Imagine TB in a world without public health...

- Patients would take TB medications incorrectly
  - drug resistance would increase
  - more relapsed cases
  - patients would remain infectious for longer periods of time
Imagine TB in a world without public health…

- No accurate TB statistics
  - is TB increasing? decreasing?
  - how much drug resistance is there?
  - what are the risk factors for TB in your area?
  - how would we know when an outbreak occurred?
  - How would we make policy decisions and allocate resources?

Imagine TB in a world without public health…

- Who would respond to a TB outbreak?
- How would individual physicians locate and test all contacts to their TB patients?
- Who would ensure that new immigrants and refugees are screened and treated for TB?
Public Health...

…notifies you that your LTBI patient should be switched to Rifampin because the source case is resistant to INH.

… informs you that your Hmong patient with suspected TB likely came from a refugee camp with an outbreak of MDR-TB.

Public Health...

…has the authority to pursue legal action with an infectious TB patient who refuses to continue his TB therapy.
Public Health...

- notifies your infection control practitioner that a patient you saw two months ago for pneumonia has been diagnosed with infectious TB in another hospital and may have exposed your staff and patients.

Public Health...

- contacts the Ohio DOH to clarify that your patient who reports that she “had TB 5 years ago” was actually an LTBI patient who took only 3 months of INH.
Public Health... 

- notifies you that your asymptomatic patient’s positive *Mtbc* culture may in fact be a laboratory cross-contamination because the public health genotyping system shows that the isolate matches that of another patient from the same lab.

Major Challenges to Successful TB Control in the U.S. (1)

- Prevalence of TB among foreign-born persons living in the U.S.
- Delays in detecting and reporting cases of pulmonary TB
- Deficiencies in protecting contacts of persons with infectious TB

Controlling Tuberculosis in the United States, CDC, 2005
Major Challenges to Successful TB Control in the U.S. (2)

- Deficiencies in preventing and responding to TB outbreaks
- Presence of substantial population of persons with latent TB infection (LTBI)
- Maintaining clinical and public health expertise in an era of declining TB incidence

Controlling Tuberculosis in the United States, CDC, 2005

Public Health Responsibilities for Prevention and Control of TB
History of Public Health Role in Tuberculosis Control

- Early 1900s: visiting nurses charged with home-based care of TB patients
- Legal mandate for TB control delegated to local and state health departments
- Strategies focus on linkages and partnerships within communities

Public Health Goals for TB

- Stop/prevent transmission
- Prompt, appropriate treatment to prevent drug resistance
- Completion of effective treatment and cure of illness
Hierarchy of TB Prevention and Control Strategies

1. Active TB Disease
2. Contact Investigation
3. Targeted testing/treatment of LTBI
4. Infection control measures in high-risk settings
Public Health Goals (1)

- Promptly initiate treatment
- Provide TB care and treatment according to published standards of care
- Prevent disease progression
- Prevent drug resistance

Adapted from New Jersey Medical School National TB Center

Public Health Goals (2)

- Complete TB treatment within appropriate time frames
- Prevent transmission of TB within the community through effective contact investigations and delinquency control activities

Adapted from New Jersey Medical School National TB Center
Public Health Goals (3)

- Educate patients, families, and communities about TB
- Report TB cases and suspected cases to public health authorities
- Implement TB control activities according to national, state and local standards

Minnesota Department of Health
TB Program Activities

- Collect, analyze and report surveillance data
- Oversee case management and contact investigations
- Assure expert TB medical consultation
- Provide public health consultation and education
- Assure the screening and follow-up of immigrants and refugees at risk for TB
- Provide free TB medications
Minnesota Department of Health
TB Program Objectives:
Active TB Disease

- 90% of eligible TB cases will complete therapy within 12 months
- 100% of culture-positive TB cases will have drug susceptibility testing done
- 92% of TB cases aged 25-44 will be tested for HIV

TB Program Objectives:
Contact Investigation

- 95% of sputum smear-positive cases will have contact(s) identified.
  - 87% of contacts will be evaluated for LTBI and TB disease.
    - 90% of contacts with disease will complete treatment
    - 83% of newly-infected contacts will start LTBI therapy.
    - 67% will complete LTBI therapy.
TB Program Objectives:
Immigrants/Refugees with TB Class Conditions

- 92% will be appropriately evaluated for LTBI and TB disease.
  - 100% with TB disease will be placed on treatment.
    - 90% will complete treatment.
- 83% who are eligible for treatment for LTBI will be placed on treatment.
  - 44% will complete treatment.

