State of TB

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March 24, 2021

Stop TB Partnership

World Health Organization

BOSTON MEDICAL CENTER

EXCEPTIONAL CARE. WITHOUT EXCEPTION.

BOSTON UNIVERSITY

COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

150 YEARS OF ADVANCING PUBLIC HEALTH

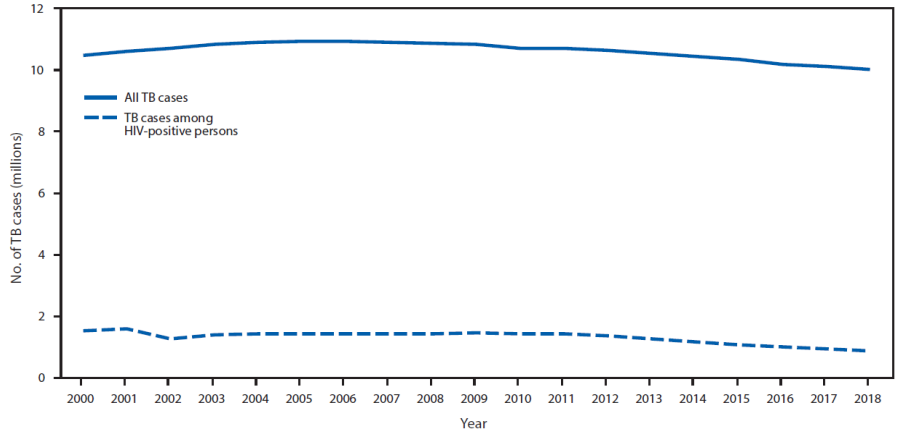
Conflicts to report

- None

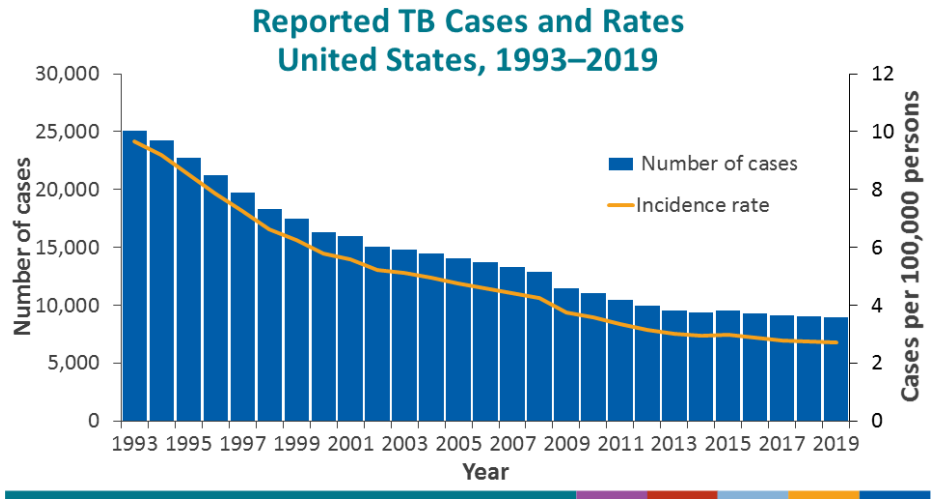
Where we were at the end of 2019

- 10 million people newly sick with TB (130 cases per 100,000 persons)
  - Estimated 3 million not diagnosed or reported
- 1.4 million deaths from TB
- TB incidence falling 2% per year 2015-2019 (9% cumulative reduction)
- 8,916 new TB cases, lowest incidence rate (2.7 per 100,000 persons) in the US since reporting began in 1953

FIGURE 1. Trends in estimated incident tuberculosis (TB) among all persons and among persons living with human immunodeficiency virus (HIV-positive persons) — worldwide, 2000–2018



Source: Adapted with permission from World Health Organization. Global tuberculosis report 2019. Geneva, Switzerland: World Health Organization; 2019.



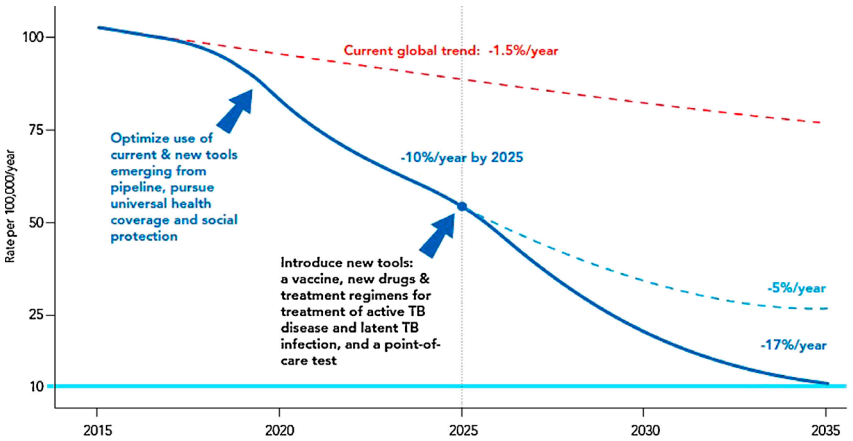
MMWR Morb Mortal Wkly Rep 2020;69:281-285; WHO: Global TB Progress at risk, October 2020

