables among the 58 awardees:

Workload Variable	Total Number 2017	Total Number 2018	Total Number 2019
Clinical specimens processed	201,374 (124–18,357)	193,534 (108–18,258)	186,849 (105–17,458)
Number of patients for whom specimen was processed	86,700 (79–9,939)	79,490 (48–9,675)	77,208 (51–9,687)

In terms of drug susceptibility test methods, the primary method in 2022 that is used among the 58 awardees is the BACTEC™ MGIT™. Of the 58 awardees, 35 (60%) use this system. This consists primarily of the laboratories that would perform first-line DST in-house. A total of 16 (27%) of the laboratories are referring out to the National PHL DST Reference Center for *Mycobacterium tuberculosis complex* (MTBC) testing. Some second-line DST is being performed by 15 laboratories, with the breakdown shown in the following table:

Second-line DST Method	Public Health Laboratory
Indirect Agar Proportion (AP)	AZ, MA, MD, MI, NYC, OR, TX, WA
BACTEC™ MGIT™	AK, CA, LAX, NY, VA
Trek Sensititre®	FL
Whole genome sequencing (WGS)	NY

Wadsworth Center in New York State Department of Health (NYS DOH) now performs primarily WGS as its first-line method and has eliminated the vast majority (~80%) of its phenotypic DST for those isolates where no mutations associated with resistance are detected. Those would be indicated as susceptible and would not reflex them for additional testing.

CDC manages the Model Performance Evaluation Program (MPEP),[11] which is a voluntary performance evaluation program through which the agency sends a panel of isolates 2 times per year to public health, commercial, clinical, and federal laboratories that perform DST. The number of laboratories that are participating in the program has been gradually decreasing over the years, with about 63 laboratories now participating. This decline is likely due to the consolidation of laboratories performing DST or referral out of specific laboratories. In 2022, all of the participants were performing testing for rifampin, isoniazid, and ethambutol. A few are doing growth-based testing for Pyrazinamide, but very few laboratories are performing testing for second-line and new and repurposed drugs.

In terms of molecular susceptibility testing, 14 of the 58 awardees perform this type of testing. This is testing that is performed primarily for isolates from culture. The vast majority of those reporting this type of testing, 8 (57%) were using the Xpert® MTB/RIF and likely are also using that for identification from culture and assessment of resistance to rifampin. A total of 4 (29%) of the laboratories reported doing targeted sequencing, while 1 (7%) laboratory reported doing WGS. Until recently, Florida made use of the Bruker MTBDRplus Line Probe Assay. That was recently discontinued in the Florida laboratory.

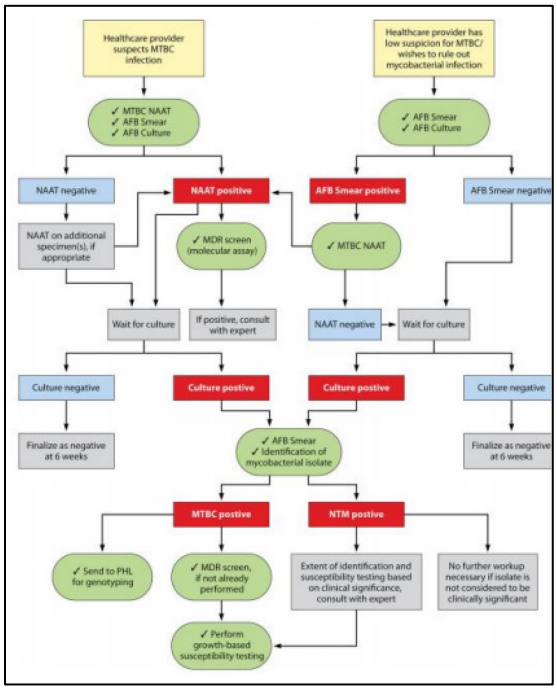
Partnerships are critical for ensuring access to diagnostic testing. Public health laboratories (PHLs) are CDC's primary partner. There is a menu of core TB testing services, but those vary depending upon the specific laboratory. The testing algorithms also vary, especially for tests such as nucleic-acid amplification testing (NAAT). Some laboratories have a universal approach such that all specimens for individuals being evaluated for TB would receive NAAT, while others may examine only those that are AFB smear positive and others may require a consultation on behalf of the TB program depending upon signs and symptoms associated with disease. There also are a number of shared service models and the laboratories are great about supporting one another for continuity of operations. CDC also works very closely with the Association of Public Health Laboratories (APHL) in terms of the development of education and training resources, communication of critical issues, coordination of subject matter experts (SMEs), and funding opportunities for PHLs for specific aspects. The APHL has oversight for the administration of the National PHL DST Reference Center.

[11] https://www.cdc.gov/tb/topic/laboratory/mpep/default.htm

The National PHL DST Reference Center[12] was established in 2015 and was intended to support DST for low volume (DST for <50 isolates/year) PHLs to help maintain high-quality testing. The Microbial Diseases Laboratory (MDL) of the California Department of Public Health (CDPH) currently serves as the DST Reference Center.[13] They provide first- and second-line phenotypic susceptibility testing, as well as access to molecular testing. Even for the laboratories and states that are currently using the DST Reference Center, CDC's Molecular Detection of Drug Resistance (MDDR) service and all other services at CDC continue to remain available to them. Dr. Starks shared a map showing active submitters to the National DST Reference Center for 2019-2022.[14] Currently, 20 submitters are enrolled. While not all of those submitters are routinely using the DST Reference Center, about 15 states are routine submitters.

CDC's MDDR service was implemented in 2009 for rapid detection of drug resistance in *Mycobacterium* tuberculosis. In February 2023, the MDDR transitioned to a new targeted next generation sequencing (tNGS) assay. This was done to help increase CDC's capacity for testing genetic loci associated with new and repurposed drugs and to expand the number of loci evaluated. CDC was able to increase its sensitivity for Isoniazid resistance by examining the entire *katG* gene instead of just a specific region, the S315T mutation in the *katG* gene, which is the most common mutation associated with isoniazid resistance. It also has increased CDC's ability to test for heteroresistance (e.g., mixtures of susceptible and resistant populations).

This algorithm was proposed in *Clinical Microbiology Reviews* (*CMR*) in 2018[15] as the "ideal" algorithm:



[12] https://www.aphl.org/programs/infectious_disease/tuberculosis/Pages/TB-DST.aspx
[13] https://www.cdc.gov/tb/topic/laboratory/mddrusersguide.pdf
[14] https://datawrapper.dwcdn.net/v4bJ6/1/
[15] https://cmr.asm.org/content/cmr/31/2/e00038-17.full.pdf

One element in this algorithm is the concept of universal NAAT, with those samples found to be NAAT-positive to be reflexed for an MDR screen. Dr. Starks proposed that with the current situation with new regimens that have been introduced due to some of the drug shortages, fluoroquinolones should be included as part of the initial screen. Following the pathway in the algorithm for those found positive by culture, there is the mention of the MDR screen if not already performed. This would be a scenario in which every individual would have access to all of these rapid tests to receive quick information about TB or not TB and also mutations associated with resistance.

One of the challenges is the piecemeal nature of TB testing. TB testing, especially for some of the most complicated drug-resistant cases, sometimes requires referral to multiple laboratories for a complete panel of testing. This is sometimes challenged by a general lack of awareness of where to obtain that testing. This is an ongoing issue. In addition, there are differences in the methods and test performances when referred to multiple laboratories. Sometimes that can lead to discordance in results, which can make the situation more complex in terms of interpretation. Communication is key but also can be challenging when multiple laboratories are involved. There are differences in how results may be reported that can impact turnaround time for results to healthcare providers to help guide clinical decision-making and that is a potential source of confusion with differences in format, terminology, and nomenclature.

A few years ago, CDC worked with APHL to try to address the issue of awareness in terms of where testing could be performed. This is an example of a tool that was developed that was distributed through the Centers of Excellence (COEs), which focused on increasing the awareness of NAAT by what states are performing it and provided points of contact for the laboratories, information on the specific matrixes that can be tested, and whether laboratories would accept samples from outside of their specific jurisdiction:

Availability of Services: Nucleic Acid Amplification Testing

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES

Nucleic Acid Amplification Test (NAAT) Methods Available at Public Health Laboratories for Use with Pulmonary and Extrapulmonary Specimen Types

Southeastern National Tuberculosis Center

SNTC	NAAT Method	Specimen Types: Pulmonary	Specimen Types: Extrapulmonary	Test Available for Outside Jurisdictions	Specimen Types Accepted	Information Required for Specimen Submission	Cost and Invoicing
Alabama	• Xpert MTB/RIF	• Raw & conc. sputum • Bronchial wash • BAL	• None	• Yes	• Raw & conc. sputum • Bronchial wash • BAL	• Clinical Signs/symptoms suggestive of TB • Clinician request • Memorandum of Agreement established before receipt of specimens	• Estimated fee $50.00 - $75.00 per specimen
Florida	• Xpert MTB/RIF • Real-time PCR (MTBC Only)	• Raw & Conc. sputum • Bronchial wash/brush • BAL • Pleural fluid • Biopsy tissue (lung)	• Urine • Tissue • CSF • Aspirate (Gastric or Lymph node) • Pericardial fluid • Bone marrow • Stool	• Yes	• All pulmonary and extra-pulmonary types listed	• Clinical signs/symptoms suggestive of TB • Clinician request • Patient risk factors • Must be vetted through SNTC	•3rd party invoice available •$60 per specimen
Illinois	• Xpert MTB/RIF	• Raw & Conc. sputum	• None	• Yes	• All pulmonary types listed	• Agreement in place with lab and program approval • Clinical signs/symptoms suggestive of TB • Clinician request • Smear status	• Invoice monthly

The landscape also is changing. There has been loss over the last few years of some legacy commercial products and there has been an increase in dependence on laboratory-developed tests than in the past. There also has been a shift toward more use of WGS. There has been a lot of influx of funding in terms of increasing capacity and expertise in the PHL sector in use of

WGS. In terms of TB, there have been advances in knowledge. The World Health Organization's (WHO's) *Catalogue of Mutations in Mycobacterium Tuberculosis Complex and Their Association with Drug-Resistance* that was released a few years ago is due to be updated for release in late Summer 2023.[16] Hence, a lot of pieces are coming together in terms of the use of these types of results for clinical care.

In terms of how accessibility might be improved, there are still challenges in terms of testing for newer drugs and progress needs to be made in expanding availability. There is a need for cheaper, simpler, and more rapid tools closer to the patient. To address the piecemeal issue, better diagnostics are needed that are usable closer to the patient. More awareness is needed of where to obtain testing. Some work can be done in this area to create additional tools to educate on where testing may be obtained. There is limited visibility on testing capacity in the private sector. Having this information could be very helpful. There is a lot of expansion in molecular testing. While expansion of molecular testing can result in faster results to determine drug susceptibility, not just resistance, there also are concerns. This type of testing is not without costs. Although a lot of investments have been made, there remains concern with regard to sustainability of those investments. In terms of workforce development, there has been considerable turnover in staff in public health generally and in PHLs. In terms of training and workforce development pertaining to additional skillsets, today's laboratory scientists are also very interested in data analytics and being able to conduct their own data and bioinformatic analyses. Consideration must be given to how to best support those skillsets among laboratory scientists.

Equitable Access to TB Diagnostics

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Dr. Bibbs Freeman added to the conversation regarding access to testing in terms of equitable access to TB diagnostics and potential laboratory infrastructure recommendations. She reminded everyone that health equity exists in its most optimal form when everyone has what they need to be their healthiest. Sociodemographics and other social determinants can contribute to disparities in optimal health. It also is known that when the social determents are controlled, morbidity and mortality can be minimized—particularly in populations who are currently underrepresented. Regarding access, having all of the resources in the world does not matter if these do not reach the people who need them. Creating the best laid plans with the best resources and best funding is necessary, but is not always the solution.

