Mid-America Regional Public Health Leadership Case Study:

TB Outbreak in Tuberque County vs. Infrastructure Development of Local Health Department

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Introduction

The ability of the public health system to respond to disease outbreaks, whether naturally occurring or man-made, is dependent upon the development of the core functions within local and State health departments. These core functions have been identified as assurance, assessment and policy development. This case study will examine the response of a local health department, located in Tuberque County, to an outbreak of active tuberculosis (see Appendix A). The ability of the local health department (LHD) to perform the assessment function will be analyzed in terms of data collection and statistical analysis, and the resulting development of policy at the local level will be discussed. The progression of infectious disease within a community is often viewed in relationship to social factors that influence their spread, and in this context, infectious disease can be socially opportunistic. Policy development occurs within, and is influenced by, the overall political and organizational environment. This case study will also examine the interrelationship between disease transmission in a social network and the related efforts to implement policy within a preexisting political environment.

Statement of Facts

The Tuberque County Health Department was created in 1967. In 1969, the local affiliate of the American Lung Association, Tuberque County TB Control Association (TCTBCA), transferred control of tuberculosis (TB) to the newly formed local health department. Annual spending for TB control activities by the TCTBCA was approximately $22,000 and hospitalization costs associated with TB control were about $21,000 in 1967. In comparison, the 1997 budget for the entire non-personnel Public Health Nursing division was $27,000 with spending for TB control as a fraction of that total amount. Exclusive of inflation trends, the total dollars spent for TB control were significantly less in 1997 than in 1967. This was despite the fact that in 1997, the actual number of cases was equivalent and the County was in an upward trend in the disease cycle. The latest disease cycle began in 1995 and resulted in Tuberque County gaining the distinction of having the highest case rate in the State during 1997 and 1998. (See Appendix B).

Public health departments operate in a political environment, as well as within the social, economic, and natural environments of the community. An outbreak of an infectious disease will test the ability of a local health department to not only adequately reduce disease incidence, but serves to demonstrate the ability of the public health system to meet the core functions. The Tuberque County Health Department's abilities were put to the test during this TB outbreak. Furthermore, the health department's organizational capacity to control the outbreak occurred while simultaneously attempting to build local public health infrastructure and organizational capacity. Local health providers, policy makers, and the community were challenged to respond to the outbreak.

Assessment of the Outbreak

As stated in the *2000 Institute of Medicine – Ending Neglect: The Elimination of Tuberculosis in the United States Report*, the major reason for the resurgence of TB was the deterioration of the public health infrastructure essential for the control of the disease and has estimated that the monetary costs of losing such control could be in excess of $1 billion for a large community, such as New York City. As a result of a similar loss of control in Tuberque County, the health department sought approval from the County Council for additional personnel to enhance TB control efforts. Appealing to the Council for approval of additional funds, the health department presented an emergency request for additional staff to be considered as an additional appropriation for the current year's budget.

Working against the backdrop of the health department's inability to ascertain statistical trends, both in terms of case rates and spending patterns, there was a relative drop in funding for TB control. Although case management activities followed general guidelines for contact investigation, the maintenance of case records occurred in a color-coded card file system. Prior to April 1998 the Health Department staff had only limited access to basic computer infrastructure and the geographical tracking of disease incidence was virtually non-existent. Acknowledging the consequence local health departments can face without robust information and data systems, the *2000 Centers for Disease Control – Public Health's Infrastructure Report* identified the ability to electronically access and distribute current public health information and emergency health alerts, monitor the health of communities and assist in the detection of emerging public health problems as a goal area for 2010.

As the public health system exists beyond the institutional boundaries of the local Health Department, the deficiencies that resulted when trying to control the spread of TB were evidenced in other parts of the medical community. Consequently, inefficient contact investigation and treatment protocol led to many contacts failing to complete preventative therapy.

Development Infrastructure

From late 1997 to early 2000, the Tuberque County Health Department's response to the TB outbreak was of critical interest, especially to the local media. Before January of 1998, former management of the Health Department described the County's TB rates as a "statistical artifact," while attributing the elevated rates to "better investigation techniques" and "increased immigration." While immigration had been a factor in other areas of the country, subsequent investigation revealed that local incidence was the result of transmission within a complex, local social network.