WHO End TB strategy 2035 goals

THE END TB STRATEGY

VISION	A world free of tuberculosis – zero deaths, disease and suffering due to tuberculosis			
GOAL	End the global tuberculosis epidemic			
INDICATORS	MILESTONES		TARGETS	
	2020	2025	SDG 2030*	END TB 2035
Reduction in number of TB deaths compared with 2015 (%)	35%	75%	90%	95%
Reduction in TB incidence rate compared with 2015 (%)	20% (<85/100 000)	50% (<55/100 000)	80% (<20/100 000)	90% (<10/100 000)
TB-affected families facing catastrophic costs due to TB (%)	Zero	Zero	Zero	Zero

* The United Nations is in the process of defining a post-2015 development agenda. A set of "Sustainable Development Goals" (SDGs) are being developed for 2030; TB is proposed to be part of the agenda and goals.



Int J Infect Dis, 2017; 56:30-33.

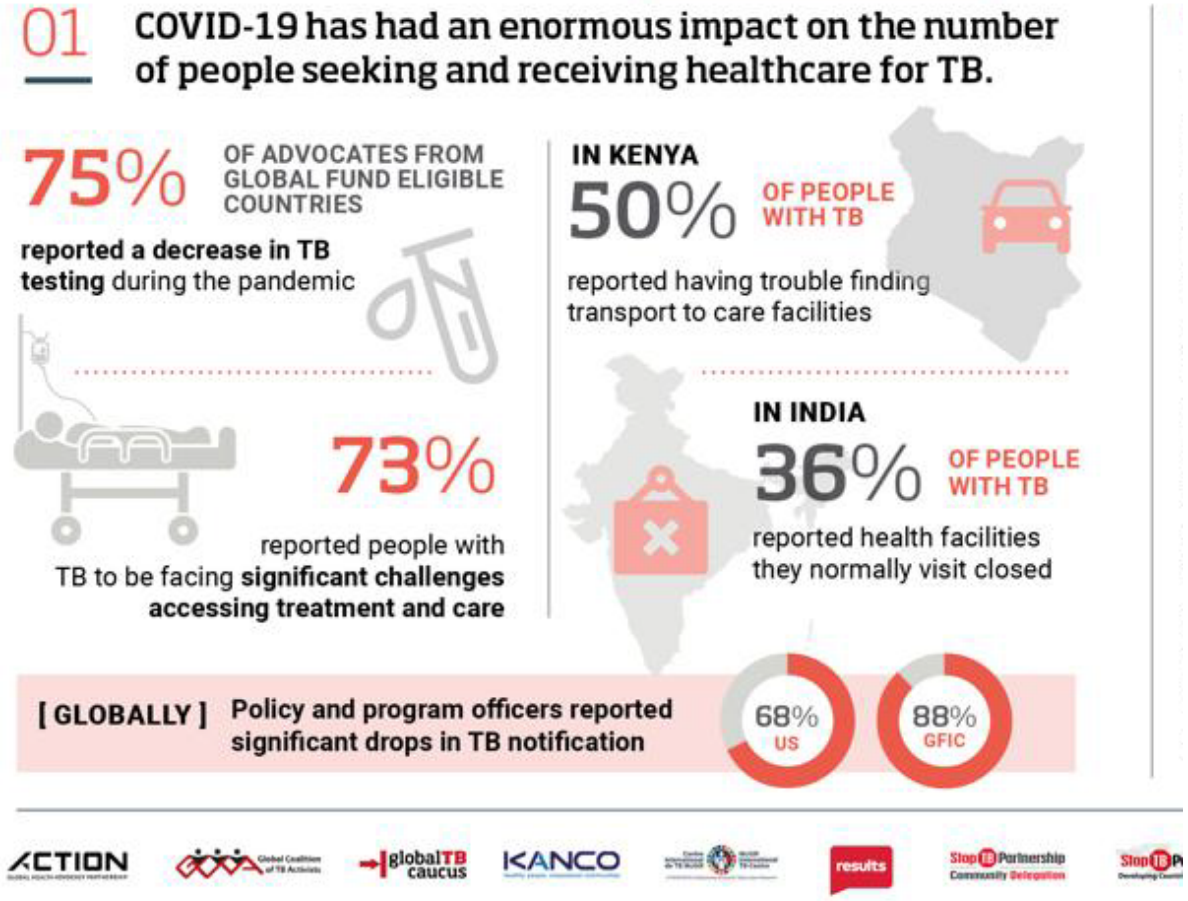
COVID-19'S IMPACT ON TB IS PROJECTED TO SET PROGRESS BACK 5 TO 8 YEARS -- RESULTING IN AN ADDITIONAL 1.4 MILLION TB DEATHS BETWEEN 2020 AND 2025.