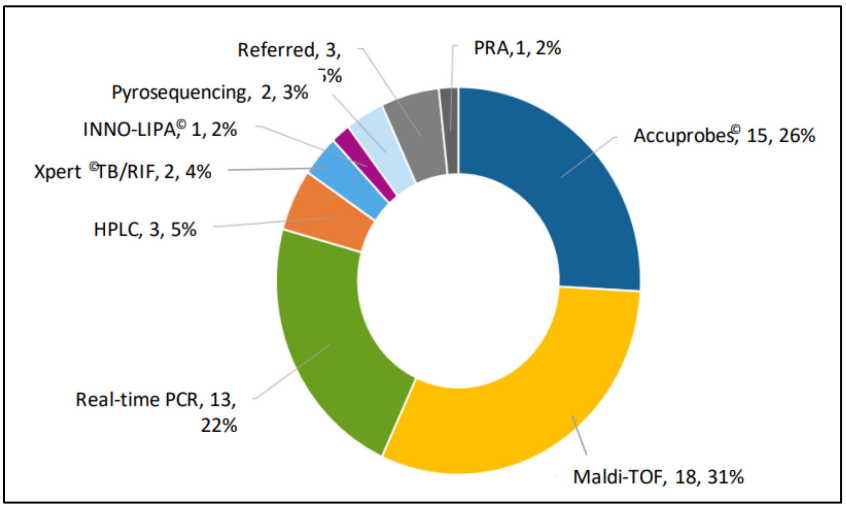
The PHL in Virginia "lives in a dark space" in the middle of the epidemiologists and clinicians. This often makes them the unseen partner in a lot of efforts, which often means that highlighting needs is more challenging. Those needs must be highlighted in order to achieve optimal health equity for everyone involved, especially for TB diagnostics. PHLs do not interface directly with the end-user of the data that they are creating, so it is very important to collaborate and partner with clinicians, epidemiologists, and communities as well. A colleague recently said to Dr. Bibbs Freeman, "We need to make the walls of the laboratory more porous." She has been thinking since then about how to do that by determining the long-range goals that need to be achieved to

[16] https://www.who.int/publications/i/item/9789240028173

improve health equity and to ensure that all partners, defined in a broad sense, know what each other need in order to support each other moving forward.

As mentioned earlier, there also is a trust issue. Following the pandemic, people do not trust healthcare providers (HCP) whomever they may be because the information coming to them may not be clear or explained in a way that they can understand. HCP may not have communicated the right information in the right way initially, which breaks down trust and requires it to be rebuilt. As everyone knowns, it can take 1000 rights to fix 1 wrong. There is a lot of work to be done in terms of rebuilding trust in communities. There are opportunities to establish some rules of engagement between clinicians and epidemiologists, public and private partnerships, and the communities. In language that they can understand, communities must be educated about what public health can do, how things work, how long it takes, and what it tells them. Dr. Bibbs Freeman proposed that there is an opportunity for Notices of Funding Opportunities (NOFOs) and grants to clearly articulate that there is intension behind creating community awareness and partnerships on the front and back ends to facilitate better health equity.

This pie chart from CDC highlights the primary methods for identification from culture in 2022 (n=58), with the caveat that Accuprobes are no longer available as of December 2022 although numerous health departments used these:



Timeliness is important, but performing a culture for TB can take weeks. This is insufficient in terms of treating people rapidly. Culture takes weeks to perform, so identification from culture also can take weeks to perform. While there is more rapid technology in the form of molecular testing and serological testing that can be done within a day, there are still challenges with getting samples to the testing laboratories quickly and efficiently. Some states have more problems than Virginia, which has a statewide courier system. States with more rural than urban populations are going to have challenges with transportation of samples. This needs further thought, particularly in high prevalence areas in terms of creating access points for rapid point-of-care devices for TB diagnostics. This is another area that could be highly impactful.

As depicted by the pie chart, many laboratories are still using culture-based techniques. Moving to a more universal approach of molecular diagnostics and testing on the front end offers another opportunity to give patients the best care they can receive. Delays of 6 to 8 weeks make it difficult to get people to return for proper care, especially transient populations. Looking

at the PHL Systems database that APHL curates, there are over 100 PHLs that perform clinical testing of some sort. A lot of these laboratories have used funds over the past few years to expand or amplify their diagnostics. This is a great time and a great opportunity to assess what they added to their repertoire of services and whether additional TB testing can be expanded into other PHLs, particularly in areas where there are under-represented communities.

Related to cost, molecular testing is not cheap. PHLs want to be able to provide the best testing possible, which for Virginia is currently NAAT testing. As mentioned earlier, this is a long-game. Investment up front to reduce costs later will begin with getting people diagnosed as quickly as possible. From an innovation standpoint, research dollars have begun to dwindle and allocated to other efforts. There is a need to develop/provide tests with more accuracy and robustness for non-sputum-based methods, continue to investigate new biomarkers that are stable for TB, and provide portable NAAT equipment so that PHLs do not have to wait for TB patients. Instead, PHLs should be able to go to patients with the things that they need.

While there is a need for additional funding, resources built during COVID-19 for one purpose could be leveraged for another. Instrumentation and equipment already exist in some cases that can be modified for use with TB. In addition, partnerships should be expanded and extended in a more intentional way in order to evaluate the engagement strategies with laboratories, clinicians, epidemiologists, and the users of the services. Research funding is needed to bolster the development of cheaper and simpler diagnostics in order to have accurate and robust tools. There also is a need for the creation of guidance documents. While it is great that APHL does a lot of this, there are more opportunities to create more documents and tools that can be used by PHLs more expansively in order to improve health equity for TB.

In 1932, some great things happened. Amelia Earhart flew across the Atlantic, Walt Disney introduced Goofy, and Franklin D. Roosevelt won the Democratic nomination for the Presidency. Also in 1932, a PHL was built that is still in use today. A recent survey identified that a lot of the PHLs that were built later than that are in great need of renovation, with 68% in need of renovation or new construction. Dr. Bibbs Freeman's building is only 20 years old and is not sufficient for what they need to do for TB or anything else—not even for people to sit in administrative areas. One of her employees said to her, "The building is dictating our science." Funding must be spent to make buildings safer, accommodate additional space, and consider technological advancements. Some of these buildings cannot be retrofitted to use the technologies needed. They may not have the correct power, water, and/or servers and data infrastructure and cannot be modified in a way that will be cost-effective. The only option is to move to a new building. This table indicates the age of principal US PHLs in years:

Age of Principal Public Health Laboratory (PHL) Building in Years

	Max	Min	Avg
State PHLs, including DC	73	1	28
Territorial PHLs	51	16	36
Local PHLs	89	7	48

In terms of information systems infrastructure, there is limited capacity. Current Laboratory Information Management System (LIMS) systems have varying levels of functionality such as nothing at all, samples tracking only, or full-scale interoperability and reporting. This leads to datasets that are very different going to CDC for the use of determining what programs and interventions are needed for the purposes of improving health equity. As seen during COVID-19, reporting was awkward, hindered, and slow because of the varying levels of interoperability

and functionality amongst all of the PHLs. There also is insufficient security. As technological environments become more advanced, cybersecurity becomes more important. However, the IT infrastructure has struggled to keep pace with the cybersecurity requirements that are needed. Modernization and sophistication are needed for better diagnostics, IT infrastructure needs, servers, cloud computing, electronic test orders, and receipt of data electronically with the samples and to get the data back out of PHLs electronically. This involves not only greater speed, but also improved accuracy. This is very important from a laboratory standpoint, because PHLs spend a lot of time troubleshooting test forms that have been completed by hand that are illegible or cannot be understood.

Some recommendations are to provide funding to continue current modernization efforts for IT hardware, software, and personnel and to remember local and territorial partners. Often funding is allocated to the state-level, but does not diffuse down to the local and territorial levels in the manner expected. Virginia is not a small state and has a great relationship with its epidemiologists. Virginia also is unique because its epidemiologists fall under the DOH, while the state PHL is under the Virginia Department of General Services (DGS). There are situations where the PHL is not brought to the table when there is funding available for diagnostics and IT infrastructure. It would be a great start to consider funding within NOFOs that are available that is specifically earmarked for laboratories, with a requirement to bring laboratories to the table when applications are being submitted. Either by regulation or mandate, bidirectional interfacing should be required for electronic test orders and results to facilitate reporting and sample submission. It is important to note that this is a broad “ask” that will help not only with TB, health equity, and access, but also with a list of conditions that disproportionately affect under-represented communities. Dr. Bibbs Freeman emphasized that in her opinion, this is one of the areas where they could get the “biggest bang for the buck” in TB and more globally.

Regarding personnel, from the PHL framework, there has been historic workforce attrition for various reasons. Those losses are not only the people who perform the tests, but also people who lead those who are performing the tests and those who are providing supporting services. PHL analysts now make a living wage, but the people who are doing data entry are not. It is difficult to justify that data entry personnel are needed when they can provide them with a living wage to perform the job that will then help others in the community. Recruitment of a diverse and qualified workforce is very important. In some cases, there is a lack of personnel to conduct training and sustain the testing being utilized. It is very challenging to obtain and keep personnel in laboratories. This year alone, there have been 4 instances in which Virginia hired someone to work in the clinical laboratories who left within 1 month—not because something happened at the laboratory, but because they did not realize how aggressive public health is. They took the skills that they had and went someplace else to be paid more money to do less work.

As science, skillsets, and technology advance, Clinical Laboratory Improvement Amendments (CLIA) guidelines are excellent for quality assurance in the laboratory. However, they are not sufficient for the modern laboratory. Discussions are ongoing in terms of how to implement molecular testing into CLIA and consider WGS and diagnostics under CLIA, consideration also must be given to how to evaluate personnel who are capable and competent to perform the testing being done in PHLs. Within institutions of higher education, PHL science is not perceived as being urgent. The Division of Consolidated Laboratory Services (DCLS) attempted to create a certificate program and was told very quickly that PHL laboratory science is not a need and that people can go through a Medical Laboratory Science (MLS) program and that would be sufficient enough. While this would help to meet the need partially, the skillset needed in a PHL is somewhat different in terms of broadly understanding how the work being done is affecting the greater population and the uniqueness around that. The DCLS was successful in getting a

PHL concentration under the MLS program. Everyone knows that when budgets are tight, training and education are the first items to be cut. In DCLS surveys, workforce who are leaving indicate the reason for leaving is because they want more training, more professional development, and to learn new things. Dr. Bibbs Freeman emphasized that if that is a way to keep people in the laboratory in order to use them for TB diagnostics and to include health equity, she is all for it. More focus must be placed on training and engagement for all employees.

In terms of some recommendations from a PHL personal standpoint, getting higher education to understand that the public health workforce needs should be considered at the curriculum level in order to create pipelines that will bolster the public health workforce. It also is important to ensure that schools with a variety of diverse populations have the same level of access to information and financial resources to support pipeline generation for PHLs. Departments of education should be held accountable for recognizing the importance of this. Funding should be increased to support competitive salaries and retention incentives like training and professional development. It is important to ensure that grantees integrate inclusion and equity into the culture of their workforce when funds are allocated to them. Finally, programs should be created that engage youth from under-represented groups to expose them to science. People begin to spread the word. When an organization has under-represented people working for them, their families trust the organization. Under-represented people in the workforce can help with policy creation and changes and can be the voice in the laboratory for the community outside of the laboratory.

Equitable Access to TB Diagnostics in the US: A Provider's View

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Dr. Haley provided a TB provider's perspective on best practices for TB diagnosis, reviewed current challenges in US-based TB diagnostics, and discussed recommended action steps for achieving equitable access to currently recommended TB diagnostics. She reminded everyone that TB is the second leading infectious killer in the world after COVID-19. It was first until the COVID-19 pandemic began, but it is likely that TB will soon be first again as an inadequate global response continues.

It is important to note that testing remains the weakest link in the care cascade. Almost 40% of TB cases remained undiagnosed globally in 2021, preventing 4 million people from accessing treatment and allowing the disease to spread.[17] Only 1 in 5 people with TB are bacterially confirmed. Only 1 in 3 people with drug-resistant TB are tested. Approximately 1.1 million new infections and 250,000 deaths are reported among children every year. Existing diagnostic tools are not fit-for-purpose or available where they are needed most. It is surprising and sad to see that diagnostic gaps are greater for TB than for any other infectious disease, and yet it is the leading cause of death (COD) from an infectious disease worldwide. As Dr. LoBue highlighted earlier, racial and ethnic and US-born and non-US-born disparities in TB diagnoses continue to exist. Although the US-affiliated Pacific Islands are not a direct part of the US's responsibility,

[17] Pai M et al, Nat. Microb. 2017

the TB incidence rates in those communities are exceptionally high.[18] There also is significant disparity in Isoniazid-resistant and multidrug-resistant tuberculosis that is much more common in persons born outside the US.

From a provider's perspective, equitable access includes bringing tests closer to home, simplified sampling for pulmonary and extrapulmonary disease, limiting the burden to the patient and the family (e.g., cost, travel, missed work, et cetera), ensuring early diagnosis and treatment for patients in all settings, patient-centered and individualized TB treatment guided by rapid detection of TB and drug resistance, manufacturing where needed and closer to communities that are using it, and rapid implementation of new science so US patients have equal access to diagnostic innovations available overseas.

Looking at the "ideal algorithm," it is necessary to collect a specimen before even getting to diagnostics. There probably are significant inequities in whether an individual even gets the appropriate specimen. Sputum induction for young children may include gastric aspirates or a bronchoscopy. Currently, bronchoscopy is probably limited to those who have socioeconomic status (SES) or who are found in urban centers and are less remote. Extrapulmonary specimens represent a very important issue. A lot of times, patients may be treated empirically and that could mean that they potentially are being managed inappropriately, drug-resistance could be missed, and that definitely can affect their clinical outcomes. The NAAT is very important to do early for patients who are suspected of TB, but it also is an important tool that can be used to help make TB isolation decisions. As found during COVID-19, over-isolation has a significant impact on cost and wellbeing. There also is a growing awareness of subclinical TB in terms of being able to make a diagnosis earlier. Expanding the use of NAAT to smear-negative patients is probably important to consider.