Upon the appointment of a new Health Officer and Administrator in early 1998, the response to the outbreak was weakened by inefficient organizational capacity, insufficient information and data systems, and a workforce that lacked a level of training

necessary to address the outbreak. The necessity of workforce competency and capacity is noted as another goal in the *2000 Centers for Disease Control – Public Health's Infrastructure Report.* The report emphasized that " if the public health system is fully prepared to carry out the essential services, then communities across the country will be better protected from both routine and acute health events."

With the director of Nursing having been in her position for six months before the appointment of the Health Officer and Administrator, this represented a complete change in the health department's administration at the height of the disease cycle. The challenges facing the new administration were increasingly significant. In addition, the lack of effective community collaboration and the medical establishment's unfamiliarity with TB made the task of controlling the outbreak much larger than the disease incidence itself. While TB control programs needed to be completely redeveloped, the need to simultaneously build the public health infrastructure of the county was equally vital.

As the outbreak cycle progressed, an incomplete understanding of the role of the local health department for communicable disease control in general and appropriate methodology for TB control in particular, lead to calls from the local media for mass screening in the public schools. The need for community collaboration was matched by a need for public education, which included local media and elected officials. For the medical community, the need for education involved proper procedure for treatment and the legal requirements for reporting cases to the local health department.

Policy Development

Upon the request from the local and state health department, the Centers for Disease Control and Prevention (CDC) initiated an EpiAid Program in Tuberque County. While the main focus was to identify the epidemiological characteristics of the outbreak, an additional focus was to analyze the policies and procedures of the local public health system.

An initial policy question involved the appropriate means for population screening. While contact investigation techniques, traditionally involving household contacts, were the primary focus of screening activities, identification of an intricate social network expanded skin testing into locations of social settings. In addition, a screening and testing protocol was developed through newly collaborated relationships with a local free clinic and other community organizations.

The relative effectiveness of screening activities can be seen in the positivity rate for various testing sites (see Appendix D). While public pressure for mass screening in the public schools was strong, positivity rates supported the policy of contact investigation, utilizing concentric circles of close contacts.

Another area of policy development involved interaction with health care providers. Having not seen TB in the community with any regularity, many physicians were unaware of reporting requirements, current treatment protocol or in some cases proper

diagnosis. The involvement of the CDC and state health department in the EpiAid Program resulted in an improvement in the diagnosis and treatment of TB in the community and strengthened the community partnership of medicine and public health.

Leadership Response

The local Health Department conducted the following activities to fortify its basic public health infrastructure:

Workforce Capacity and Competency

- Health Department staff received intensive TB training at the National Jewish Research Center of Denver, Colorado, USA, as did medical staff from local health care providers;
- The Centers for Disease Control and Prevention (CDC), and the State Department of Health, initiated an EpiAid program to assist the local health department in identifying the epidemiologic characteristics of the outbreak. This project also identified areas needing improvement in the local public health system;
- Health Department staff received training in database design, resulting in the internal development of a database tracking system. Further training in Geographic Information System (GIS) software allowed for the spatial display of disease incidence.

Information and Data Systems

- Training in software applications allowed the health department to demonstrate, through spatial analysis, disparities in health outcomes;
- A computer network that linked two health department offices was constructed, allowing for the electronic sharing of health information and an improvement in patient management.

Organizational and Policy Capacity

- Grant funding allowed for additional staff for contact investigation;
- Collaborative partnerships were developed with local hospitals and clinics that served the uninsured, resulting in a coordinated effort to expand community screening beyond traditional contact circles;
- Health department reorganization of the TB program was instituted in accordance with CDC recommendations;
- Upon demonstration of health disparities in the outbreak community, and of insufficient staffing levels and high disease incidence, approval was granted for permanent extra hires;
- Approval was granted for the establishment of a non-reverting fund for the control of communicable diseases. This served as a supplement to the regular budget for

the Nursing division of $36,000 annually, and provided funding for additional services for the diagnosis and treatment of sexually transmitted diseases.