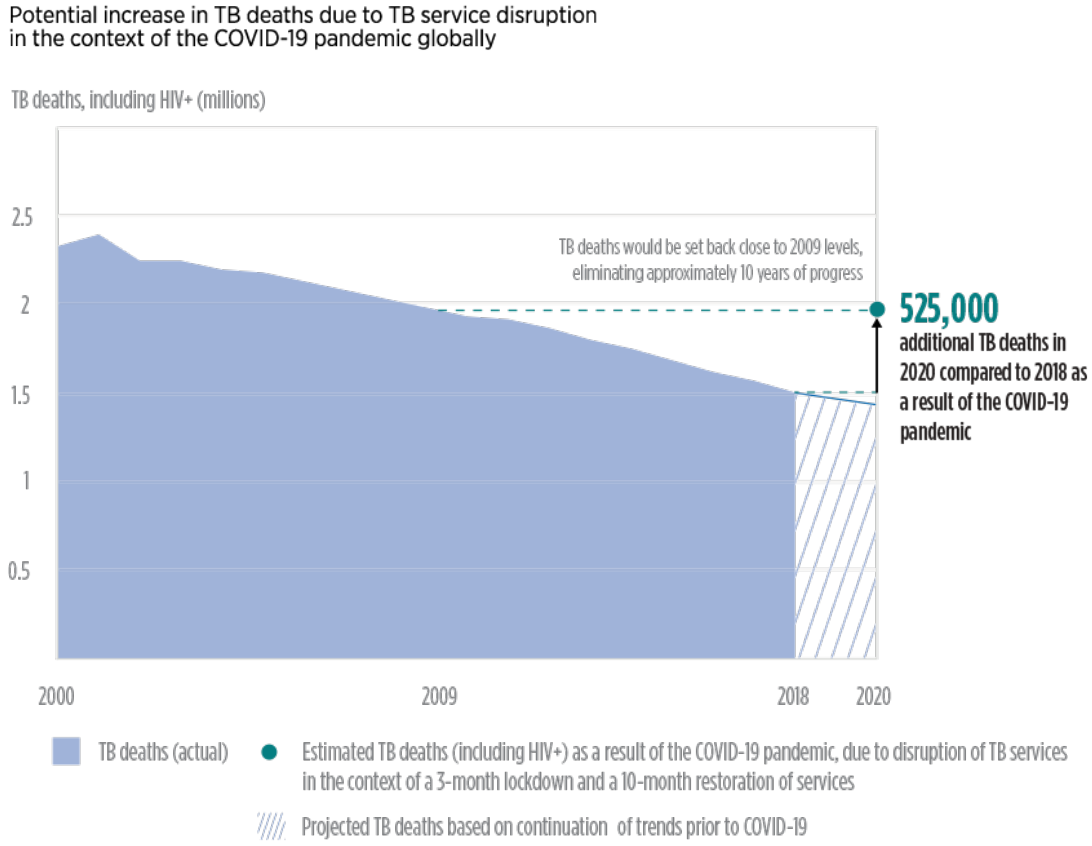
Source: Stop TB Modeling Study

GLOBAL
ACCELERATOR
TO END TB

USAID
FROM THE AMERICAN PEOPLE

Global TB trends





May 2- June 2, 2020 survey

Global impact of COVID-19 on TB

- 12 months of COVID-19 eliminated 12 year progress in global fight against TB (to 2008 levels)
- 20% drop in diagnosis and treatment for TB worldwide
  - Nine countries* with most TB cases (60% of global TB burden) saw declines in TB diagnosis and treatment ranging from 16-41%
  - Impact of lockdown on TB transmission not yet known
- In India and South Africa, people coinfected with TB and COVID-19 had 3x higher mortality than people with TB alone

Stop TB Partnership

*Bangladesh, India, Indonesia, Myanmar, Pakistan, Philippines, South Africa, Tajikistan, Ukraine

