Broadening the Application of Epidemiology in Tuberculosis Control

Key activities in TB control

Current and broader applications of epidemiology in TB control

Examples from New York City – using data strategically
Using Epidemiology for Data-Driven Decision-Making in Tuberculosis Programs
February 24, 2016

GLOBAL


1. Pursue high-quality DOTS expansion and enhancement
2. Address TB/HIV, MDR-TB, and the needs of poor and vulnerable populations
3. Contribute to health system strengthening based on primary healthcare
4. Engage all care providers
5. Empower people with TB, and communities through partnership
6. Enable and promote research

COMPONENTS OF WHO STOP TB STRATEGY

WHO END TB STRATEGY (BY 2035)
Essential Components of a Tuberculosis Prevention and Control Program Recommendations of the Advisory Council for the Elimination of Tuberculosis

- State and local health departments have primary responsibility for preventing and controlling TB. To meet this challenge successfully, TB control programs should be able to administer activities that include the following core components:
  - conducting overall planning and development of policy,
  - identifying persons who have clinically active TB,
  - managing persons who have or who are suspected of having disease,
  - identifying and managing persons infected with M. tuberculosis,
  - providing laboratory and diagnostic services,
  - collecting and analyzing data, and
  - providing training and education.
TB PROGRAMS IN THE USA HAVE COOPERATIVE AGREEMENTS WITH CDC

CDC: Basic principles of TB Control
1. Find, treat and case manage TB cases to treatment completion
2. Contact evaluation
3. Prevention of TB disease in persons with TB infection
4. Prevention of recent transmission through application of:
   - Infection control measures
   - Molecular epidemiology

- Programs funded to conduct:
  - Surveillance and Reporting
  - Treatment and Case Management
  - Contact investigation
  - Evaluation of immigrants and refugees
  - Program evaluation
  - Human resource development

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LOCAL: KEY ACTIVITIES FOR NEW YORK CITY BUREAU OF TB CONTROL

- Direct patient care
  - Provides free diagnostic and treatment services, and offer clinic-based directly observed therapy (DOT) in four TB clinics throughout the city

- Surveillance and reporting
  - Maintain surveillance and case management system, and monitor trends

- Case management and contact investigation
  - Conduct intensive case management to ensure TB patients complete treatment, ideally on DOT
  - Evaluate household contacts for TB infection and disease

- Outbreak detection and response
  - Investigate genotyped clusters and coordinate public health interventions to prevent the spread of TB

- Medical consultation and outreach
  - Set standards and guidelines, and provide consultation to health care providers on all aspects of TB control

- Research and evaluation
  - Conduct data analytic and evaluation of policies and practices, monitor performance indicators and conduct in research
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APPLICATIONS OF EPIDEMIOLOGY IN TB CONTROL

- **SOCIETY FOR EPIDEMIOLOGY IN TB CONTROL (SETC)**
  - Professional network of TB controllers interested in epidemiology
  - Promote excellence in the use of epidemiologic analysis and interpretation of data to inform TB prevention and control efforts
  - Promote the use of epidemiologic data in program planning and decision-making at the local, state and national level
  - Provide a network for collaboration and communication among epidemiologists engaged in the control and prevention of tuberculosis
  - Build regional and national capacity in epidemiologic expertise through mentoring of epidemiologists
  - Organize and facilitate TB-related educational opportunities for epidemiologists
  - Promote understanding and collaboration between epidemiologists, clinicians and public health programs in the control and prevention of TB in communities
  - Promote the evaluation and implementation of new epidemiologic tools (e.g., to collect and analyze data or to assess TB transmission), as they become available
  - Promote and participate in a research agenda addressing the needs of TB controllers
  - Advocate for national data-driven policies and resource allocations which promote and enable achievement of the goal of tuberculosis elimination in the United States
Current applications of epidemiology in TB control
- Surveillance/descriptive epidemiology
- Analysis
- Database management

Broadening the role of epidemiology
- Enhancing field work
- Assessing transmission in contact investigations
- Conducting outbreak investigations
- Use surveillance data to inform and evaluate program planning
- Identification of high risk groups
- Informing non-epidemiologic analyses
- Cost effectiveness analysis
- Qualitative studies

NEW YORK CITY EXAMPLE
TB REGISTRY DATA: WHERE DOES DATA COME FROM?