There are three organizational practices identified for the policy development core function: (1) acting as an advocate for public health; (2) building community and evaluation constituencies and (3) identifying resources in the community. These activities are critical to building supportive and collaborative relationships with public and private agencies in addition to community partners to effectively create organizational systems for effective planning, implementation and management of public health programs and services. (*Rowitz)* These plans are essential for developing action plans in cooperation with community partners. Similarly, setting priorities, and developing plans and policies to meet the prioritized health needs of the community, are fundamental to response. Finally, assurance practices, including evaluation of program activities provides the framework for critical review of the effectiveness of the program, the data, and monitoring performance.

Conclusion

The case represented an analysis of a local health department's response to a TB outbreak during a time of administrative transition and inadequate infrastructure capacity. The assessment and assurance public health core functions primarily guided the analysis with policy development considerations. Data tables were developed to demonstrate the parallel processes between the natural disease cycle and organizational response cycle to an infectious disease. The health department's response was driven by the need to demonstrate the public health core functions of assessment and assurance, while building infrastructure capacity.

Case Study Appendix

Appendix A

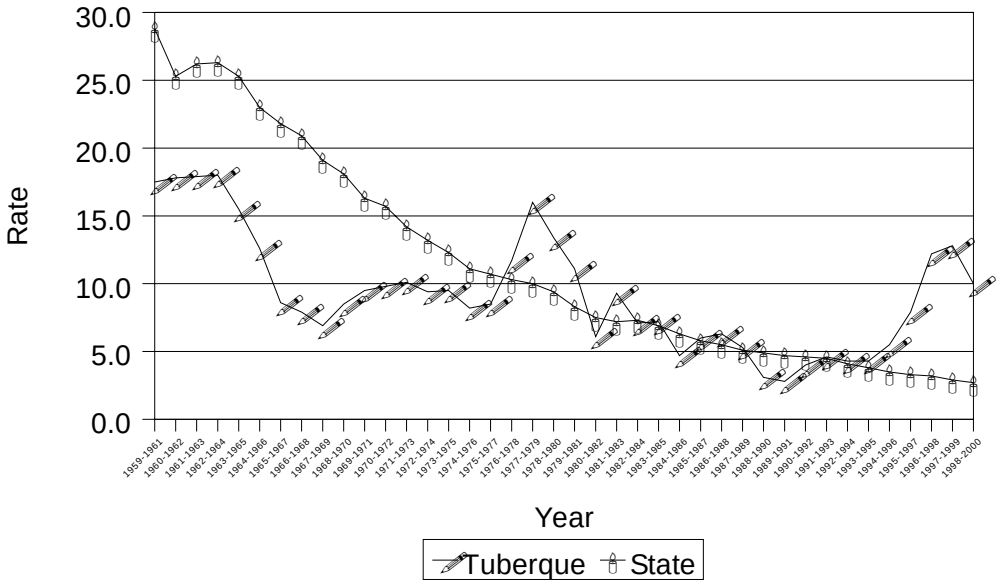
COMMUNICABLE DISEASE EPIDEMIC
CORRELATION OF NATURAL HISTORY OF DISEASE
AND PUBLIC HEALTH AGENCY RESPONSE

Pre-Pathogenesis	Pathogenesis			
Natural History of Disease				
No exposure. Awareness of disease prevention and health protection behaviors.	Exposure and infection of host.	Screening and diagnosis	Initiate treatment and follow-up to completion of regimen	Freedom from active disease and infectivity. Use of appropriate health promotion and protection measures.
Public health agency response to outbreak				
Local rate at or below state/ national rates. Policies, procedures, staff, resources, and infrastructure in place for on-going assessment and assurance.	Recognition of increased cases within the population.	Initiation of epidemiological investigation.	Active response by engaging internal and external resources in limiting new cases and assuring treatment of existing cases.	Incidence returns to or below pre-outbreak levels.

