TB Outbreak Investigation in Fishery Workers, Maryland

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Airborne Transmission

- Tuberculosis
  - Small droplet nuclei (<5 microns)
  - Can remain suspended in the air for long periods
  - Float on dust particles
  - 20-30% of close contacts will become infected
  - 5-10% of infected will progress to active TB
Risk of TB infection and disease among exposed individuals

- Exposure (close contact)
  - No infection: 70%
  - Infection: ~30%

- Early progression (recent TB ≤ 2 years)
  - 5-10%

- Containment
  - 90-95%

- Late progression (reactivation TB)
  - 5%

- Continued containment
  - 85-90%
Treatment of Latent TB Infection (TLTBI)

• Individuals at high risk of active disease
• Medication for prolonged period
  – Mainly, INH for 9 months (hepatotoxicity)
  – Other regimens are now available
• Prevents the development of TB disease 90% of the time
Using Genotyping to Detect Transmission

- TB transmission from one patient to another
- IS6110 RFLP patterns
  - Lane 1: Lab Standard
  - Lane 2: Patient A
  - Lane 3: Patient B
Background

- Between 1980 and 1998 there were 3 TB outbreaks among fishery workers in Queen Anne’s County, MD.
- In 1996, Queen Anne’s County had the highest incidence rates of TB in the entire state (23.1 versus 6.6 per 100,000)
Number of TB Cases and Rates
Queen Anne’s County, Jan ’79 – June ‘98
Objectives of the Internship

• To describe the outbreak history and current surveillance data.
• To summarize the transmission patterns of the cluster and to determine any additional TB cases linked to the cluster.
• To describe the public health intervention by the local health department taken to eliminate further outbreaks.
Methods

• Review of medical and contact investigation records
• Review of newspaper articles and other documents from the outbreak period
• Genotyping database review
  – Searched for similar genotypes
  – Collaborated with Delaware and Virginia TB Control Units
• Interviews with local health department staff and owners of the fishery house
• Observation of intervention activities
A Reoccurring Outbreak

- Newspaper articles indicated the problem had been an issue since the 1980’s
- Cases from the 1996-1998 outbreak were listed as contacts in previous outbreaks
- The source case for the 1996 outbreak was found to be TST positive in 1976
The 1996 Outbreak

Figure 3: Overlap of Contact Between RFLP Clustered Cases Compared to Non-Clustered Cases

LEGEND
DNA Linked  Non-DNA Linked  Isolate Not Available
Proportion of TST Positivity Among Contacts Jan '95 - April '98

- Fishery Workers: 72%
- Non-Fishery Workers: 40%
- US (1986 Data): 72%

Legend:
- TST Positive
- TST Unknown
- TST Negative
Percent LTBI Treatment Completion Among Eligible TST Positive Contacts (January 1995 - April 1998)

Non-Cases (n=85)

- Completed LTBI Treatment: 18
- Did Not Complete LTBI Treatment: 25
- No LTBI Treatment: 42
Results:
Genotyping Database Review

• No matching genotypes were found
  – Maryland – 1595 isolates reviewed
  – Virginia – 494 isolates reviewed
  – Delaware – 12 isolates reviewed
Results: Local Health Department Intervention

- Active case finding
  - Annual sputum collection at fishery houses
- Improved reporting mechanisms
- Dedication of local health department staff
- Baseline TST
- Educational program for local physicians
- Part-time nurse hired
- Actively built relationships with local fishery managers
Key Issues

• Underserved populations
• An evolving at-risk population
• Treatment for latent infection
• Genotyping project & multi-state outbreaks
• Active case finding & effectiveness of the intervention
Underserved Populations

• A need to identify and describe TB outbreaks in underserved populations, including the poor, rural, and immigrant
• TB rates for African Americans are 8.3 times that for Whites
• African Americans with TB are more likely to have excess alcohol or drug use
• TB interventions often only access to healthcare
An Evolving Population

- 53.7% of TB cases are from foreign-born individuals
- 41% of those cases are from Central & South America and the Caribbean
- Hispanics now make up 50% of the fishery population
- A mix of TB with social services
- Translation
- Culturally sensitive interventions
Treatment for Latent Infection

• Only 13% of this cohort underwent LTBI treatment
• Prevailing reason was fear of risk of liver damage
• How to convince an alcoholic population?
Genotyping & Multi-State Outbreaks

- CDC-sponsored genotyping project was critical
- Relationships between cases with the same strain, which would have otherwise been missed, were identified.
- Important to periodically compare genotype patterns beyond local jurisdictions
Active Case Finding & Effectiveness of the Intervention

- The strikingly high rate of TB infection and disease
  - Needed a new approach to control it
- A need to address a delay in TB diagnosis
- Active case finding was most appropriate for this situation (vs. enhanced case finding or treatment of LTBI).
Lessons Learned

• State & local health department partnership and inter-state partnership
• The components of a strong intervention
• The need to address changing populations
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