United States TB trends

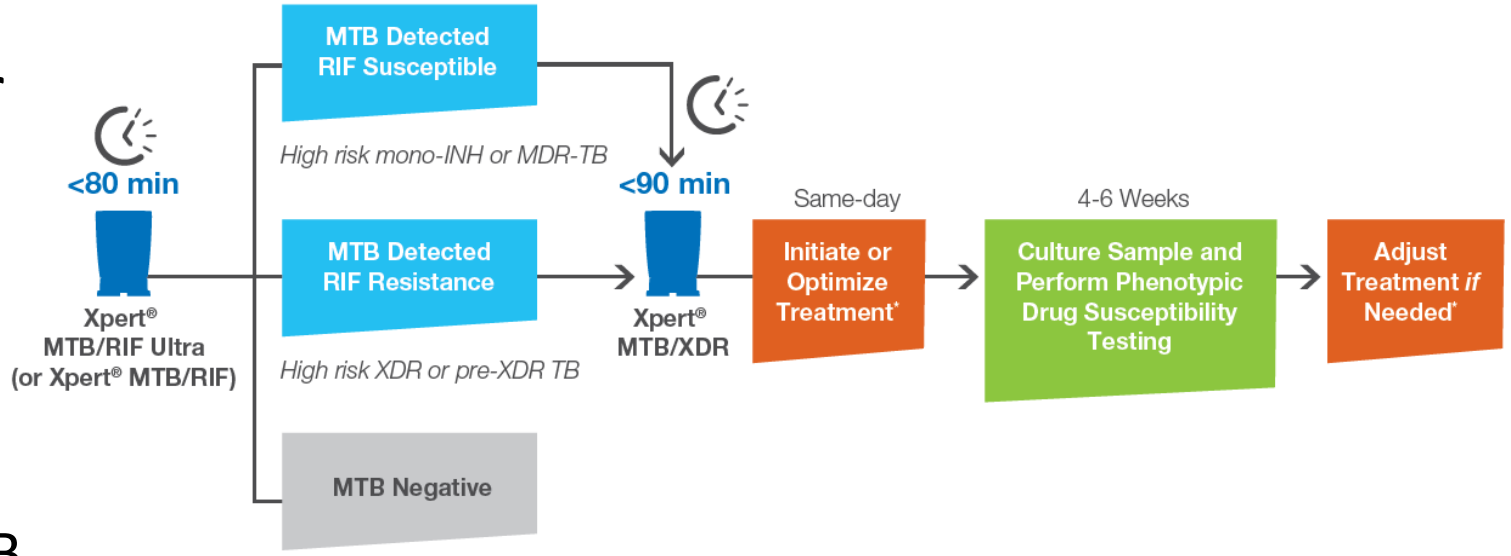
- In 2020, 23% (1,747) decline in reported TB cases during the pandemic
  - Normally would expect about 100 fewer from 2019
  - Under-ascertainment versus true decline unclear
    - Fewer persons arriving in the United States
    - Less in person screening
    - Reassign public health staff from TB to COVID-19 activities

Molly Deutsh-Feldman, CDC, End TB NAR Union 2021 Conference talk

2020 successes and ways forward

Detection and diagnosis

- Scaling of rapid molecular tests and DST towards universal access
- Biomarkers
  - Incipient and subclinical TB
  - Non-sputum based diagnostics
  - Assess host response
- Radiography as screening tool



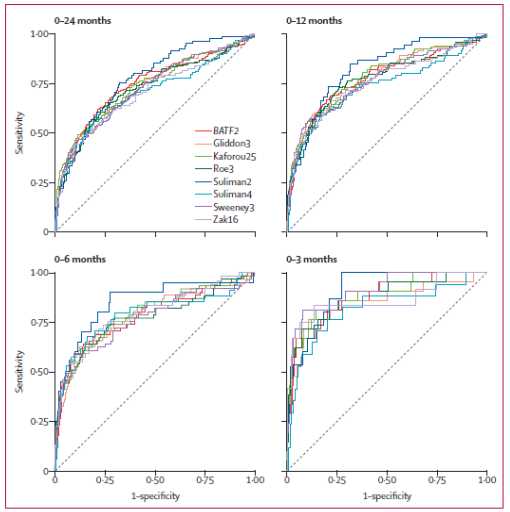
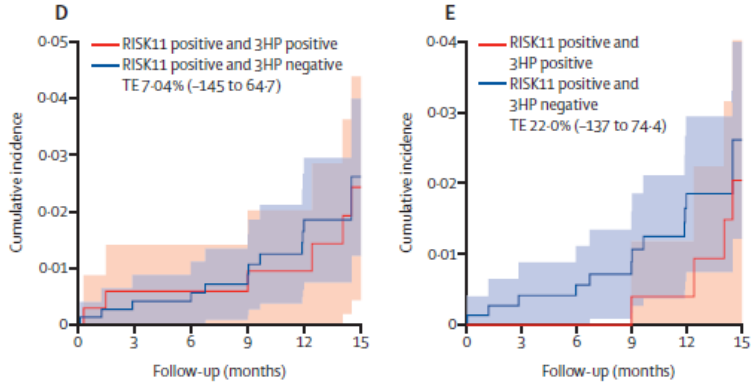


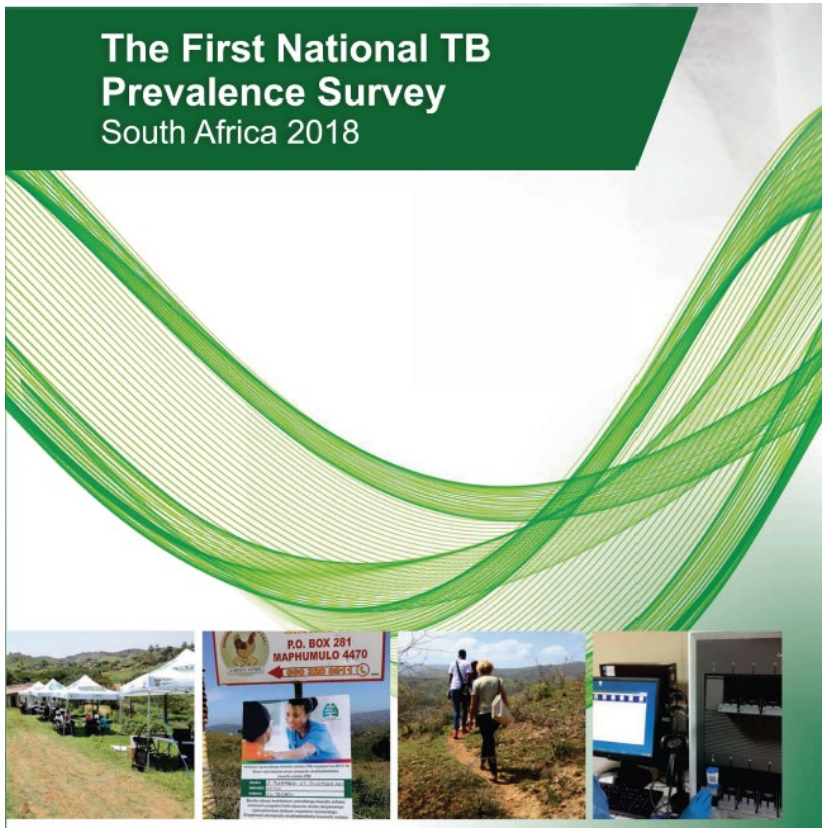
Figure 3: **Receiver operating characteristic curves showing diagnostic accuracy of eight best performing transcriptional signatures for incipient tuberculosis**
Receiver operating characteristic curves shown stratified by months from sample collection to disease. Area under the curve estimates and 95% CIs are shown in the appendix 1 (p 15). Number of samples included for each signature, at each timepoint, indicated in the appendix 1 (p 19).