There has been discussion about screening for MDR. Rapid detection of resistance to INH and fluroquinolone resistance is important not only for patients who may have drug resistance, but also to help make a decision about whether a patient can be switched to another drug. There also is frequently inaccurate detection of Pyrazinamide (PZA) resistance. Growth-based technology is tricky, so it is not uncommon to get false positive drug-resistance to PZA. That can mean that PZA may be stopped by a clinician who does not realize it is a false positive. Being able to do molecular testing for PZA can determine whether a patient can continue PZA. PZA's benefit is to shorten treatment from 9 to 6 months, which can have significant outcomes for a patient. In addition to waiting for phenotypic drug-based susceptibility, it is important to know very quickly if a patient is resistant to INH or Rifampin and what else they are susceptible to and how to determine the best regimen for that individual in order to avoid giving them drugs that may cause harm and no benefit. It also is important to make even growth-based second-line drug susceptibilities using minimum inhibitory concentration (MIC) methods much more broadly available. Knowing the exact MIC of an organism can help to determine whether the safest lowest dose is being used for an individual. Having universal genotyping being done for epidemiological purposes is not the same as having rapid full drug susceptibilities at the time a decision is being made on what a patient needs. It is very important to try to figure out how to continue to expand access to truly rapid molecular detection of drug resistance.

[18] https://www.cdc.gov/tb/statistics/reports/2021/default.htm

In terms of LTBI diagnostics, there are millions of people in the US who have LTBI who are not identified. Without treatment, they are at risk for developing TB disease. During a recent collaborative meeting between the NTCA and the APHL, Dr. Haley heard a number of people talk about how in their local health departments, they are not able to access IGRAs. This is such an important tool, especially when a lot of individuals are entering the US from high burden countries for whom the tuberculin skin test (TST) is not an accurate test. Therefore, broad investments are needed for IGRAs at the point-of-care. Furthermore, it is important to support the development of and early implementation when available and to understand that a positive test for LTBI can distinguish between a person who is still infected versus a person who may have cleared the infection, but has a persistent immune response. A test also is needed that can help determine who among those who are infected will progress to active TB and to be able potentially to monitor a response to treatment for LTBI to know that there will be lifelong prevention of TB.

As highlighted by Dr. Cassandra Kelly-Cirino during the recent NTCA/APHL meeting, lack of diagnostics where people seek care leads to missed cases and inequity in diagnosing TB. Regional laboratories, primary care clinics, and hospitals may send samples out to a reference laboratory, which is very slow and could take from several days to over a week. New technology is being explored that might offer the ability to collect samples in a patient's home other than sputum (e.g., oral swabs, breath tests, and others). It is important to put these tools into practice when they become available. It would be beneficial if, as with HIV, a test and treat approach could be taken in which individuals could be tested for TB and begin treatment on the same day.

A survey conducted with state and local health department users who are NTCA members helped to understand who has access to rapid diagnostic tests for diagnosis of TB and using that as a tool to help discontinue isolation. To highlight some of the survey results, 71% of the 68 programs surveyed (e.g., 38 states, 6 large cities, and 4 US territories) responded. Nearly all jurisdictions (n=47/48) reported having access to rapid tests. Of the programs, 44 (92%) reported "all" or "most" areas in their jurisdiction had access, 3 (6%) reported "some" areas had access, and 1 jurisdiction had unknown areas of access. For persons with suspected infectious TB, 31 (65%, n=48) jurisdictions considered negative rapid test results as part of their criteria for discontinuation of isolation, regardless of AFB smear result. About 40 of the 47 programs mentioned having access to the Cepheid Xpert® MTB/RIF assay. Far fewer (n=4) had access to the GenoType MTBDRplus line probe assay that also can indicate resistance to INH and very few had access to sequencing done locally. CDC is doing sequencing through their MDDR service, but it takes time for a sample to go from the PHL to CDC and get those results reported back. It can take even more time if someone is at a hospital and the test has to go first to the state laboratory before it can go to CDC. Some of these delays could be streamlined to make these more available in a truly rapid manner. Although about 50% of respondents reported almost always using RDT, the other 50% only sometimes or never use RDTs.

In terms of accessibility of DST in 2022 (n=58), high burden states have high access to referral of first- and second-line DST. Quite a few states have a medium or higher burden of TB but have access immediately only to first-line DST. There are states in low incidence areas that have to refer all DSTs. Kansas had an outbreak of MDR-TB, which is a scenario in which increased capacity is needed at a local level. Similarly, Georgia recently had a large outbreak of MDR-TB and is having to refer tests to California, CDC, and Florida.[19] While on the surface it

[19] https://www.cdc.gov/tb/statistics/reports/2021/default.htm

may look like there is good accessibility, drilling down to the different types of patients and settings will reflect much bigger issues of accessibility than realized.

Finally, after 5 decades, some new drug regimens are being introduced. While this is incredibly exciting, it highlights the need for even more diagnostics to keep up with that. For instance, it is important to know right away when certain patients are susceptible to INH and quinolones before therapy is initiated. Similarly, determination is needed of resistance for BPaL among drug resistant patients and for some patients who are intolerant or have significant drug interactions.[20] It is important to know from the start that drugs are going to work for those patients. Sometimes it is necessary to move on to creative regimens. Even if a patient has DST, it is important to know a full result.

In *Treatment of Drug-Resistant Tuberculosis, 2019*[21] CDC recommends that molecular DSTs should be obtained for rapid detection of mutations associated with resistance; resistance to fluoroquinolones should be excluded whenever INH resistance is found; and regimens should include only drugs to which the patient's *M. tuberculosis* isolate has documented or high likelihood of susceptibility. *Provisional CDC Guidance for the Use of Pretomanid as part of a Regimen (BPaL) to Treat Drug-Resistant Tuberculosis Disease, 2022*[22] recommends that ideally, molecular DST would be performed to evaluate the presence of mutations known to be associated with first- and second-line antituberculosis drug resistance as well as with newer drugs like bedaquiline. While BPaL is being made available now, this regimen has been in use several years. There is a desire among the community to determine the problem and figure out a solution. Only 1 test is approved by the Food and Drug Administration (FDA) at this time for rapid molecular testing for resistance, which is the Cepheid GeneXpert® MTB/RIF. In many laboratories, this is used only for respiratory specimens and not for extrapulmonary specimens. Some laboratories will use it only for confirming cultures.

Dr. Haley said she was glad to see the rapidly evolving TB diagnostic pipeline that Cassandra Kelly-Cirino presented during the NTCA meeting. Notably, many diagnostics have been developed since 2010. However, the only one the US has access to is MTB/RIF. The WHO is recommending MTB/RIF ULTRA, which is more sensitive for other countries in the world. However, the US does not have access to that because it is not, and may never be, FDA-approved. Consideration must be given to how some of these diagnostics can be moved along and accessed for US patients. Florida is trying to add a screening duplex to allow for more rapid resistance testing of more drugs.

Florida and New York have been working together to get rapid molecular testing up, and is allowing anyone in other parts of the country to send samples to them for free testing as a public heath to public health benefit. Not being funded for that is problematic. In terms of partnerships, they have had 2 patients who have mutations to bedaquiline. This is a growing concern worldwide, which makes it a concern in the US as well. Because of connections through the TB community with a provider at the Baltimore City Health Department who also has worked at Johns Hopkins in academics and does some research in the laboratory, Johns Hopkins Mycobacteriology Research Laboratory stepped up and said they are doing drug susceptibility testing for Pretomanid. For the 2 patients who failed BPaL initially, Florida wanted to know their drug susceptibility and was able to access the Johns Hopkins Mycobacteriology Research

[20] Courtesy of Derek Armstrong
[21] https://www.cdc.gov/tb/publications/guidelines
[22] https://www.cdc.gov/tb/topic/drtb/bpal

Laboratory. Johns Hopkins was willing to do it without charge because there is a need and it benefits them to have more opportunities to get proficient at these tests. This is one way to show that by working together, some of the challenges can be overcome.

Reflecting on Dr. Starks' presentation, Dr. Haley recapped the following issues and suggestions for improving accessibility:

- Cheaper, simpler, and more rapid tools closer to patient
  - Specimen collection (induced sputum, tests based on urine, oral swabs, stool)
  - Rapid detection of at least RIF, INH, quinolones
  - Molecular PZA susceptibility testing
  - Decentralized, increased number of laboratories with capability

- Testing for new and repurposed drugs
  - Validation approval process is way too long; CDC may have results but cannot report out due to CLIA rules—perhaps there is a way to work with CLIA
  - TB experts can interpret "for research only" results for clinical use

- Expansion of rapid molecular testing for determining drug susceptibility
  - Opportunity to leverage investments (e.g., whole genome sequencing)
  - Increase capacity and test availability, decrease turn-around times, clear/rapid reporting of results (laboratory, local TB expert)

- Piecemeal TB testing and awareness of where to obtain testing.
  - Enhance collaboration so that hospitals, clinics, other high-risk community settings send specimens to PHL
  - Raise awareness of PHLs and TB experts as partners
  - Laboratory and local TB expert collaboration on using results to guide treatment
  - Funding for rapid transport of specimens to and between labs

- Workforce development
  - Training and education of staff, providers, laboratorians
  - PHLs, nurses and PH staff to prioritize/track specimens/results (case management)
  - APHL, TB COEs, Local TB Experts, state/local PHL, NTCA, other partners to raise awareness of public health capability

Rapid testing with NAATs has been recommended since 2009. As a clinician who receives many calls from hospitals and providers, Dr. Haley emphasized that these tests are very underutilized. While this seems so obvious to those working in TB, it is important to raise awareness well beyond the public health community. It is important to go back to the basics to help people understand that there is still TB, especially among persons born outside of the US. Some suggestions for improving early diagnosis and detection of drug resistance are to:

- Do more with the "Think TB" campaign, especially in high-risk groups geared toward providers and health settings where initial TB diagnosis is made (or MISSED!)
- Identify best practices for TB diagnosis: what and where
- Leverage existing laboratory platforms for rapid molecular testing
- Use GeneXpert® to end isolation, cost-savings, patient well-being
- Encourage/incentivize referral to PHLs instead of reference laboratories

- Avoid lab-to-lab delays (i.e., direct submission to lab with needed testing)
- Ensure rapid reporting of results to clinician for treatment decisions
- Have TB experts available for interpretation
- Ensure timely follow-up on pending lab results and tracking specimens
- Utilize APHL laboratory diagnostics for providers based on "Understanding Tuberculosis (TB) Laboratory Testing for Public Health Nurses"[23]

It is very exciting that FIND[24] is being used as an arm of the WHO that is seeking to ensure equitable access to reliable diagnosis around the world. A lot of US taxpayer funding is being allocated to FIND through CDC. As a US provider, Dr. Haley would like to see these technologies that are available overseas have a priority for access in the US. To quote Helen Keller, "Alone we can do so little; Together we can do so much..."

ACET Discussion

For this discussion, ACET was asked to consider the following questions:

1. *What are recommendations to HHS and CDC on addressing equitable access to TB diagnostics presented by the panelist?*

Dr. Ahmed asked whether there is a role for diagnostic stewardship as a formal approach to say that every patient who has a sputum submitted should receive a consultation, or if that would be overwhelming.

Dr. Haley responded that it depends upon the jurisdiction. Normally, it is difficult to pick out a group of symptoms that are predictive. It would be helpful to be able to predict whether a patient fits certain criteria that would trigger a consultation. This is tricky and would require a lot more consultation. Some laboratories will do reflex testing if there is a smear positive, but that does not mean that someone who is smear negative and high-risk does not need that as well. A lot of patients get biopsies that are stored in formalin. A lot of people do not understand that CDC has a wonderful infectious disease pathology laboratory that can still try to extract deoxyribonucleic acid (DNA) and make a TB diagnosis and then send it on to MDDR. It is a good idea to consider.

Dr. Loeffler noted that where she works, they are suffering with the problem of commercial laboratories that are located outside of California. Not only do they not do NAATs when they have smear positives, but also they do not always even identify an organism, check susceptibilities, or tell them. There seem to be a lot of opportunities to develop order sets and hold laboratories accountable.

[23] https://learn.aphl.org/learn/course/external/view/elearning
[24] https://www.finddx.org/about-us/donors-and-partners/our-donors/

Dr. Haley replied that a lot of hospitals send samples to reference laboratories. It is not clear why they are sending samples to a place they have to pay for testing when they could send the specimens to a PHL without charge. If the specimens went straight to PHLs, it would be possible to know sooner and the right testing would be done. Sometimes a sample sits in a reference laboratory for a long time before it can be retrieved from a reference laboratory and submitted to a PHL that can do the appropriate testing. She has had cases for which results were not back after 2 to 3 months because the laboratory did not believe the results showing that there was resistance and kept repeating the test time and again.