Appendix B

TB INCIDENCE RATES

3 YEAR MOVING AVERAGE

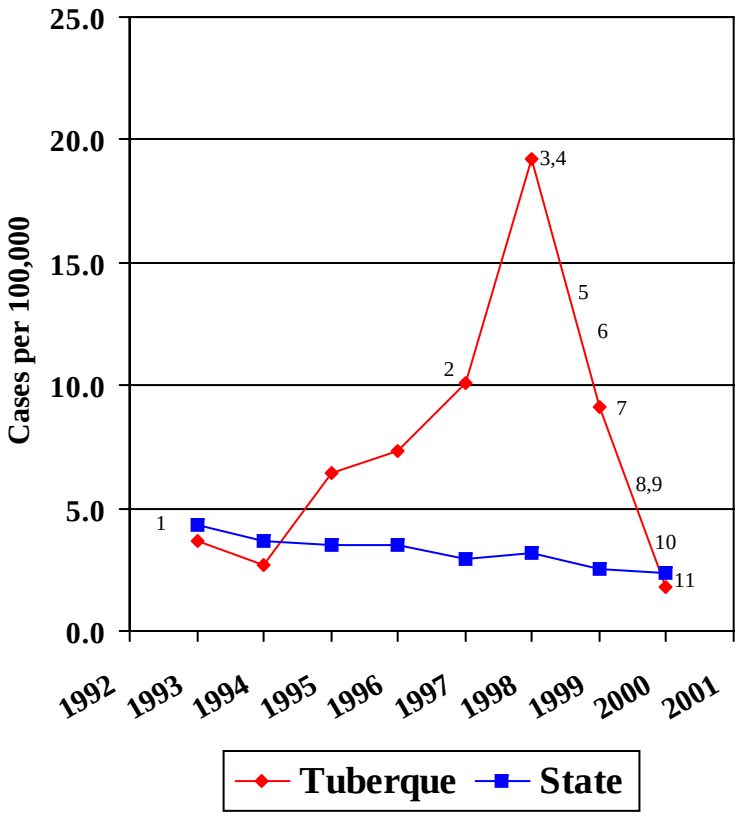


Source: Team SALUD

In order to determine if there indeed was an increase in TB cases, we needed to look at individual year rates. Because of the small numbers for most of those years, it was decided to look at a 3 year moving average, starting in 1969. By looking at the graph between Tuberque County and the State, we could see that the rates were definitely higher in the late 1990's. The state's rate was decreasing steadily, however the county rate was increasing, starting in the time period 1995-1997. By calculating significance tests, it was determined that there were three 3-year time periods that were higher than the state: 1996-1998, 1997-1999, and 1998-2000. This would indicate that there was indeed a problem in Tuberque County. Something was going to have to be done in order to decrease these rates.

Appendix C

TB Case Rate and Event Chronology



1) 1992: Mandatory TB screening in public schools

2) July 1997: New Nursing Supervisor appointed; requests increase in Nursing budget for TB control, but was denied by administrator

3) January 1998: New Health Officer appointed

4) April 1998: New Administrator appointed

5) June-August 1998: Jail screening database development; collaborative community outreach projects; grant--funded personnel additions; public pressure for mass screening in public schools

6) October 1998: Approved for DHC grant for full-time outreach worker

7) February 1999: CDC/SHD EpiAid program

8) May 1999: Emergency request to County Council for additional permanent personnel

9) May 1999: Implemented CDC recommendations for TB program; reorganized Nursing division