Lancet Respir Med 2020;8:395-406; Lancet Inf Dis 2021; 21:354-65

TB disease spectrum—beyond symptoms

- 852 cases per 100,000 persons
  - Males 1094 vs Females 675 per 100,000
  - Highest ages 35-44 years and >65 years
  - Lowest participation in youth and males
- 2/3rds of HIV uninfected, symptomatic persons had not sought care
- HIV uninfected more asymptomatic than HIV infected individuals
- Estimated 39.5% of TB cases not found
- How improve systematic screening for TB disease



Treatment shortening therapeutics

Study 31/A5349 Schema

Key Notes:
- All treatment: daily 7/7
- Flat P dose of 1200 mg
- M dose of 400 mg
- Food guidance: food with RPT, no food with RIF

Screen for eligibility

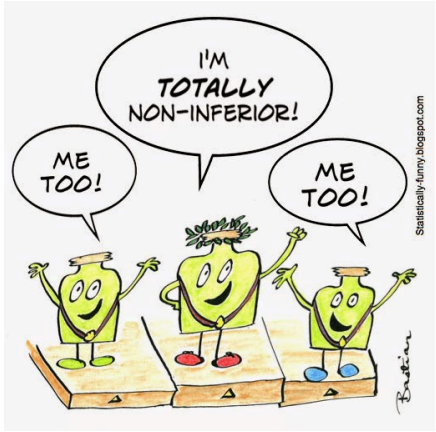
Consent, enroll

Randomize 1:1:1

Regimen 1	Regimen 2	Regimen 3
(control)	(investigational)	(investigational)
2RHZE/4RH	2PHZE/2PH	2PHZM/2PHM
(26 wks)	(17 wks)	(17 wks)

Evaluation for primary outcome at 12 months after randomization, secondary at 18 month

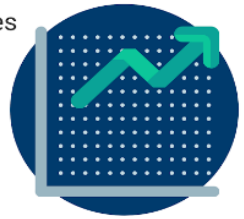
SECONDARY: Evaluate safety and tolerability of the regimens, extensive PK of ALL TB drugs and EFV, biobanking



THE IMPORTANCE OF LINKING TUBERCULOSIS SURVIVORS TO PRIMARY CARE

1 We have a growing population of TB survivors

The World Health Organization estimates **58 million people survived TB** between 2000 and 2018, due to improvements in TB treatment and detection.



! TB survivors may be living with chronic conditions associated with, caused by, or made worse by TB.

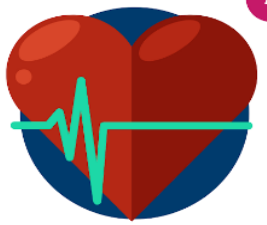
2 TB survivors are at an increased risk for premature mortality

Despite completing treatment, TB survivors, in both high and low income countries, experience **three times higher mortality** than their local populations.

3 Estimates of residual lung damage in TB survivors range from 18 to 80%

Pulmonary TB can cause **irreversible lung damage**, which can lead to loss of lung function, long-term respiratory symptoms, and chronic respiratory disease.

Emerging evidence suggests that pulmonary rehabilitation programs may be beneficial for post-TB lung disorders.



4 TB may play a role in the development of cardiovascular disease

TB appears to be a marker for increased cardiovascular disease risk. This risk may be related to **smoking** or **systemic inflammation** caused by TB, but the research is limited.

We need to evaluate TB survivors for the presence of comorbidities and provide support for modifiable risk factors, such as cessation programs for smoking.

5 TB can have long-term harmful effects on mental health

Mental health after completion of TB treatment is poorly documented, but up to 70% of people on TB treatment experience changes in their mental health due to **stigma, isolation**, and **inadequate social support**.

A simple assessment tool, such as the Patient Health Questionnaire-9© could be used to assess mental health in TB survivors. Those with depression or severe anxiety should be referred.