Dr. Loeffler indicated that this is not a solution in her county because the PHL is very limited at this time. Nevertheless, this needs to be fixed.

Dr. Stout said he was particularly struck by the juxtaposition of Dr. Haley's talk suggesting that testing needs to be decentralized and made available up front and Dr. Bibbs Freeman's talk reporting their difficulties in keeping staff working in a PHL. There is a powerful argument in that what CDC has done with MDDR testing and centralization has worked fantastically. He is impressed with the new MDDR testing that has been rolled out. He asked Dr. LoBue what they are thinking in terms of policies for what is reasonable to centralize for TB diagnostics versus what they think should remain at the local level.

Dr. LoBue responded that if a location is performing only 5 drug susceptibility tests per year, there are proficiency issues and it is not realistic. That is why CDC has tried to encourage states that have low levels to consider referring. That is why the DOT Reference Center was established in California and a fair number of states are using it. There will have to be a balance. There will be places that have high burden where it will be more efficient to test in their own state because they have high proficiency and it is more efficient that way, while states with small numbers probably need to consider other options. There also is the issue of how technology is going to evolve with WGS. If it is actually available in every laboratory and they can do it well, perhaps it will move the needle back more toward decentralization. He thinks this is yet to be determined. Part of the issue with decentralization pertains to funding. It probably will cost more to fund 3 places versus 1 place.

Dr. Starks added that funding is definitely an issue. Ideally, there has been discussion about a world where everyone will have universal molecular susceptibility testing. While this could be done, it still would be based on a culture isolate and COEs could be developed for that purpose. There is not only a sequencing issue, but also there is a lot of upstream and downstream components. From a staffing and resource perspective, the manpower it would take around that to create a system has to be taken into consideration with respect to the need for a CLIA clinical consultation to understand when tests are appropriate, what the results mean, et cetera. That is not insignificant. CDC's MDDR service has been operational since 2009. That piece alone is a considerably intensive component. Even finding a PHL that would want to take that on may be a challenge. At some point, more consideration needs to be given to decentralization, but there are many other caveats to consider that will inform how that eventually shakes out.

Dr. Cattamanchi commented that even before getting to decentralization or centralized testing, there must be agreement about what the standards should be for testing for TB. Dr. Haley crystalized this really well when she said that all people suspected of having TB should have a molecular test and if the molecular test shows TB, they should have molecular testing for resistance to INH and fluoroquinolone and if any of those are positive, a full panel. It is pretty simple, but they are still hearing about smear, high risk, low risk, et cetera. That creates confusion. He would like ACET to articulate what should be the best practice and standard and

then figure out how to work toward that. Regarding FDA approval, many tests are used for which there is not FDA approval for TB. He asked whether some of the tests could be used on a laboratory or research basis. He does not think FDA approval is going to happen and there will just be a bigger gulf with what is happening internationally as an increasing number of tests are being reviewed and endorsed by WHO in their plan for 2024.

Dr. Belknap indicated that the short answer is that someone could go through the process of validating internally. However, this would be a non-reimbursable test. To be expected to do this at scale and not be paid for it, a laboratory is unlikely to take that on. In prior ACET meetings, there have been conversations with ACET's FDA liaison regarding the barriers to getting tests marketed. A representative from Cepheid presented during one ACET meeting to talk about GeneXpert® and learned that the first step in the process is that the manufacturer needs to go to the FDA and understand what would be needed. Cepheid identified a barrier as FDA requiring them to have data generated in the US population, which is too much work. In one of the ACET discussions, a suggestion to address this regarded the potential to partner with TB programs that are seeing and have access to patients and specimens in order to generate the data more efficiently and at less expense. He followed up with the representative from the December 2022 ACET meeting and received a response that Cepheid is still talking about it internally. It is not just FDA—manufacturers also have to be convinced that this is worth doing.

Dr. LoBue clarified that molecular tests are recommended universally for diagnosis and drug susceptibility testing. It is not about what is recommended as best practices. It is about how they are implemented. There are variations in terms of which patients are tested, which are made at the laboratory levels. The ACET might be able to make recommendations around cost or workload, but the testing recommendations are quite clear.

Dr. Cattamanchi suggested that perhaps communication around what the expectations should be needs to be disseminated more broadly.

Dr. Glover pointed out that it is a tedious task for a laboratory to take on a validation process, especially when facing workforce shortages and turnover. The people who will validate a test will be the same people who will be performing the routine work. That is really difficult because there are not dedicated methods development staff who would focus only on developing and validating assays.

Dr. Haley indicated that some laboratories are ready to begin doing this work. All laboratories are not going to be ready and may not be appropriate.

Dr. Starks added that some settings lack the tools or appropriate isolate panels to be able to validate some of the tests. They have had some conversations with WHO from the global and US perspectives about trying to create isolate panels that will allow for broader access to help support these efforts.

Revision of the Tuberculosis Technical Instructions for Panel Physicians and Civil Surgeons

Joanna Regan, MD, MPH
Medical Officer, Immigrant, Refugee, and Migrant Health Branch
Division of Global Migration and Quarantine
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Dr. Regan indicated that she is a pediatrician by training and have been at CDC for about 14 years where she currently works on writing technical instructions for TB and several other diseases. In terms of background, Dr. Regan began by providing the following definitions:

- Immigrant/lawful permanent resident (LPR)/:Green-Card holder"
  - Persons admitted to the US on an immigrant visa issued overseas (N=500,000 annually)
  - Persons who adjust their immigrant status inside the US (N=500,000 annually)
- Refugees
  - Persons with a well-founded fear of persecution if they return to their country of origin who are officially processed overseas in terms of medical examination
- Panel Physicians
  - Perform the immigrant medical examination for these immigrants and refugees overseas
- Civil Surgeons
  - Perform the status adjustment medical examination in the US
- Technical Instructions
  - Define how the medical examination is performed
  - Written by CDC DGMQ
  - The Tuberculosis Technical Instructions (TBTIs) were last updated in 2018

Regarding the process of TBTI, a Discussion Group was formed several months ago with representatives from the various organizations, including the following:

- DGMQ: Joanna Regan and Drew Posey
- STOP TB USA: Amee Patrawalla
- DTBE: Terry Chorba, John Jereb and Margaret Oxtoby
- ACET: Ann Loeffler
- NTCA: Jennifer Flood, Lisa Armitage, Amy Painter

In terms of the timeline, the Discussion Group was formed between February and March 2023. From April through August 2023, the Discussion Group will engage in monthly meetings about revision topics. The new TB TIs will be posted online in Fall 2023. Implementation of the new TB TIs is planned to begin on October 1, 2024.

The major change anticipated for the new TB TIs is the addition of IGRA in adults. The current IGRA usage for the US screening program is that Panel Physicians are required to perform IGRA in all children 2-14 years of age in high TB burden countries. "High burden" is defined as any country in which the number of cases reported by WHO is ≥ 20/100,000 people or more. The Panel Physicians move on to a chest x-ray only if the IGRA is positive, the children have signs or symptoms of TB, or they have known HIV infection. The Civil Surgeons in the US are

required to use IGRA in everyone 2 years of age and older. All children 2–14 years of age have a medical history, physical exam, and IGRA test. Those with positive IGRA, signs and symptoms of TB have a chest x-ray. Those with a chest x-ray, signs or symptoms of TB, or known HIV infection had 3 sputum samples taken, 3 sputum smears, and 3 sets of cultures. Those with positive cultures move on to DST. In high or low burden countries, adults 15 years and up receive medical history, medical exam, and everyone gets a chest x-ray. If the chest x-ray is suggestive of TB, they have samples and cultures taken. Those with positive cultures go on to DST.

The major change in the new TB TIs would be IGRA testing in high burden countries in adults that already were doing IGRA in children. IGRA would be in addition to chest x-ray for adults. Although IGRA cannot differentiate active TB disease versus LTBI, it still is recommended as part of the workup for active TB disease. Despite overall case count declines in the US, the number of TB cases among non–US-born persons living in the US for 20 years or longer before diagnosis increased during 2021 compared with average case counts during 2015–2019, highlighting the importance of evaluation and treatment of LTBI to prevent progression to TB disease. Of non-US-born cases, 92% are thought to be reactivation as opposed to recent transmission.[25]

LTBI screening and treatment are recommended in the US. The USPSTF recommendations were published on May 2, 2023 demonstrating that screening for LTBI in adults from high TB burden countries without other risk factors is recommended and is supported by the evidence.[26] The WHO now recommends LTBI treatment.[27] Program-managed LTBI treatment is also considered a key intervention for low TB burden countries that are pursuing TB elimination. However, WHO emphasizes that testing positive for LTBI or receiving TB preventive treatment should not affect the immigration procedure or cause denial of entry.

Several studies demonstrate that treatment of LTBI is cost-effective. For instance, Tasillo A et al showed that it is cost-effective to test and treat LTBI[28] and Jo et al showed that it is cost-effective to test and treat in the high-burden states of California, Florida, New York, and Texas.[29] Programs are treating LTBI domestically. Among applicants diagnosed with LTBI seen by health departments from 2007-2019, 17,229 (66.5%) initiated and 9185 (35.4%) completed LTBI treatment. Significant improvements were observed in initiation and completion of treatment after the 2018 change in the Technical Instructions to require IGRA from TST.[30] It should be noted that in the CDC program, the immigrants would be paid for the IGRA testing overseas and their information will be transmitted to health departments in the US.

There are a number of challenges for IGRA testing in adults overseas. CDC does not have control over the costs of IGRA, which varies greatly from country to country. CDC has some knowledge about this from the children who are currently being tested. IGRA testing might add to the time exams take. It is important to stress that a negative IGRA does not rule out TB

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[25] *MMWR* 2022 Mar 25;71(12):441-446, Filardo et al
[26] https://www.uspreventiveservicestaskforce.org/uspstf/document/RecommendationStatementFinal/latent-tuberculosis-infection-screening
[27] https://www.who.int/publications/i/item/9789240001503
[28] Tasillo A et al. Cost-effectiveness of Testing and Treatment for Latent Tuberculosis Infection in Residents Born Outside the United States With and Without Medical Comorbidities in a Simulation Model. *JAMA Internal Medicine*, 2017
[29] Jo et al, Model-based Cost-effectiveness of State-level Latent Tuberculosis Interventions in California, Florida, New York, and Texas. Clinical Infectious Diseases, 2021
[30] Wang Z, et al. US Postarrival Evaluation of Immigrant and Refugee Children with Latent Tuberculosis Infection Diagnosed Overseas, 2007-2019. Journal of Pediatrics. 2022

disease. There is now a system called eMedical that will allow business rules to be set to prevent errors and Panel Physicians will not be able to rule out TB due to a negative IGRA test if there are signs, symptoms, or an abnormal chest x-ray. This will increase the number of immigrants and refugees with LTBI who are referred to health departments. In terms of what can be done to improve treatment of LTBI domestically, Panel Physicians can educate applicants to seek LTBI treatment and TBTIs can provide resources for how to access LTBI care in the US. Additional topics for which the Discussion Group proposes to make updates include the following:

- Treatment of LTBI overseas versus domestically
- Civil Surgeon algorithm in low-burden countries
- Video Directly Observed Therapy (DOT) versus the currently required in-person DOT
- Molecular tests and requirements for use
- Second-line DSTs
- Stool testing in children

ACET Discussion

For this discussion, ACET was asked to consider the following items:

1. *Does ACET have any further comments on the revisions presented by Dr. Regan?*

Dr. Belknap asked whether Dr. Regan could share whether there have been any discussions around offering treatment pre-travel.

Dr. Regan indicated that this is one of the topics the Discussion Group has been considering and for which numerous challenges have been identified. The WHO recommends against it being required. Based on the regulation, CDC cannot require treatment of LTBI before immigration. However, many people agree to that and are curious about voluntary treatment of LTBI overseas. The challenge is with it not being required are than then CDC cannot have people come back in and there is no way of recording it. Many people fly to the panel site to get their exam. If they are diagnosed with LTBI and treatment was offered at that time, they would then fly back home with a prescription for treatment. In most cases, CDC would not be able to contact most cases. This means that there would be no way to engage in follow-up or transmit the results of that treatment. CDC treatment and testing of active disease requirements differ from those of other countries. For countries that are not now treating LTBI, adding that element to the discussion is something additional to ask for from countries.

Dr. Narita asked whether there have been successful trials of treatment of LTBI overseas and what the denominator is for the number of people who are being seen by Panel Physicians who would need follow-up in the US.

Dr. Regan replied that while she did not have that exact number on hand, she would find out and report back to the ACET. It would be many thousands. The 500,000 immigrants seen overseas is not exclusive of just the high burden countries.

