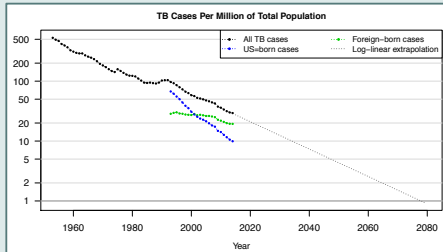


THE FUTURE OF TB IN THE UNITED STATES

Nicolas A Menzies [1], Ted Cohen [2], Reza Yaesoubi [2], Kara Galer [1], Emory Wolf [1], Suzanne M Marks [3], Andrew N Hill [3], Joshua A Salomon [1]
 [1] Harvard T.H. Chan School of Public Health, Boston. [2] Yale School of Public Health, New Haven. [3] Division of TB Elimination, U.S. Centers for Disease Control and Prevention, Atlanta.

Policy and epidemiological context

- The number of TB cases reported in the United States has followed a prolonged exponential decline since the mid 1950s, only interrupted by an HIV-fueled increase in TB cases in the 1990s.
- If annual declines in TB case rates match the trend observed over the past 20 years, it will take more than 60 years to achieve TB elimination, defined as <1 case per million per year.



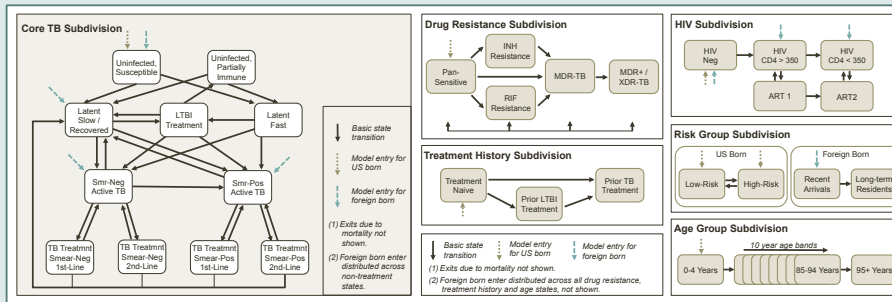
- Foreign-born individuals represent an increasing share of reported TB cases, with 66% of all TB cases reported for 2014 among foreign-born individuals.
- Historical reductions in TB case rates reflect improvements in case finding and treatment, but further improvements in these areas may be difficult. New intervention approaches may be needed to maintain and accelerate declines in TB cases.

Research questions and approach

- It is important to understand the long-term trends in TB epidemiology in the US, and the impact of policy options that might be employed to decrease TB burden and shorten the time to TB elimination.
- We developed a detailed mathematical model of TB epidemiology and the mechanisms determining long-term outcomes, and used that model to simulate the future course of TB epidemiology under several policy scenarios.

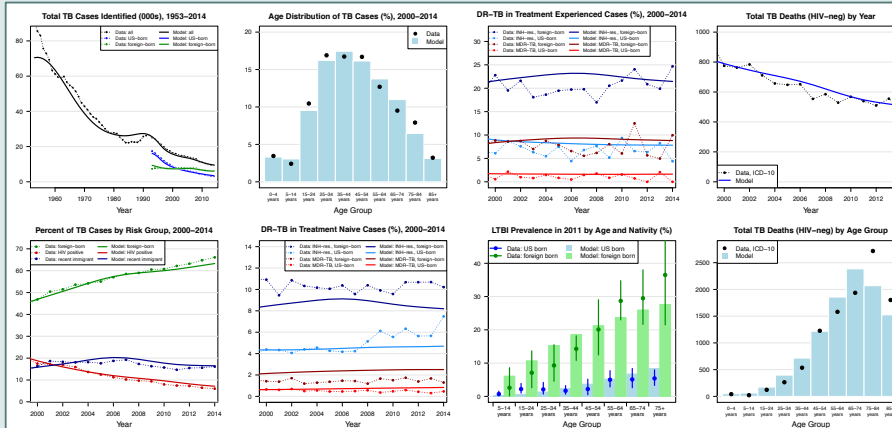
Model structure and parameterization

- Model constructed as deterministic state-transition model, with subdivisions for relevant features of TB epi and control.
- Published evidence used to create prior distributions for model parameters, then Bayesian calibration to program data.



- Simulations from 1950 to create appropriate cohort distributions, compare to historical data. Policy projections from 2015.

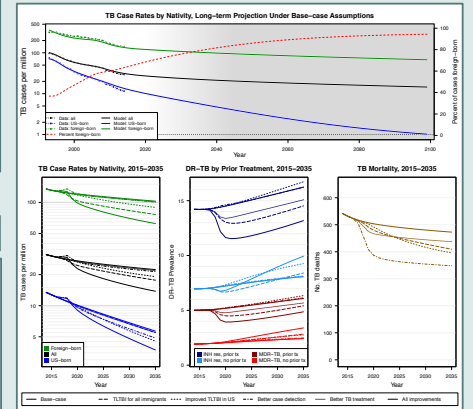
Fit to historical data



Scenarios

- Base case: TB care held at current levels
- LTBI screening & treatment for all immigrants
- INH-RPT LTBI regimen, intensified screening of risk-groups
- Intensified case detection, halve time to treatment initiation
- Reduce treatment default/failure, DR-TB misdiag. by 50%
- All improvements (scenarios 2-5) together

Future projections



Conclusions

- Projections suggest an ongoing, approx. log-linear decline in TB cases among the US-born population. TB incidence increasingly dominated by imported infection, and longer-term projections are sensitive to uncertainty in immigration patterns and trends.
- Future trends in TB in the US depend on TB control success among foreign-born and high-risk groups. Accelerating declines in TB cases will require substantially expanded LTBI treatment, strategies targeting imported infection, or novel approaches for addressing LTBI burden.