- Patient reported to health department
- Assigned a BTBC case manager
- Chart review
- Interview and test
- Identify contacts
- Interview and test contacts
- Follow-up for cases and contacts until treatment completion

TB MAVEN

- Data on all reportable TB-related conditions
  - TB cases
  - Contacts to TB cases
  - Persons suspected of having TB
  - Children <5 years old with TB infection
- Over >2300 fields in TB-Maven in 19 question packages
  - Demographics – age, race, sex, addresses, country of birth
  - Laboratory – smear, culture, NAA, drug susceptibility, genotyping
  - Clinical – co-morbidities (e.g., diabetes, hepatitis, etc.)
  - Social history – smoking, drug, alcohol, substance use, mental health
  - Referrals and recommendations
  - Contact management
  - Exposure site management
- Data is integrated into all BTBC public health activities

STRATEGIC USE OF DATA

- Surveillance/case management data
  - Review trends, understand our local epidemiology
  - Monitor certain high-risk populations
  - Inform decisions on when to expand contact investigations
  - Ad hoc analyses to inform policy and programmatic decision-making
- Genotyping data
  - Active surveillance of TB strains and clusters
  - Outbreak detection
  - Inform epidemiologic investigation and understand TB transmission
- Research and program evaluations
  - Inform local, national and international policy
ROLE OF SURVEILLANCE AND EPIDEMIOLOGY IN THE BTBC

- Surveillance
  - Provider and laboratory reporting, data collection and data entry, Maven administration, maintenance and data management, electronic reporting and laboratory coordination, managing interstate referrals
- Field epidemiology
  - Conduct surveillance for and investigate exposures of TB in congregate TB settings to identify and prevent transmission
- Outbreak detection and response
  - Reporting and analysis of genotyping results and cluster-related information, identifying, prioritizing and assigning TB clusters for investigation, coordinating public health interventions to control and prevent TB outbreaks
- Epidemiologic data analysis and research
  - Monitor trends, descriptive and analytic studies to guide program & clinical care

TUBERCULOSIS CASES AND RATES, NEW YORK CITY, 1980 – 2013

TWO EPIDEMICS

TB in New York City (NYC), 1992-2013

Average percent decline in TB cases per year 1992-2013
- Overall: 9.1%
- US-born: 14.6%
- Foreign-born: 0.6%
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PRIORITIES FOR TB CONTROL

Recent transmission
- Contacts to TB patients
- Disseminated cases, outbreaks
- Young children

High risk groups
- HIV-infected and other medical risk (e.g., immunosuppressed)
- Marginalized populations
  - Homeless
  - Substance users
  - Undocumented

Marginalized populations

Who else?
- Certain foreign-born
- Diabetics, other medical risk

PRIORITIES FOR TB CONTROL

- Routine data analysis
  - Surveillance data
- Supplemental data analysis
  - Sentinel populations
  - Ad hoc analyses
- Research
- Molecular epidemiology
  - Genotyping/outbreak detection/epidemiologic investigation

USE DATA STRATEGICALLY TO IDENTIFY HIGH-RISK GROUPS

HIGH RISK GROUPS AMONG FOREIGN-BORN TB PATIENTS

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SYSTEMATICALLY EXPANDING CONTACT INVESTIGATIONS

ECI REFERRALS, 2014

- 413 congregate exposures
  - 153 healthcare facilities
  - 130 worksites
  - 47 school/daycare
  - 26 other (many HHA related)
  - 18 worship
  - 13 airline
  - 9 homeless shelters
  - 8 home health aide-related
  - 6 leisure
  - 3 prison

- Of the 413 exposure sites:
  - 165 not investigated
  - 24 decision pending
  - 225 investigated
  - 159 healthcare
  - 17 large sites (15 or more)
  - 44 small sites (<15)
  - 5 “other”

- 900 contacts tested in these investigations!

THANK YOU!

AGENDA
- 1. Intro
- 2. Epidemiology
- 3. Case Investigation
- 4. Contact Investigation
- 5. Data Analysis
- 6. Reporting
- 7. Prevention

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