Dr. Sosa-Bergeron asked how adults with a positive IGRA and negative chest x-ray would be classified.

Dr. Regan indicated that they would be classified as B2s.

CAPT Burton asked whether the cost being borne by the immigrants and the fact that costs vary widely are anticipated to be barriers to implementing the new guidance, and what would happen for those who are not able to afford the cost of IGRA.

Dr. Regan indicated that it would be a requirement, so they would need to be able to pay for it. The cost of the exam in general is monitored and negotiated to some degree by the Department of State. At this time, FDA-approved IGRAs are required in other countries. Lower cost options are being explored. CDC's International Panel Physicians Association (IPPA) has explored public health pricing for the IGRAs with mixed results. Sometimes country officials or organizations where Panel Physicians work may be involved in setting the price within their country.

Dr. Loeffler noted that some of the Panel Physician sites are very busy and would do a lot of IGRAs, while others may only do 1 test a week. The sites that are not as busy would lead to higher prices for the individuals receiving the test and would delay the amount of time they would have to spend in the vicinity of the site.

Dr. Regan added that some countries have very few children being screened, which has driven up the price and increased the delays. In some cases, adding adults may reduce the price somewhat.

Dr. Bloom inquired whether there have been Qiagen shortages, Dr. Regan indicated that this has been a challenge during COVID. There has been discussion about reverting to TST versus having no tests done. Adults still would receive the chest x-ray regardless. Right now, there is good availability and there are very few countries on the high burden list. The larger volume countries are experiencing issues with availability, which is another reason to consider using non-FDA-approved testing.

Dr. Loeffler indicated that the Discussion Group had a lively conversation about the use of vDOT. While the group initially had a lot of reluctance, they brainstormed about ways that it could be person-centered and with good quality control for compliance.

ACET Business Session 1

Business Item 1: Approval of Previous ACET Meeting Minutes

A motion was properly placed on the floor by Dr. Sosa-Bergeron and seconded by Dr. Stout to accept the minutes from the December 2022 ACET meeting. With no further discussion or changes, the motion to accept the minutes as written carried unanimously with no abstentions or opposition.

Public Comment

No public comments were provided.

Day 1 Wrap-Up

Robert Belknap, MD, ACET Chair
Medical Director
Denver Metro Tuberculosis Control Program
Denver Public Health

Dr. Belknap expressed gratitude to everyone who attended the ACET meeting throughout the long day. The following new business topics were proposed for consideration during the Business Session on the second day of the meeting:

- Respond to the Request For Information (RFI) Congress sent out on June 12, 2023 seeking input from stakeholders on the challenges related to ongoing drug shortages:
  - Questions 6 and 14 appear to be the most relevant to TB and ACET.
  - ACET members agreed to review the Congressional letter overnight and consider possible input.
  - Responses are due to HHS by July 7, 2023.

- Establish a new ACET Working Group (WG) focused on diagnostic and drug challenges:
  - Such a WG would be charged with evaluating the barriers and questions related to accessing drugs and diagnostics as a way to identify creative solutions to improve this persistent and unrelenting challenge, with the final output to be specific advice to CDC regarding potential solutions.
  - Drs. Sosa-Bergeron and Loeffler volunteered to join this WG if established.
  - Advocate through this WG or another means for a narrow import waiver so that US TB programs could procure directly from the Global Drug Facility (GDF) considering that the US government is a major funder and would be interested in being able to access something that is benefitting from its own funds while programs in the US are struggling.
  - The TB Roundtable would be happy to convene or co-convene with ACET a specific WG or series of exploratory conversations. Follow up with Elizabeth Lovinger.
  - NCTA/California TB Controllers Association (CTCA) have an existing WG on which CTCA is the lead. The advantage to leveraging this existing mechanism would allow for access to DC and advocacy partners. There is existing work being done that could inform the broader discussion no matter who convenes the group. Follow up with Donna Wegener.
  - Other possible groups include the Association of State and Territorial Health Officials (ASTHO), National Governors Association (NGA), National Coalition of STD Directors (NCSD), American Academy of Pediatrics (AAP), American Medical Association (AMA), TB survivors.
  - ACET could have a representative on other WGs who could inform the full ACET membership.
  - While TB should be part of the conversations that are occurring, ACET as a committee is prohibited from lobbying. ACET's role and goal is to ensure that TB is included as a priority for any solutions to address drug shortages. ACET can provide information and educate Congress but cannot request legislation. Providing advice to HHS through the CDC is different and falls within ACET's scope.

With no further business posed, the meeting was adjourned at 5:16 PM ET. The ACET stood in recess until 9:00 am ET on June 21, 2023.

June 21, 2023 Opening Session

Marah E. Condit, MS
Public Health Analyst | Advisory Committee Management
Office of Policy, Planning, and Partnerships
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Philip LoBue, MD, FACP, FCCP
Director, Division of Tuberculosis Elimination
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention
Acting ACET Designated Federal Officer (DFO)

Ms. Condit called the meeting to order at 9:00 AM ET on June 21, 2023 and provided meeting instructions. Dr. LoBue welcomed participants to the second day of the ACET meeting. He then conducted a roll call to confirm attendance of the ACET voting members, *ex-officio* members, and liaison representatives. He reminded everyone that ACET meetings are open to the public and that all comments made during proceedings are a matter of public record. He informed the ACET members to be mindful of their responsibility to disclose any potential COI, as identified by the CDC Committee Management Office, and to recuse themselves from voting or participating in discussions for which they have a conflict. The roll call confirmed that the 18 voting members and *ex-officio* members in attendance constituted a quorum for ACET to conduct its business on June 21, 2023. No additional COIs were declared and quorum was maintained throughout the meeting.

Challenges in TB Diagnostics and Treatment—Provider Education and Access

Joseph Burzynski, MD, MPH
Bureau of TB Control
NYC DOH Health & Mental Hygiene

Kristin Bertrang, RN, MSN
Nebraska TB Program Manager
Nebraska DOH & Human Services

Cherie Stafford, RN, MSN/MPH
TB Nurse Coordinator
Arizona Department of Health Services

Connie A. Haley, MD, MPH
Medical Consultant
Southeastern National TB Center

Panelists were provided a list of questions in advance and were asked to consider and provide input on survey questions during this session regarding challenges in TB diagnostics and treatment and provider education and access. The 4 primary questions included the following:

1. What are the biggest challenges your jurisdiction faces in getting diagnostic testing for patients?
2. What are your biggest challenges accessing TB treatment?
3. What strategies have been most effective in communicating with healthcare providers to improve access to testing or treatment?
4. What can CDC do to optimize or strengthen strategies that have worked?

Each panelist provided a brief overview of their challenges, followed by input from ACET members during the discussion periods. In the interest of time, Questions 3 and 4 were combined.

1. ***What are the biggest challenges your jurisdiction faces in getting diagnostic testing for patients?***

Dr. Burzynski reported that one issue New York has is that AccuProbe has gone out of business, which is going to increase the time for identification of organisms in the Mycobacteria Growth Indicator Tube (MGIT). Another issue is that some locations that have low levels of TB are now not performing any in-house work. For example, Dr. Neil W. Schluger hospital in Westchester stopped doing smears. While they did not previously have the ability to perform NAAT, that changed in the last 6 months when they brought GeneXpert® into the hospital to resolve the issue of the increase in TB cases and suspected TB cases in the region. The Wadsworth Center state PHL has brought in next-generation sequencing, which can be used directly with specimens instead of having to wait for culture.

Ms. Stafford indicated that Arizona's biggest challenge is when patients present outside of the public system, particularly when samples are sent for testing to commercial laboratories outside of Arizona. Sometimes the laboratory test needed is not ordered or is not available. For instance, DSTs may not be ordered. As a nurse, part of her job is to stalk samples. Results can be delayed if they have to wait for a reference sample to be sent to the state laboratory in order to set up DSTs. It can be quite a challenge to submit orders or find out what was ordered. They also have run into roadblocks obtaining rapid molecular results. This ranges from a commercial laboratory not offering any NAATs for smear positive sputum samples, which results in nurses trying to obtain other samples in order to perform tests in-house. While that works, sometimes the only sample that is smear positive that actually has the presence of MTB is at the commercial laboratory. Some commercial laboratories test only for INH mutations, which is concerning sometimes because they need to know if a patient potentially has MDR in order to address treatment and avoid leaving a patient in a holding pattern. It would be beneficial to automatically see what mutations were identified to help providers know what to do next. She also has to track down samples to submit to the CDC MDDR, which is particularly challenging outside of Arizona. She looks forward to hearing from others about how Arizona can use WGS to perform testing in-house, which would help with the delays due to logistics. There is a lot of Valley Fever in Arizona. It is not uncommon to see people who were born in other countries who have a high risk for TB exposure who have been diagnosed with Valley Fever, who never got better. One goal is to get the message out that if someone has Valley Fever, to think TB simultaneously. People with Valley Fever in Arizona are 52 times more likely to have TB than the general population, while 9% of TB patients are also diagnosed with Valley Fever. The cost of IGRA is prohibitive for small, rural areas.

Ms. Bertrang emphasized that being in a rural state is very unique. It makes TB overall feel very challenging at times. Nebraska does not have any public TB clinics, so private providers are used for management. A major problem is provider knowledge about what to order. A lot of education is needed, especially in rural localities where TB may be uncommon. Providers may be managing all diseases and TB is just another thing they have to know, so education regarding diagnostics is very important. She receives a lot of calls about what to do. Nebraska does not have any place that can measure TB drug levels, but finding places outside of the state that will accept their payments is an issue. Finding laboratory providers that will work with them, especially in rural localities, can be very challenging—especially if they are collecting

things such as drug levels.

Dr. Haley noted that she was representing the National Society of TB Clinicians (NSTC). She conducted an informal survey of the members of the NSTC. She posed these same 4 questions to them and requested that they send back some tips, which largely reinforced what had already been said during this session and some of what was discussed the previous day. Delays in getting diagnoses is very much related to a lack of thinking about TB. At a high level through CDC and at a lower level from local TB public health, efforts must be made to continue to raise awareness that this is a persistent problem. There are approximately 8000 cases a year, which can pop up anywhere—even in low burden jurisdictions. That is even more challenging in areas that are not likely to see TB because it is more likely to be missed. Raising awareness among providers, and in states that do not have a TB Specialist or TB Medical Director where TB might be pushed out to the private community, is important because a lot of delays can occur that have clinical consequences. There also was significant concern among survey respondents regarding lack of awareness of what testing is available and what should be ordered. Challenges with specimen collection also was mentioned, especially among children. People also talked about challenges with getting specimens back out of referral laboratories and where to send tests, lack of access to therapeutic drug monitoring, lack of access to IGRAs, inappropriate use of IGRAs, how to handle discordant drug testing for PZA, awareness of heteroresistance and what to do about it, how to get resources to help encourage appropriate diagnostics, extra funding for laboratories and programs, and more.

Question 1 Discussion Points

- While practitioners want to do the best they possibly can for TB patients in terms of prompt diagnosis and treatment, TB has become a rare random bad thing (RBT) problem in many jurisdictions where it is not commonly seen. There is a balance between the ability to provide all of the resources possible in terms of diagnostics and therapeutics versus the reality on the ground that TB is uncommon in many jurisdictions. Allocating resources to all of these activities, resources will be taken from elsewhere. There is a lot of literature on diagnostic delays in TB, but perhaps there would be value in obtaining current data on the actual impact of all of these factors on patient care. To justify doing more in terms of providing resources, diagnostics, et cetera, there needs to be a more solid quantitative argument for that.

- These questions are often posed on a global stage, but targeting similar research to domestic issues is very important. While global support should not be diminished since TB is such a major issue, the same kind of attention should be paid to what is occurring in the US. Systems-based linkages to care are needed, including specimens and results. Rural US especially needs that type of consolidated, centralized, or regionalized effort.

- For hospitals that have to send out specimens for smear or NAAT, it seems that having rapid access to a GeneXpert® would reduce isolation time in hospitals and lead to quicker discharges. Perhaps a study could be done on this.

- There is some evidence in hospitalized patients for the use of molecular tests because it shortens duration of isolation. On the outpatient side, accessing rapid diagnostic tests to minimize isolation for individuals also is incredibly important. Lost work and all of the challenges placed on individuals who have to be in isolation outside of a hospitals in rural

settings or otherwise is incredibly difficult. Having access to rapid diagnostics to allow people to safely return to work, school, and life also is important and can be quantified.

- To combat some rural issues, telehealth can be invaluable. TB Consultants and Primary Care Providers (PCP) can see patients via telehealth, which can improve care for TB patients in rural areas. One problem with telehealth is not being licensed in other states. Perhaps multistate licenses could be explored in order to be able to conduct telehealth regionally. Providing telehealth with support from experts seems like an easy fix and an easy solution to implement.