6 We need to better advocate for the health and wellbeing of TB survivors

We need to **support TB survivors** through their treatment by recognizing the long term effects of TB. An excellent first step is to ensure that people completing treatment are **linked to primary care**.

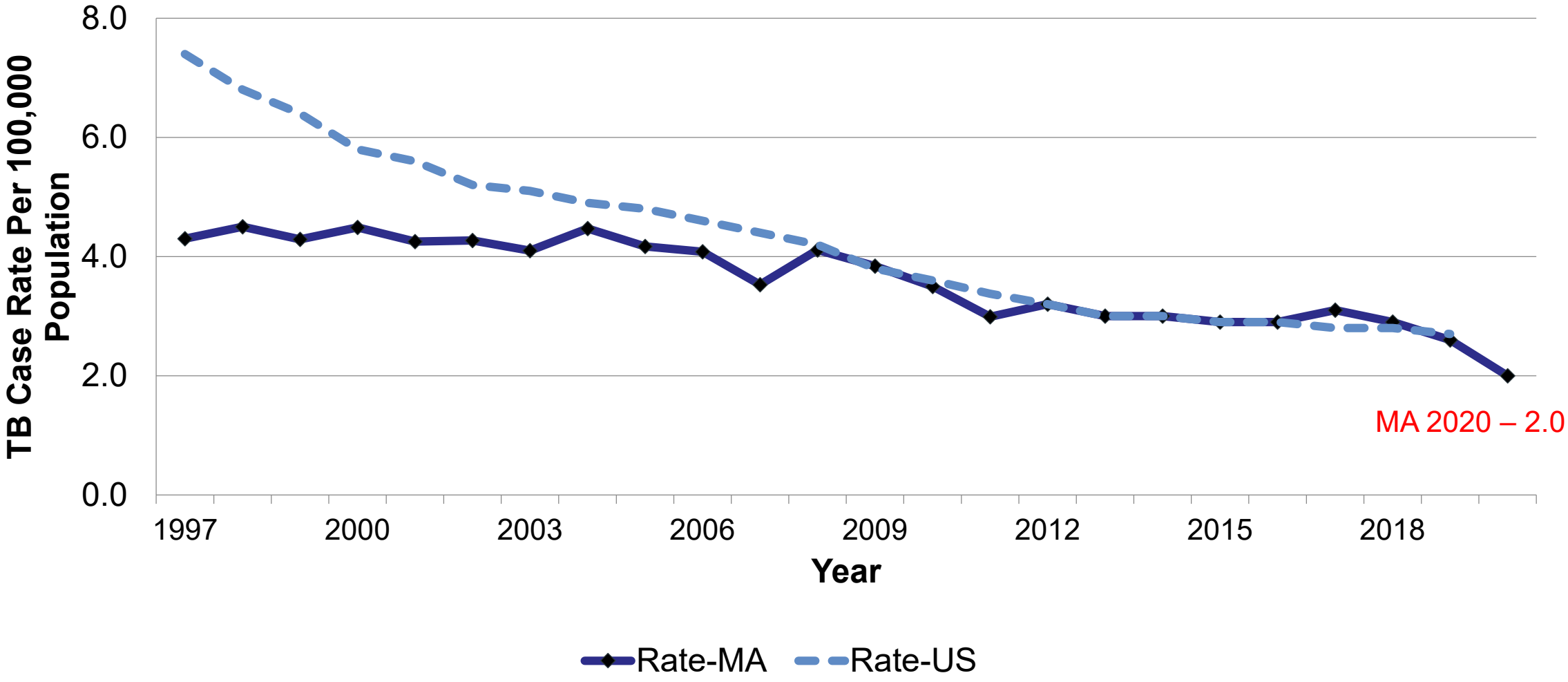
Scan the QR code for the references used to create this infographic.

Kamila.Romanowski@bccdc.ca
Created by Kamila Romanowski, C. Andrew Basham, and James C. Johnston