10) Approved for non-reverting fund for Communicable Disease Control

11) Initiated new STD clinics utilizing Communicable Disease Fund

Source: Team Hoosier SALUD

Appendix D

Table 2

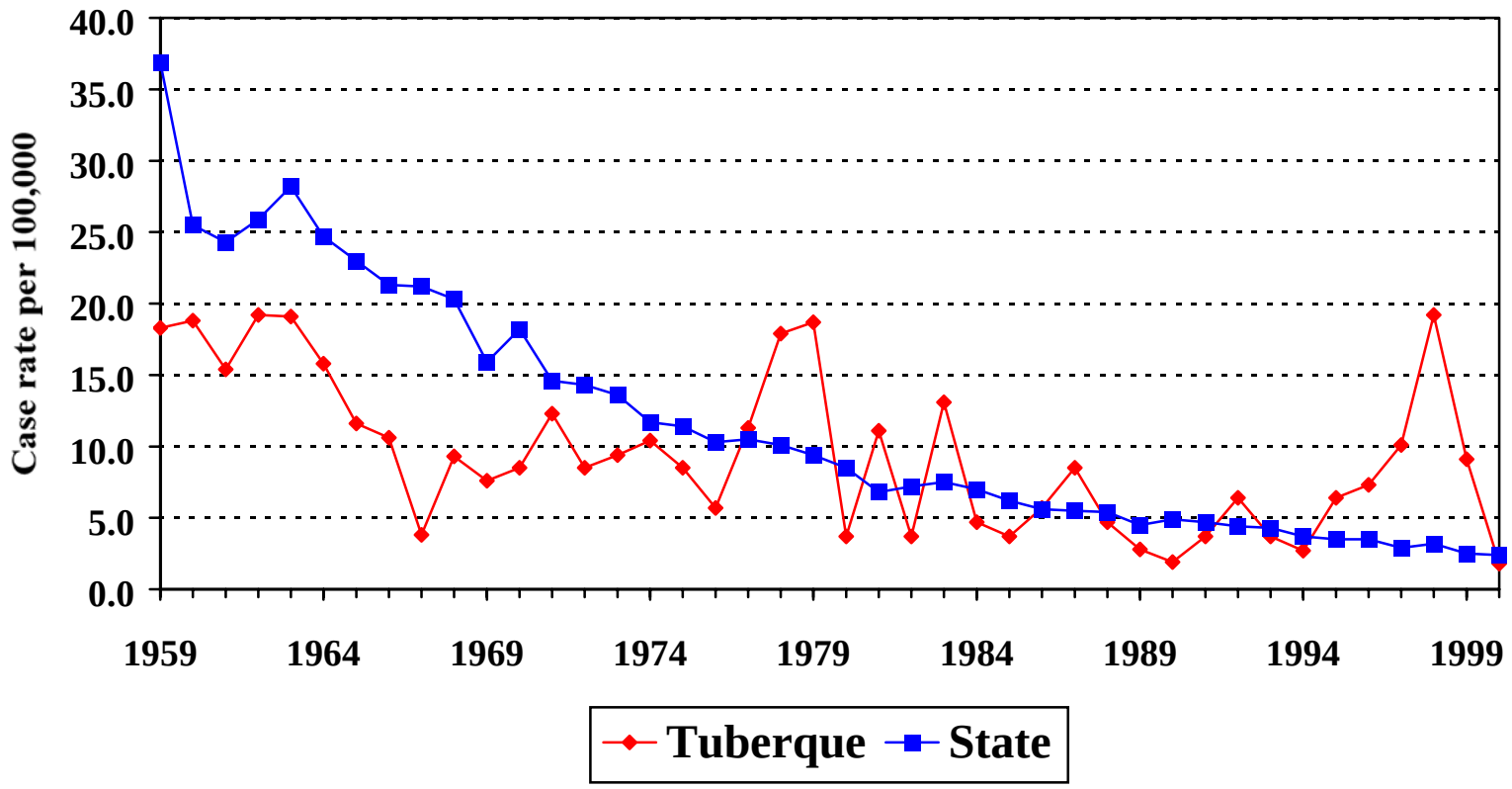
~~Contact Tracing Positivity Rate, Tuberque County, State~~

~~Location~~	~~% PPD+~~
TCHD Contact Investigation	63
Junkyard	36
Soup Kitchens	17
Housing Complexes	43 (1)
Workplace	3
Alternative School	4
Overall School Screening	< 1
Open Door Clients	6

(1) Note: Total persons tested N=7, results unreliable

Appendix E

TB Case Rates, State and Tuberque County



Source: Team Hoosier SALUD

Teacher's Guide Questions

1. What alternative strategies would you develop to address the inadequate case management?
2. How would you involve other local agencies to address this community health issue?
3. Referring to Appendix A, in what way does the case differ from the model?
4. How did the county come up with the extra money for the programs?
5. Did the media help or hinder the health department in acquiring additional resources?
6. What interpersonal skills would you suggest are necessary to gain acceptance into an outbreak community that is socially and culturally different from the outreach worker?
7. How can the public health department gain the acceptance of the outbreak community?
8. What methods would you have employed to assure that recalcitrant patients completed therapy?
9. Under what conditions would you consider 'incentives' and how might you incorporate the use of incentives into the procedures of a local health department's communicable disease program?
10. In your own experience, how do events external to your agency influence policy development? How did they impact Tuberque County in the development of program policy? How might a LHD engage the community in assessment while retaining the statutory responsibilities associated with communicable disease programs?