- Some of the data for this current question may be found at this URL: https://www.tbcontrollers.org/docs/resources/NTCA_APHL_GeneXpert_Consensus_Statement_Final.pdf

- Consideration should be given to the workforce. For instance, nurses are spending hours trying to track down where a specimen is, what labs have been ordered, how the results can be obtained even if they are not the order provider, et cetera. That is time that they are not spending with patients or collaborating with treating providers, which is a detriment to patient care and difficult to quantify.

- The public health model has been reactionary and not necessarily proactive. When TB cases appear in rural areas, it feels like "reinventing the wheel" each time. Putting fast-track procedures in place would be beneficial. It is important to share experiences across counties and states in order to be ready to go. That does not necessarily mean that diagnostics have to be in every place, but it would be helpful to know where to send specimens, who to call, et cetera. Getting better and easier access to complicated diagnostics is probably not realistic for many rural areas so that needs to be considered. An expert who knows where they are and how to access them and streamlining that system is key.

- Nurses are often working without a state or local TB medical person, and they are not always treated well. Sometimes private doctors are under the impression that a public health practitioner must not have been smart enough to get into other settings. Nurses in the field in particular need to be empowered by having someone to turn to, knowing where to go, and not having to be the one who is trying to work with a private provider who says something does not need to be ordered when it does or is using a regimen they think is right that is not.

2. What are your biggest challenges accessing TB treatment?

Dr. Burzynski said that the biggest challenge for New York has been procurement of drugs. Last year they had difficulty obtaining INH for quite a while, but then something happened and they received a "boatload" of it. While they are fine for now, it always is worrisome that they will not be able to obtain all of the drugs that are needed. Procurement of MDR drugs is a difficulty. New York is fortunate to have someone who is specialized in this now and knows all of the people to call and all of the forms to fill out. It is still difficult work that takes time and is probably much harder for places that do this once a year.

Ms. Stafford reported that stockouts and supply chain issues impact all first-line drugs in Arizona. Several Arizona jurisdictions have fulltime TB clinics and almost all of them have mentioned having issues obtaining first-line medications at some point, which often has to do with supply chain issues. Rural jurisdictions do not keep TB medication stock on hand because

it is so rare for them to have a need for it. They have to order at the time that someone actually needs it. Pediatric formulations pose a major problem, particularly because it is very difficult to get these medications into children. It would be extremely beneficial to have access to the same medications that are available overseas, perhaps through some type of special designation. Arizona also has challenges in obtaining second-line medications that result in delays in initiation of appropriate treatment. This is even more challenging in rural areas. Arizona Department of Health Services has a plan to provide support to rural areas to obtain those medications, but it is still very challenging. Linezolid is particularly problematic because of the need to follow a set protocol. While there are studies assessing appropriate dosages, there is no standardized dosage and drug levels must be measured. This is not feasible in rural communities.

Ms. Bertrang echoed all of the previous comments. Nebraska is different in that it uses private pharmacies for TB treatment, so she has a lot of agreements with pharmacies across the state. They are few and far between because they do pay Medicaid pricing. They have Bedaquiline access, which is significant in terms of releasing someone from isolation. It is not uncommon locally for all of the drugs not to be given at a pharmacy, which requires going back to get the other drugs. There are few compounding pharmacies. She has gone out of state to find compounding pharmacies for pediatric situations, but it is difficult because lead time is needed. If someone is leaving the hospital sooner than expected, medications are needed immediately.

Dr. Haley indicated that this was discussed at the NTCA Board meeting recently, during which they had the opportunity to talk to Dr. LoBue and the DTBE team. The primary clinical issue discussed was the inability to obtain drugs, which leads to delays in starting treatments and potentially using regimens that have greater risk of toxicity or require a longer length of treatment. While she did not know if there are compiled data about whether delays impact patient outcomes, individual case studies certainly suggest that this is problematic. Prolonged isolation resulting from 2 to 4 weeks to receive a drug is absolutely detrimental to a patient in terms of their mental health, their family, stigma, inability to work resulting in loss of resources, et cetera. Drug stockouts are typically unexpected, sporadic, and may be unequal from one jurisdiction to another. A better tracking and forecasting system would be extremely beneficial. Another concern is that one jurisdiction may be able to get medications and another may not, but they cannot share medications or take/mail them across jurisdictions, from one county to another in some states, or across state lines. While the National Stockpile is a wonderful option for medications, it is not full at the moment because of drug stockouts and other issues and it is not accessible to them. When medications were released from the National Stockpile, they were fairly close to the expiration date. While it is understandable that the National Stockpile may not want to release medications and then not have any for an emergency, when a patient is in need of drugs and there are drugs in the National Stockpile, it seems better to put them into circulation than to have them sitting for a scenario that might be worse. The rules regarding access need to be made clearer. For instance, Guam and some of the US Pacific Islands may be able to acquire medications from WHO through the GDF for leprosy, but they cannot get medications from the same source for TB. Another issue is that states often can set up only one contract with a company for a specific drug. Someone suggested that perhaps CDC could put something in its NOFOs to have one contract and a back-up contract in case there is a stockout to avoid a long contracting process that results in treatment delays. Access to Bedaquiline is much too complicated. It is very difficult to tell a patient that they have a deadly form of TB with drug-resistance but that it will be several weeks before they can be treated, but that they can be given something that is less effective and more toxic to get them out of isolation. This puts patients at risk when there is something better. These are difficult challenges for clinicians to deal with.

Question 2 Discussion Points

- Representatives from pharmacies, pharmacists, pharmaceutical industry, and distributors are missing from the conversation. Shortages often are local and are the result of a distribution challenge. This is resulting in rationing and is detrimental to patients.

  - Dr. Neela Goswami (CDC) specifically designated pharmacists as consultants in the last funding cycle from each of the 4 centers and has been convening them once a month. They do bring a different point-of-view and advice. This group has been discussing compounding issues. She invited those who are interested to join the COE pharmacist meetings.
  - A lot of this is falling on NTCA staff and it is a lot of work. While it is wonderful that Dr. Neela Goswami is trying to find solutions within CDC, having more guidance and leadership from CDC would be helpful in terms of others taking on some of this responsibility. Pharmaceutical companies may be more willing to communicate with someone at CDC.

- EMRs were started in 2011. One premise of that was to have a one-stop-shop where medical providers could obtain information on all patients without having to go through the onerous request for medical records and so forth. That has never come to fruition, but perhaps ACET could implore HHS to assess this. There are scenarios in which nurses and clinicians are not aware of what the appropriate steps are. This could be strengthened with states and health departments. Partnerships are needed with states to improve their communications and set up protocols with rural hospitals, free clinics, and so forth. An example of partnerships are AMA and American College of Chest Physicians (CHEST) who also could disseminate information to the physician population to increase awareness of what is most current. Solutions are needed to maximize what is already available, but this is getting lost in the conversation. Perhaps ACET could assemble solutions and actions that could be put into place in order to solve some of the issues that have been identified.

- While a suggestion was made that perhaps ACET could address the issue of sharing medications, it was noted that this is federal rule 340b that states that medications may not be shared among separate 340b entities as this is considered to be diversion. Neela Goswami indicated that there is a 340b contact who presented to CDC at one time, was willing to talk, and noted that exceptions are possible.

- If TB was not a chronic and slow disease and instead was an outbreak type of acute disease, there would be a way to quickly get medications to where they need to be. Perhaps there are ways that ACET can point out the urgency and the need among individuals who are awaiting treatment.

  - Dr. LoBue indicated that they went to CDC and were told “no.” DTBE has gone to the CDC Drug Service, the Strategic National Stockpile (SNS), and pretty much everyone on the planet and have gotten nowhere. They are left with their own stockpile, for which they have an interagency agreement with another federal agency and have to purchase the drugs. There have only been 100 patients in the US, but the cost was $2.2 million for Bedaquiline. That is just not practical. At one time, there was a considerable amount of INH in the stockpile, of which 88% was destroyed because programs would not take it. DTBE cannot purchase Bedaquiline at $22,000 per course and destroy it. That would be criminal and is just not a solution. While a suggestion was made about continuous

rotation, Dr. LoBue emphasized that this is not how the stockpile works. They are not going to buy a single course of Bedaquiline. They buy quantities of Bedaquiline and it will sit there until somebody asks for it. If it does not get used, it will be destroyed. There is a possibility that DTBE could take $2.2 million from the cooperative agreement, which means each state will have a 3% cut. He cannot even guarantee that it is going to be there when someone calls for it. This is a very risky proposition.

3. ***What strategies have been most effective in communicating with healthcare providers to improve access to testing or treatment?***
4. ***What can CDC do to optimize or strengthen strategies that have worked?***

Dr. Burzynski indicated that New York has a TB hotline for direct calls, which is plastered on all materials, is on their website, and shared every time they go out to speak. Most doctors throughout the city know how to access that. They have someone answering the phone to field the calls they receive from doctors, providers, and infection control nurses around the city. That has been very effective. They also engage in grand rounds where they speak in front of residents and fellows at various hospitals. They speak with nurses at the same hospitals to talk about reporting and infection control policies. Another strategy that has worked pretty well this year is the creation of an LTBI detailing kit. They have been visiting private providers and FQHCs to talk about testing and treating LTBI, which has been effective. It also has been eye-opening in that many providers who do not diagnose and treat TB all of the time are having a lot of difficulty doing this. Some do not know about short treatment regimens. Many are still using TSTs. Some of that is due to lack of knowledge and some of it is not being able to pay for the IGRAs for people without insurance and people whose insurance will not cover it, which is limiting testing. Directly going into the community with a detailing kit and speaking to people directly has been effective, realizing that not everyone will be able to do this. In terms of what CDC can do, the CDC website is very helpful and he hopes it continues. It is user-friendly, current, and accurate. It would be beneficial for CDC to include other medical specialties that do not see TB as much in dissemination of educational materials, such as OB/GYNs.

Ms. Stafford indicated that the tactic in Arizona is to go to their target audience instead of having them come to the Department of Health Services. The reality is that there were over 11,000 cases of Valley Fever last year versus 154 TB cases. In 2020, she did a poster that was accepted and then COVID happened and she did not attend the conference where she was to present the poster. She plans to try again so that she can go to the target audience. They also build relationships with other core groups, such as the Jail Nurses group. She also reaches out to the Association for Professionals in Infection Control and Epidemiology (APIC) who know her by name. She is also part of an Immunization Conference because they do a lot of employment screening, which has been a good place to deliver messages. She also has partnerships in the HIV space and is always seeking new places to spread TB knowledge. As a nurse, it helps her to have access to a COE. She appreciates the requirement to have a Nurse Coordinator at the state-level, because her job basically is about trying to connect people. She advocated for having more nurses at the leadership level, given that they bring a different perspective about how to work as a team. While rural areas may have a doctor who is writing orders, nurses in those areas are doing everything. She is a major fan of order sets, which she would like to standardize so that when rural hospitals are doing the work-up, it automatically does TB and they cannot cancel it. In terms of future strategies, reporting requirements for detecting mutations on laboratory reports would be great. If they knew which probe in the GeneXpert® that has a mutation, it would provide additional information that would be quite helpful. The current reference laboratory system is great and she really appreciates the service. Within public health,

CDC is doing a good job and provides access to the tests that are needed. Logistically, it would be great to have WGS at the PHL system because it would cut down on time by a week. She also appreciates CDC for funding the COE and looking into pediatric formulations.

Ms. Bertrang said that one of the successes in Nebraska is telehealth, given that the state is so rural. One of their consultants serves on the Mayo Team for clinical consults. To have that expert in a rural state is invaluable to serve their patients. They take advantage of a variety of educational opportunities. If they identify a problem in an area, they focus on education. This can be hard to predict due to the rural issues they face locally. They engage in speaking opportunities, such as with APIC. She has a good relationship with the Statewide Corrections Director and she is speaking at the Infectious Diseases Society for Nebraska (ID Nebraska) in August along with their consultant. Taking advantage of those types of activities provides great opportunities with the funding from CDC. In terms of CDC efforts, she could not do her job without the COE. They have had some highly complex situations for which the COE has helped guide them in treating the patient effectively and in the best way possible. She also appreciates CDC's LTBI resource for the primary care provider, which she uses several times a week to field calls about how to take care of patients with LTBI. Referencing Page 23 of the laboratory guidelines is invaluable in terms of doing her job. In terms of what CDC can do, she would just say keep up the great resources.