https://sites.google.com/view/link-tb-survivors-to-care/home

Massachusetts

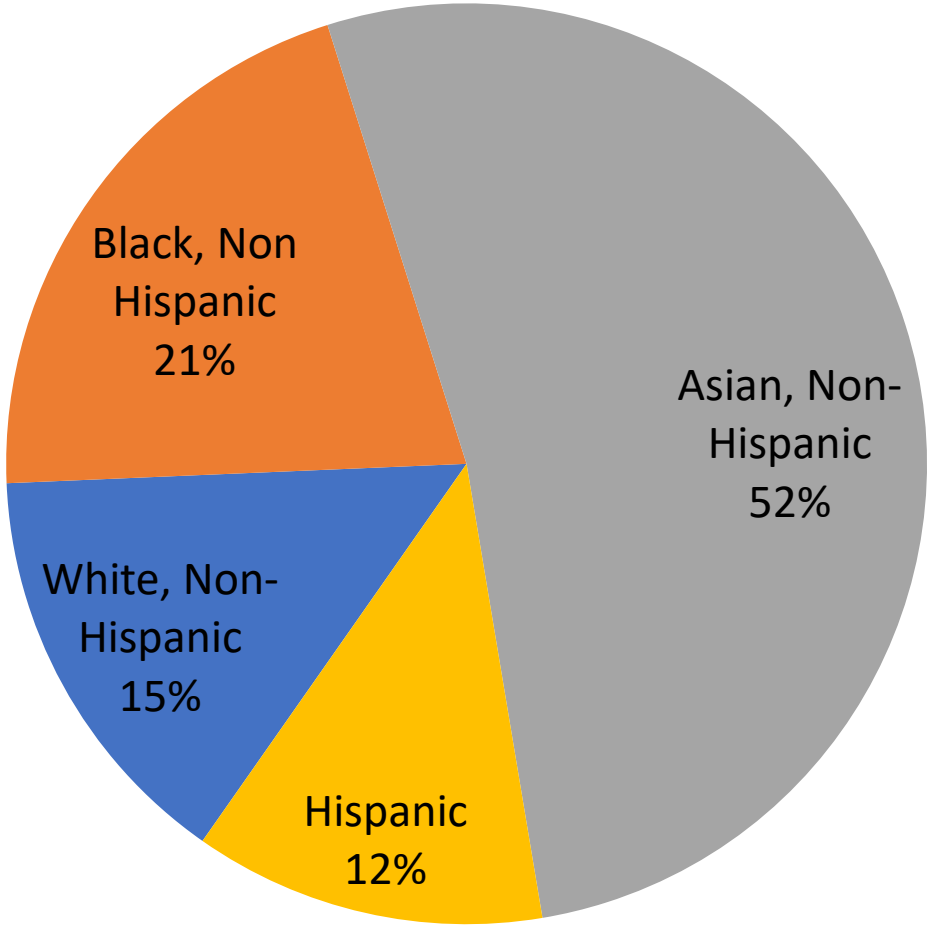
Rate of Tuberculosis Cases, United States and Massachusetts, 1997-2018



Data current as of 1 March 2021
Data gathered from Massachusetts Virtual Epidemiologic Network

Courtesy of Andy Tibbs, Jennifer Cochran

Distribution of Tuberculosis Cases by Race/Ethnicity Massachusetts, 2020

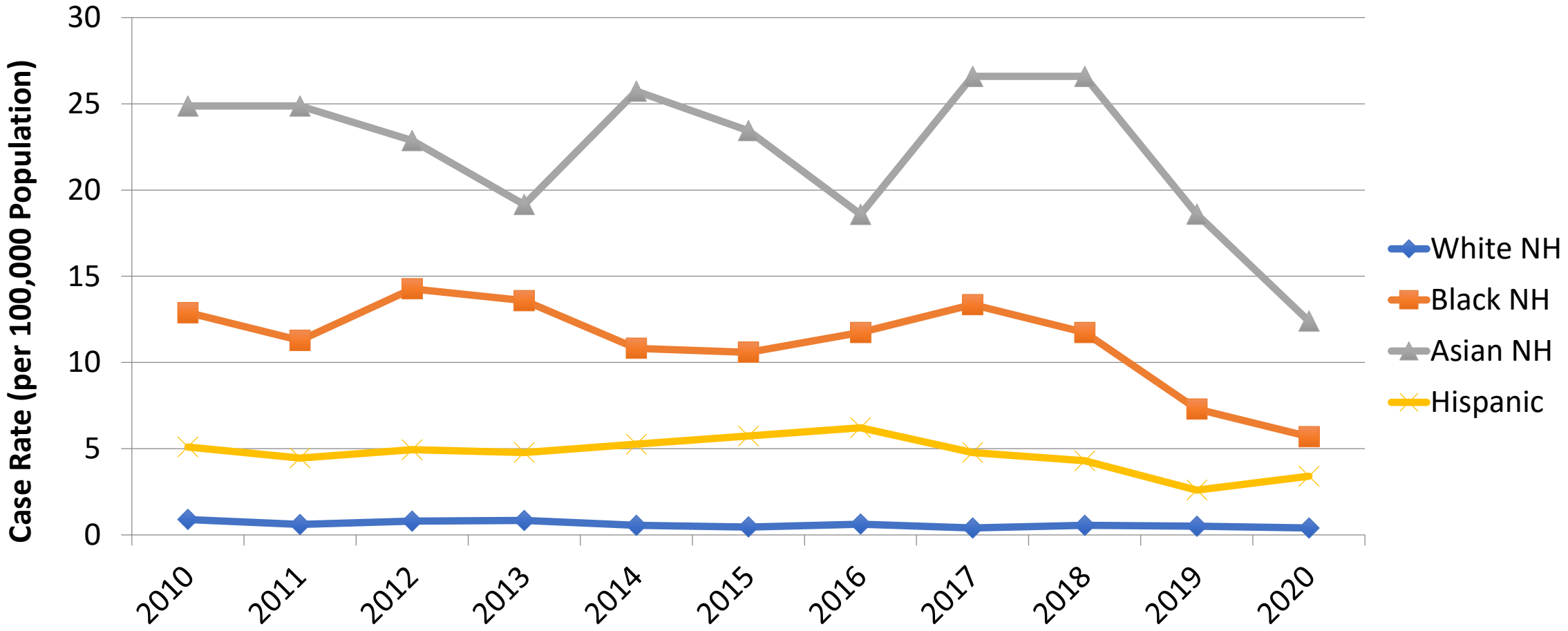


(N=142)