Local Health Departments Responsibilities (1)

- Monitor TB trends/risks in their jurisdictions
- TB contact investigations
- DOT and nurse case management
- Provide incentives/enablers
Local Health Departments (2)

- Ensure access to TB clinical and diagnostic services
- Facilitate reporting of TB suspects and cases to MDH; address problems with compliance
- Locate new refugees and arrange for initial health assessments
- Monitor persons on LTBI therapy

Collaboration Between Public Health Agencies and Private Providers Caring for TB Patients
**TB Reporting**

- Reporting of active TB
- Reporting in all states
- Reporting of suspected TB cases
- Laboratory reporting
- Reporting of LTBI
- Reporting of clusters of TST conversions
Reporting Active TB Disease

- TB cases and suspected cases should be reported to PH authorities within one working day of identification
  - Culture positive for *Mtbc*
  - Suspected TB starting on TB treatment
  - Includes pulmonary and XP sites
  - Includes culture-negative (“clinical”) cases

HIPAA and Communicable Disease Reporting

HIPAA allows reporters to provide medical information necessary for public health surveillance, investigations and interventions.
TB REPORTING

Labs, Health Care Providers, Other Reporters

Local Health Department

State TB Program

CDC DTBE

WHO

Public Health Surveillance

Ongoing, systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, integrated with timely dissemination of these data to those responsible for prevention and control.
Uses of Public Health Surveillance

- Estimate magnitude of problem
- Determine geographic distribution of illness
- Portray natural history of a disease
- Detect epidemics/define a problem
- Generate hypotheses, stimulate research
- Evaluate control measures
- Monitor changes in infectious agents
- Detect changes in health practices
- Facilitate planning

Surveillance – Geographic Distribution
Tuberculosis notification rates, 2005

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border locations for which data may not yet be fully available.
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Surveillance: History of Disease

Reported Cases of Tuberculosis
Minnesota, 1953-2007

Surveillance – Monitor Changes in Infectious Agents

Highest MDR-TB rates
> 10% among new cases
> 50% among previously treated cases
## Surveillance – Detect Changes in Health Practices*

<table>
<thead>
<tr>
<th>How TB Cases Identified</th>
<th>1980</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presented at hospital or clinic</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>Overseas TB screening</td>
<td>1%</td>
<td>9%</td>
</tr>
<tr>
<td>TB contact investigation</td>
<td>1%</td>
<td>6%</td>
</tr>
<tr>
<td>Employee screening</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Domestic refugee screening</td>
<td>2%</td>
<td>25%</td>
</tr>
</tbody>
</table>

* Hypothetical data
Public Health TB Laboratory

“The laboratory is an essential part of the diagnosis, treatment, prevention, and control of TB”

Institute of Medicine Report, L. Geitner, ed
Ending Neglect: The Elimination of TB in the US, 2000

Public Health TB Laboratory

“Delays in laboratory confirmation of TB and reporting of drug-susceptibility results can lead to delays in initiation of therapy, prolonged infectiousness, inappropriate therapy, and missed opportunities to prevent transmission.”

CDC
National Action Plan to Combat MDRTB, 1992
Public Health TB Laboratory Support

- State PH labs
  - AFB smears and cultures
  - Species identification
    - Liquid & Solid media
    - HPLC
    - NAA
  - Drug susceptibilities
  - Consultation for labs, clinicians
- CDC labs
  - Drug susceptibilities
  - Genotyping

Role of the Health Department in TB Case Management
TB is a Unique Disease

"It is strongly recommended that the initial treatment strategy utilize patient-centered case management with an adherence plan that emphasizes direct observation of therapy."

Treatment of Tuberculosis, 2003

Responsibility for TB Treatment (1)

The responsibility for successful treatment lies with the public health program or private provider, not with the patient.

Treatment of Tuberculosis, 2003
Responsibility for TB Treatment (2)

- The prescribing physician...is carrying out a public health function with responsibility not only for prescribing an appropriate regimen but also for successful completion of therapy.
- ... given a clear understanding of roles and responsibilities, oversight of treatment may be shared between a public health program and a private physician.