In terms of strategies that were most helpful, Dr. Haley said she hears repeatedly that direct communication is effective. Establishing a direct line of communication can help to raise awareness and build capacity. This is done a lot through the COEs, but some of this has to be local. More support with setting up processes or guidance would be helpful. Creation of fact sheets and toolkits is starting to fall pretty heavily on NTCA. The LTBI Guide for Providers is an excellent resource, but something similar is needed for diagnostics and drug alternatives. Simple but accurate "how to" information would be very helpful. Leveraging CDC's knowledge of the federal system in terms of who to contact for certain things would be helpful. She understands that CDC cannot necessarily put a lot of Bedaquiline in the stockpile, but perhaps the agency could provide information about the bureaucracy in terms of who to contact about 340b to help change the regulations so that drugs can be shared across jurisdictions, and how to encourage CLIA to lighten up on some of the requirements for in-house testing or reporting for research only. Perhaps even some funding could be allocated through contracts to others such as NTCA to engage in activities that CDC is not permitted to do as federal employees, so that NTCA could take on more responsibilities without volunteering more time. Best practices should be compiled and shared.

Questions 3 & 4 Discussion Points

- Dr. LoBue clarified that it is not just that federal employees cannot do certain things. They also cannot specifically solicit and/or fund people to do things that they cannot do as federal employees.

- Having some knowledge and conversations about avenues that CDC has explored would be helpful for ACET to understand. It might be a task for ACET to try to understand why a strategy may not have worked, for which ACET could provide advice to CDC. For instance, perhaps ACET could provide advice to CDC about expanding the CDC Drug Service to cover conditions that impact more than 100 people a year.

- There has been discussion about how to use the ACET vehicle in the best way possible. Having various groups in the same room with ACET, such as FDA, could be beneficial in terms of identifying possible solutions.

ACET Business Session 2

Robert Belknap, MD
ACET Chair
Medical Director, Denver Metro Tuberculosis Control Program
Denver Public Health

Dr. Belknap opened the Business Session and facilitated a review of old and current business items that warranted ACET's formal action and allowed time for additional discussion and/or requests for future agenda items. While a Business Session was held on each day of the meeting, all business items are grouped together in this section.

Business Item 1: Response to the Congressional RFI Regarding Drug Shortages

There was discussion on the first day of the meeting with regard to crafting a response to Questions 6 and 14 in the RFI Congress sent out on June 12, 2023 seeking input from stakeholders on the challenges related to ongoing drug shortages. Although a draft response was developed, the decision was made that ACET cannot respond to public RFIs as SGE members are federal employees.

Business Item 2: Biennial Letter

Dr. Belknap reminded everyone that during the December 2022 meeting, ACET agreed in principle with the high-level numbered priority topic areas for recommendations and in general on the language that supports them. They voted unanimously to accept the 5 priority areas, with the proposed edits incorporated. Together with ACET, he reviewed v11 of the Biennial Letter to ensure that the edits were properly incorporated and to include additional edits proposed during this session. The final signed version of the Biennial Letter is appended to this document as Attachment #3.

Vote: Biennial Letter
A motion was properly placed on the floor by Dr. Loeffler and second by Dr. Ahmed to approve the Biennial Letter. With no further discussion or changes, the motion carried unanimously with no abstentions or opposition.

Business Item 3: Workforce Recommendations

The following amendments were proposed to the December 2022 Workforce Recommendations:

1. **December 2022 Recommendation:** ACET recommends CDC develop a standard process for evaluation and periodic assessment of the US PH TB workforce.

   Amend To: ACET recommends CDC explore existing resources and tools that can be used to develop a standard and sustainable process for evaluation and periodic assessment of the PH TB workforce (for example: integrated into the TB cooperative agreement, via the

COE assessments, or by partnering with organizations with existing assessments, including, but not limited to, APHL, CSTE, NTCA).

2. **December 2022 Recommendation:** ACET recommends CDC consider a cost analysis to sustain the current TB workforce to achieve TB elimination.

   Amend To: ACET recommends CDC consider a cost analysis to provide a workforce sufficient to achieve TB elimination.

Vote: Workforce Recommendation
A motion was properly placed on the floor by Dr. Sosa-Bergeron and seconded by Dr. Ahmed to accept the amendments to the Workforce Recommendations. With no further discussion or changes, the motion carried unanimously with no abstentions or opposition.

Business Item 4: DMI/PHDS Recommendations

The following new recommendations were made focused on DMI/PHDS:

1. ACET recommends CDC to work with partners to identify TB data modernization priorities focusing on interoperability between data sources and automating collection and sharing of high-quality data.

2. ACET recommends CDC explore a common dataset across NCHHSTP and the specific variables that are high value for TB care that could be shared across the Center.

Vote: DMI/PHDS Recommendations
A motion was properly placed on the floor by Dr. Loeffler and seconded by Dr. Chen to accept the DMI/PHDS Recommendations. With no further discussion or changes, the motion carried unanimously with no abstentions or opposition.

June 2023 ACET Recommendations	Action
1) Biennial Letter	• ACET voted unanimously to accept the Biennial Letter.
2) TB Workforce	• ACET voted unanimously to accept the following amendments proposed to the December 2022 recommendations: – ACET recommends CDC explore existing resources and tools that can be used to develop a standard and sustainable process for evaluation and periodic assessment of the PH TB workforce (for example: integrated into the TB cooperative agreement, via the COE assessments, or by partnering with organizations with existing assessments (including, not limited to: APHL, CSTE, NTCA). – ACET recommends CDC Consider a cost analysis to provide a workforce sufficient to achieve TB elimination.
3) DMI/PHDS	• ACET voted unanimously to accept the proposed new recommendations focused on DMI/PHDS: – ACET recommends CDC to work with partners to identify TB data modernization priorities focusing on interoperability between data sources and automating collection and sharing of high-quality data.

June 2023 ACET Recommendations	Action
	– ACET recommends CDC explore a common dataset across NCHHSTP and the specific variables that are high value for TB care that could be shared across the Center.

Business Item 6: Future Agenda Items

The following future agenda topics were put forth for consideration:

- Presentation from the CDC Drug Service
- Presentation from the 340b contact
- Presentation from CLIA regarding challenges such as IGRAs and opportunities for other diagnostic tests as they relate to turnaround and/or reporting
- FDA update on nitrosamines and a presentation to explain some of the issues regarding reporting
- Continue the discussion of DMI and potential priorities to help flesh this out further
- Update on TBESC-III if the analyzed baseline data

Closing & Adjourn

Robert Belknap, MD
Medical Director, Denver Metro Tuberculosis Control Program, Denver Public Health
ACET Chair

Philip LoBue, MD, FACP, FCCP
Director, Division of Tuberculosis Elimination
National Center for HIV, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Dr. Belknap expressed appreciation to the ACET members for their time and discussion during this productive meeting, emphasizing how fantastic it was to see some people in person and have others join via Zoom who could not travel. He emphasized what a pleasure it was to have served as the ACET Chair and noted that there was a chance they would see him again.

Dr. LoBue reminded everyone that the next ACET meeting also will be hybrid and will be convened on December 12-13, 2023 in-person in Atlanta and virtually.

With no further discussion or business brought before ACET, the meeting was officially adjourned at 12:00 pm on June 21, 2023.

Chair's Certification

I hereby certify that, to the best of my knowledge, the foregoing minutes of the proceedings are accurate and complete.

_____	_____
Date	**Robert Belknap, MD, Chair** **Advisory Council for the Elimination of Tuberculosis**

Attachment 1: Participants' Directory

ACET Members Present

Dr. Robert Belknap, Chair
Dr. Amina Ahmed
Dr. Adithya Cattamanchi
Dr. Lisa Chen
Dr. William Glover
Dr. Ann Loeffler
Dr. Lynn Sosa-Bergeron
Ms. Kristine Steward-East
Dr. Jason Stout

ACET *Ex-Officio* Members Present

Dr. Amy Bloom
US Agency for International Development

Dr. Karen Elkins
Food and Drug Administration

Dr. Sheena Harris
Agency for Healthcare Research and Quality

Dr. Jonathan Iralu
Indian Health Service

Dr. Lawrence Kline
US Section, US-Mexico Border Health Commission

Dr. Mamodikoe Makhene
National Institutes of Health

Mr. Stephen Martin
National Institute for Occupational Safety and Health

Dr. Gary Roselle
Department of Veteran Affairs

Dr. Kevin Taylor
Department of Defense (Alternate)

Dr. Ronald Wilcox
Health Resources and Services Administration

ACET *Ex-Officio* Members Absent

Dr. Naomi Aronson
US Department of Defense

CDR Tara Rhodes
Bureau of Prisons

CAPT David Wong
Office of Minority Health

ACET Liaison Representatives Present

Ms. Valerie Adelson
American Thoracic Society

Dr. Natasha Bagdasarian
Association of State and Territorial Health Officials

Dr. Robert Benjamin
Stop TB USA

Mr. Jeffrey Caballero
Association of Asian Pacific Community Health Organizations

Dr. Charles Daley
American Thoracic Society

Dr. Jonathon Golub
International Union Against TB and Lung Disease

Ms. Elizabeth Lovinger
Treatment Action Group

Dr. Masahiro Narita
National Association of County and City Health Officials

Ms. Kate O'Brien
We are TB

Dr. Amee Patrawalla
American College of Chest Physicians

Mr. Colin Puzo Smith
RESULTS

Ms. Susan Ruwe
Association for Professionals in Infection Control and Epidemiology

Dr. Sylvie Stacy
National Commission on Correctional Health

Dr. Wendy Thanassi
American College of Occupational and Environmental Medicine

Mr. Andrew Tibbs
Council of State and Territorial Epidemiologists

Dr. Lornel Tompkins
National Medical Association

Dr. Daphne Ware
Association of Public Health Laboratories

Mr. Bobby Watts
National Healthcare for the Homeless Council

Dr. David Weber
Society for Healthcare Epidemiology of America

ACET Liaison Representatives Absent

Dr. Heidi Behm
National Tuberculosis Controllers Association

Dr. Mayleen Ekiek
Pacific Island Health Officers Association

Ms. Susan Rappaport
American Lung Association

Dr. Susan Ray
Infectious Disease Society of America

ACET Designated Federal Officer

CAPT Deron Burton
NCHHSTP Deputy Director

CDC Representatives

Leeanna Allen
Kumar Batra
Kevin Borden
Elise Caruso
Terry Chorba
Marah Condit
Kelly Curtis
Nick Deluca
Erica Figueroa
Neela Goswami
Savannah Harrelson
Nicholas Jarboe
Philip LoBue
Suzanne Marks
Susan McClure
Donna McCree
Selma Moore
Maria Sessions
Angela Starks
Michelle Van Handel
Carla Winston
Marylin Wolff
Joanna Regan

Guest Presenters

Ms. Kristin Bertrang
Dr. Joseph Burzynski
Dr. Marilyn Bibbs Freeman
Dr. Connie Haley
Ms. Cherie Stafford

Federal Guests

Misty Carlson (ICE)
Stephanie Latham (BOP)

Members of the Public

Rajita Bhavaraju
Leslie Byerly
Jennifer Cochran
Susan Cooley
Jason Cummins
Diane Fortune
K. Gladfelter
Kay Hendricks
Julie Higashi
Sophia Hsu
Krystle Mallory
Amy Painter
Kathleen Ritger
Ashley Rodriquez
Claire Stafford
Burnestine Taylor
LaTweika Trejo
Donna Hope Wegener

Attachment 2: Glossary of Acronyms

Acronym	Definition
AAP	American Academy of Pediatrics
AAPCHO	Association of the Asian Pacific Community Health Organizations
ACET	Advisory Council for the Elimination of Tuberculosis
ACOEM	American College of Occupational and Environmental Medicine
ADA	American Diabetes Association
AE	Adverse Event
AHRQ	Agency for Healthcare Research and Quality
AMA	American Medical Association
APHL	Association of Public Health Laboratories
APIC	Association for Professionals in Infection Control and Epidemiology
APL	Applied Physics Laboratory
ASTHO	Association of State and Territorial Health Officials
ATS	American Thoracic Society
BDQ	Bedaquiline
BHC	US-Mexico Border Health Commission Mexico Section
BOP	Federal Bureau of Prisons
BPaL	Bedaquiline, Pretomanid, and Linezolid
CBO	Community-Based Organization
CDC	Centers for Disease Control and Prevention
CDPH	Chicago Department of Public Health
CEO	Chief Executive Officer
CEPI	Center for Evidence and Practice Improvement
CFA	Center for Forecasting and Outbreak Analytics
CMS	Centers for Medicare & Medicaid Services
COE	Centers of Excellence
COI	Conflict of Interest
CoPs	Communities of Practice
CSTE	Council of State and Territorial Epidemiologists
CTCA	California TB Controllers Association
CXR	Chest X-Ray
DASH	Division of Adolescent and School Health
DC	District of Columbia