Data current as of 1 March 2021
Data gathered from Massachusetts Virtual Epidemiologic Network

Courtesy of Andy Tibbs, Jennifer Cochran

Rate of Tuberculosis Cases by Race/Ethnicity Massachusetts 2010-2020

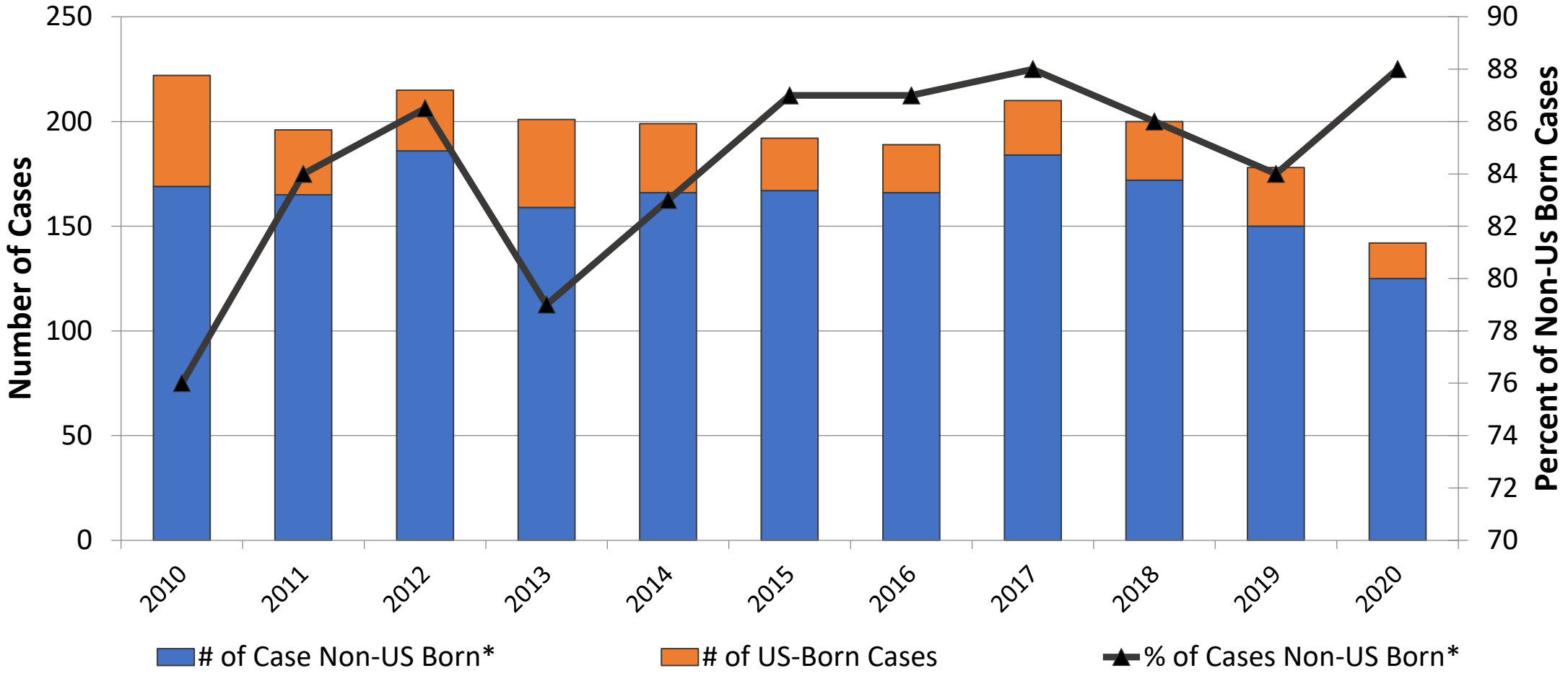


*NH – Non-Hispanic

Data current as of 1 March 2021
Data gathered from Massachusetts Virtual Epidemiologic Network

Courtesy of Andy Tibbs, Jennifer Cochran

Trends in Tuberculosis Cases among Non-US Born* Persons, Massachusetts, 2010-2020



Data current as of 1 Mar 2021
Data gathered from Massachusetts Virtual Epidemiologic Network

*US Born cases include Puerto Rico

Other 2020 TB Data Insights - Massachusetts

- 2020 TB cases ARE impacted by COVID pandemic
  - 20% decline in cases
  - ~40% decline in reported latent TB infection (preliminary data)
  - More study needed to determine direction and extent of impact
    - Increased respiratory precautions (likely cause of decline in flu cases)?
    - Decreased international travel (88% of TB cases seen in non-US born)?
    - Decreased care seeking for mild cases?
    - Misclassification of COVID/TB co-infected cases (similar symptoms and radiographic presentation)?

- 98% of culture-confirmed isolates were genotyped and little to no local clustering was seen outside of households

Thank you