TB Case Management

- Assures that:
  - Patient assessed, interviewed; treatment plan developed
  - Therapy appropriate and continuous (DOT)
  - Response to treatment monitored
  - Patient educated about disease and treatment

- Isolation maintained as appropriate
- Contacts identified, evaluated & treated
- Referral to other services as needed
- Continuity of care

Treatment of Tuberculosis, 2003
What Is TB Case Management?

- Systematic approach
- Responsibility assigned to one person
- Collaborative process
- Plan to ensure specific, measurable outcomes
  - e.g., completion of therapy, HIV testing
- Regular review of patient’s progress
- Coordinates care

Eight Elements of TB Treatment Plan

1. Assignment of responsibility
2. Medical evaluation
3. TB treatment
4. Monitoring
5. Adherence plan
6. TB education
7. Social services
8. Follow-up plan

CDC, 1995
Case Management Team

- Public Health Nurse Case Manager
  - May be shared responsibility between local and state health departments
- Physician
- Clinical nurse
- Contact investigator
- Others (e.g., outreach worker, interpreter, social worker, school nurse, correctional facility, dialysis unit, etc.)

What Do TB Nurse Case Managers Do? (1)

- Assess patient’s knowledge and perception
- Hospital discharge planning
- Educate individuals and communities about TB
- Provide Directly Observed Therapy (DOT)
**Directly Observed Therapy (DOT)**

“DOT is an adherence-enhancing strategy in which an HCW or other specially trained health professional watches a (TB) patient swallow each dose of medication and records the dates that the administration was observed. DOT is the standard of care for all patients with TB disease and should be used for all doses during the course of therapy for TB disease…”

CDC. Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005.

**DOT at Home**

Photograph courtesy of Hennepin County TB Program
DOT at Workplace

What Do TB Nurse Case Managers Do? (2)

- Monitor tolerance of therapy, report adverse effects to physician
- Document response to therapy
- Refer to social services or other community resources (food, housing, HIV/AIDS services, etc.)
- Interjurisdictional referrals

Photograph courtesy of Hennepin County TB Program
What Do TB Nurse Case Managers Do? (3)

- Document non-adherence and interventions undertaken to help improve adherence
- Assure isolation of infectious patients
- Help ensure that TB patients keep medical appointments and obtain follow-up lab/CXR testing

Case Management

Isolation/Legal Measures

- Least restrictive
- May require proof of infectiousness
- May require documented history of non-adherence
  - Isolation
  - DOT
  - Examination
- Authority assigned to state or local PH department
Expert TB Medical Consultation

Regional TB Medical Consultation
TB Medical Consultants for Minnesota

Dean Tsukayama, MD
- Medical Director, Hennepin County TB clinic
- tsuka001@umn.edu
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Michelle Hulse, MD (Pediatric TB)
- Infectious Disease Specialist, Children’s Medical Center
- 651-220-6444 (o)

TB Contact Investigation

Every case of TB was once a contact
Contact Investigations – A Crucial Prevention Strategy

- On average, 10 contacts are identified for each person with infectious TB in the U.S.
- 20%–30% of all contacts have LTBI
- 1% of contacts have TB disease
- Of contacts who will ultimately have TB disease, approximately one-half develop disease in the first year after exposure

Contact Investigation Responsibilities

- Health departments are responsible for ensuring the conduct contact investigations
- Contact investigations are complicated activities that require
  - Many interdependent decisions
  - Time-consuming interventions

CDC
Purpose of Contact Investigations

1. Finding and treating additional cases of TB (potentially interrupting further transmission)

2. Finding and treating persons with LTBI to prevent future cases

Steps in a Contact Investigation (1)

1. Decision to initiate an investigation

2. Investigating the index patient and sites (locations) of transmission

3. Assigning priorities to contacts

Adapted from CDC
Steps in a Contact Investigation (2)

- Diagnostic and public health evaluation of contacts
- Medical treatment for contacts with LTBI (or disease)
- Deciding when to expand a contact investigation

Thank You

Questions
References

- Controlling Tuberculosis in the United States: Recommendations from the American Thoracic Society and the Infectious Diseases Society of America. MMWR 2005; 54(No. RR 12)
- Essential Components of a Tuberculosis Prevention and Control Program (ACET). MMWR 1995; 44 (No. RR 11)
- The Role of the Public Health Department in Tuberculosis. Etkind, Sue. Medical Clinics of North America; 1993;77:1303 1314