Acronym	Definition
DDID	Deputy Director of Infectious Diseases
DFO	Designated Federal Official
DGMQ	Division of Global Migration and Quarantine
DHP	Division of HIV Prevention
DMI	Data Modernization Initiative
DNA	Deoxyribonucleic Acid
DOT	Directly Observed Therapy
DST	Drug-Susceptibility Testing
DSTDP	Division of STD Prevention
DTBE	Division of Tuberculosis Elimination
DUAs	Data Use Agreements
DVH	Division of Viral Hepatitis
EDAV	Enterprise Data Analytics and Visualization
EDN	Electronic Disease Notification
eDOT	Electronic Directly Observed Therapy
EHE	Ending the HIV Epidemic
EHR	Electronic Health Record
ELC	Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases Cooperative Agreement
EMR	Electronic Medical Record
ET	Eastern Time
FACA	Federal Advisory Committee Act
FDA	(United States) Food and Drug Administration
FQHCs	Federally Qualified Health Centers
GDF	Global Drug Facility
HCP	Healthcare Providers/Professionals
HHS	(United States) Department of Health and Human Services
HIV	Human Immunodeficiency Virus
ICHS	International Community Health Services
IDSA	Infectious Diseases Society of America
IGRA	Interferon-γ Release Assay
IM&E	Implementation, Monitoring, and Evaluation
INH	Isoniazid
IPPA	International Panel Physicians Association
JAMA	*Journal of the American Medical Association*
LGBQ	Lesbian, Gay, Bisexual, Queer/Questioning +
LGBTQ+	Lesbian, Gay, Bisexual, Transgender, Queer/Questioning +
LHD	Local Health Department
LIMS	Laboratory Information Management System
LTBI	Latent Tuberculosis Infection
MDDR	Molecular Detection of Drug Resistance
MDR-TB	Multidrug-Resistant Tuberculosis

Acronym	Definition
MGIT	Mycobacteria Growth Indicator Tube
MIC	Minimum Inhibitory Concentration
MLS	Medical Laboratory Science
MMWR	*Morbidity and Mortality Weekly Report*
MPEP	Model Performance Evaluation Program
Mpox	Monkeypox
MTBC	*Mycobacterium Tuberculosis Complex*
NAAT	Nucleic-Acid Amplification Test
NCHHSTP	National Center for HIV, Viral Hepatitis, STD and TB Prevention
NCSD	National Coalition of STD Directors
NCSLPH	North Carolina State Laboratory of Public Health
NCSTLTPHIW	National Center for State, Territorial, Local, and Tribal Public Health Infrastructure and Workforce
NEMS	North East Medical Services
NGA	National Governors Association
NHCHC	National Health Care for the Homeless Council
NIH	National Institutes of Health
NMA	National Medical Association
NNPHI	National Network of Public Health Institutes
NOFO	Notice of Funding Opportunity
NSSP	National Syndromic Surveillance Program
NSTC	National Society of TB Clinicians
NTCA	National Tuberculosis Controllers Association
OHE	Office of Health Equity
OSHA	Occupational Safety and Health Administration
PCP	Primary Care Providers
PHAC	Public Health Agency of Canada
PHDS	Public Health Data Strategy
PHIO	Public Health Informatics Office
PPHI	Policy as a Public Health Intervention Initiative
PHLs	Public Health Laboratories
PrEP	Pre-Exposure Prophylaxis
QA/QC	Quality Assurance/Quality Control
RFI	Request For Information
RVCT	Report of Verified Case of Tuberculosis
SAMHSA	Substance Abuse and Mental Health Services Administration
SDOH	Social Determinants of Health
SME	Subject Matter Expert
SNTC	Southeastern National TB Center
SSP	Syringe Services Programs
STD	Sexually Transmitted Diseases
STI	Sexually Transmitted Infections

Acronym	Definition
STLT	State, Tribal, Local and Territorial
TB	Tuberculosis
TBCB	California Tuberculosis Control Branch
TBESC	Tuberculosis Epidemiologic Studies Consortium
TBTC	Tuberculosis Trials Consortium
TBTI	Tuberculosis Technical Instructions
TEA	Tuberculosis Elimination Alliance
tNGS	Targeted Next Generation Sequencing
U4U	Uniting for Ukraine
UCSF	University of California, San Francisco
US	United States
USG	United States Government
USPHS	United States Public Health Service
USPSTF	United States Preventive Services Task Force
vDOT	Video-Supported Directly Observed Therapy
WG	Working Group
WHO	World Health Organization
WGS	Whole Genome Sequencing

Attachment 3: Biennial Letter Final

ACET

Advisory Council for the Elimination of Tuberculosis

June 27, 2023

The Honorable Xavier Becerra
Secretary
Department of Health and Human Services
200 Independence Avenue, S.W.
Washington, D.C. 20201

Dear Mister Secretary:

In 1989, US Public Law Act [42 USC 247b-6(f) (section 2(b)), Public Law 101-368 (section 317E of the Public Health Services Act)], as amended, established the Advisory Council for the Elimination of Tuberculosis (ACET) as a Congressionally mandated advisory body to provide guidance to the Secretary, US Department of Health and Human Services (HHS), the Assistant Secretary for HHS, and the Director, Centers for Disease Control and Prevention (CDC), regarding elimination of tuberculosis (TB) in the United States.

ACET is formally chartered under the Federal Advisory Committee Act to (a) make recommendations regarding policies, strategies, objectives, and priorities; (b) address development and application of new technologies; (c) provide guidance and review regarding CDC's TB Prevention Research portfolio and program priorities; and (d) review the extent to which progress has been made toward TB elimination.

Background

Tuberculosis continues to be a major health concern in the United States (US) and globally. Worldwide an estimated 10.6 million people got sick from TB and 1.6 million people died in 2021. Pandemic-related disruptions in TB care resulted in increased TB deaths for the first time in decades.[i] TB was the single leading cause of death from an infectious disease prior to COVID-19[ii] and likely will be again as COVID-19 recedes. The full impact will not be known for years but modelling has estimated that setbacks in TB care will result in many thousands of excess deaths due to TB.

In the US, TB disproportionately impacts underserved communities defined by race, country of birth, and socioeconomic status. The inverse association between the social determinants of health with disease burden and outcomes for TB, COVID-19 and other health conditions is well documented. [iii,iv] Addressing the longstanding inequities in TB would help reverse decades of neglect and begin building trust with communities. A critical lesson from the pandemic is the importance of partnering with communities and establishing trust prior to an emergency.[v] Working with communities to eliminate health

disparities will also effectively prepare for responding to future public health emergencies.

Key ACET activities since 2021

ACET continued to meet virtually twice yearly during the pandemic. Meetings were productive and addressed important issues. We learned about a multi-state outbreak of TB associated with contaminated bone allograft material and the subsequent investigation by the CDC's Division of TB Elimination (DTBE). A Food and Drug Administration (FDA) representative presented on the process of getting approval for new diagnostic tests and drug treatments in the US with the goal of understanding potential barriers to ensuring domestic TB programs have access to the best tools and medications for TB. A manufacturing company was then invited to provide an industry perspective on the challenges. The Division of Global Migration and Quarantine (DGMQ) discussed strategies for decreasing TB among immigrants and refugees including a study that evaluated treating LTBI pre-immigration. The Immigration and Customs Enforcement (ICE) was invited to discuss opportunities for improved coordination of care for people with suspected or confirmed TB who are being detained and when they are released.

ACET convened two working groups in 2022. The first was charged with determining what is known about the current and future status of the US TB workforce. This was in response to concerns raised about declines in US TB workforce due to redeployment during the pandemic, burnout, decreased funding, and pending retirements. The working group concluded that the risks to the TB workforce are real but not well characterized or systematically measured. ACET gave 2 recommendations to DTBE: 1. work with TB Centers of Excellence and the National TB Controller's Association (NTCA) to develop a process for ongoing, periodic assessments of the US TB workforce 2. estimate the funding needs to sustain the current TB workforce into the future and the additional funding to achieve TB elimination in the US.

The second working group was charged with determining the key priorities to advance TB elimination efforts in the US. That group reviewed the recent prior ACET recommendations to CDC and HHS. They also conducted a survey of ACET members and liaisons. The outcome of that work informed our advice and requests of CDC and HHS in this letter.

Assistance from the HHS Secretary

Your leadership as Secretary of HHS is crucial to eliminate disparities in TB, prevent a resurgence of TB in the U.S., and reignite progress towards TB elimination. We respectfully request that HHS:

1. **Support, strengthen and sustain the U.S. public health TB infrastructure**

   The COVID-19 pandemic demonstrated the importance of a strong public health infrastructure for ensuring a timely and effective response. COVID-19 caused a

redirection of TB staff resulting in delayed case management, contact investigation, and TB prevention activities. CDC funding for TB has been flat or decreased year to year since at least 2014. This has resulted in a nearly 20% decrease in relative funding when adjusted for inflation. Without a sustained commitment to the US public health TB infrastructure, the goal of TB elimination in the US will remain out of reach.

Requests:

- Restore funding for the CDC's Division of TB Elimination to $173 million per year which would be equivalent to the 2014 funding level when adjusted for inflation. Determine a sustainable funding model necessary to maintain the public health infrastructure and account for rising costs
- Through dedicated funding, support CDC efforts in data modernization, specifically for TB data, including the seamless sharing of data for people newly arriving in the US or moving between states and other jurisdictions

2. **Improve equitable access to diagnostic testing and treatments for TB to all people**

There is a lack of knowledge of and access to the most current diagnostic tests for TB in the U.S. The availability of nucleic acid amplification tests (NAAT) for TB, a recommended test for all persons being evaluated for TB disease, is variable across the U.S. This is magnified by the absence of FDA clearance for the most updated NAATs as well as their use on non-respiratory and pediatric specimens. Access to patient-friendly formulations including fixed-dose combinations and water dispersible medications that are available on the global quality assured market are not available to persons in the US. Drug shortages continue to impact the treatment and prevention of TB as described in a letter from ACET to HHS on May 30th, 2023. Timely access to the best medications for treating drug-resistant TB varies based on where someone lives in the US and their insurance status.

Requests:

- Mitigate regulatory barriers for accessing molecular tests and patient-friendly medication formulations for pediatric and adult patients.
- Support increased provider education about the national testing guidelines and how to access the preferred tests locally
- Explore precedents and potential for centralized import waiver to enable access to the global quality assured market for TB medicines during domestic TB drug shortages or when fit-for-purpose formulations (e.g., fixed-dose combinations, pediatric formulations) are otherwise not available in the United States.
- Develop strategies to close the gaps between ordering TB tests and starting treatment for those with active TB with a focus on access to newer drugs like bedaquiline, pretomanid, and linezolid when drug resistance is suspected

- Incentivize processes to make newer diagnostic tests, pediatric friendly formulations, and fixed-dose combinations of TB medications available in the U.S.

3. **Address TB in priority populations to increase equitable access to TB evaluation and treatment**

TB disproportionately affects marginalized populations in our country. These groups must be prioritized for TB testing and treatment to be able to reach the goals of TB elimination in the US. To do this, barriers to testing and treatment must also be addressed.

Requests:

- Designate and maintain LTBI evaluation and treatment as covered services by Medicare and Medicaid.
- Direct the Centers for Medicare and Medicaid Services to establish a mandatory national coverage determination for LTBI testing and treatment and a metric for evaluating performance.
- Increase access to testing and treatment for people who:
  - Have lived outside the US
  - Are incarcerated or have been recently released from a correctional setting
  - Are experiencing homelessness
  - Are uninsured
  - Underserved populations, including black, indigenous, and people of color (BIPOC)

4. **Increase support for investments in TB research**

Despite ever-present challenges to TB elimination and the COVID-19 pandemic, important advances have been made that have led to new drugs and shorter course regimens and more rapid diagnostic tools. Healthcare providers and the public health community are eager to take advantage of new advances as they are tested and approved. The pipeline for TB research must be strengthened, expanded, and maintained to effectively address global and domestic barriers to TB elimination.

Requests

- Increase funding to the CDC and NIH (in line with updated fair share targets to meet the Stop TB Partnership goals for the upcoming UN High Level Meeting on TB) for basic and translational studies to improve the diagnosis, treatment, and prevention of TB with an emphasis on advanced diagnostics, point of care tests, new drugs with novel targets and less toxicity, shorter

course regimens to optimize treatment completion, and a TB vaccine to prevent new TB disease.

On behalf of ACET, I want to thank the CDC and HHS for their commitment to advancing public health priorities. As the country shifts away from the pandemic emergency response, restoring US TB programs is necessary to strengthen the US public health infrastructure. TB program staff have critical expertise and experience managing a contagious respiratory disease which is why so many were redeployed in the response to COVID-19. Loss of that expertise through burnout and retirement makes the US less prepared now for a future pandemic than in 2020. Adequate resources to work with communities most impacted to eliminate TB would provide greater returns by building community trust and the foundations needed for eliminating other health disparities and responding to future emergencies.

Sincerely,

Robert Belknap, MD
Chair, Advisory Council for the Elimination of Tuberculosis

Cc:
Jonathan H. Mermin, MD, MPH, RADM and Assistant Surgeon General USPHS, Director, National Center for HIV, Viral Hepatitis, STD and TB Prevention
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ACET Members

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