

TUBERCULOSIS CONTROL: A COOPERATIVE PUBLIC AND PRIVATE MODEL

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Challenges to public health programs for tuberculosis control are mounting. A review by the Institute of Medicine suggests that public health departments divest themselves of direct patient care to focus on broader concepts of management in the control of infectious diseases and other health care issues. The increase in the number of infectious diseases specialists in clinical practice in many geographic areas has provided an opportunity for cooperative private and public efforts to meet public health disease control objectives while improving medical management of patients who have traditionally sought care from local public health departments for the treatment of communicable diseases. This article describes a cooperative model for managing tuberculosis that was developed by a group of infectious diseases specialists with the public health department in Pierce County, Washington. Private-practice-based care of active tuberculosis cases achieved a cost savings for the health department and better compliance with treatment recommendations.

PUBLIC HEALTH INTERVENTION has been critical in reducing the morbidity and mortality associated with tuberculosis in the United States [1–3]. However, local control programs are currently faced with daunting challenges. The emphasis on directly observed therapy (DOT) requires substantial manpower [4,5]. The increasing incidence of multidrug-resistant strains has made the skilled management of complex medical regimens a vital component of many programs [6–8]. Despite the increased complexity of tuberculosis care and management, funding sources have become ever more uncertain. There has been reluctance in most communities to increase taxation for health care. Managed care initiatives in many communities have also shifted the responsibility for patients from the public to the private sector [9,10]. Following these trends, the Institute of Medicine recommended that health departments consider reducing their direct patient care services and re-allocate funds to develop population-based programs

[11]. They specifically suggest agencies should “develop relationships with and educate legislators and other public officials on community health needs on public health issues, and on the rationale for strategies advocated and pursued by the health department. These relationships should be cultivated on an ongoing basis rather than being neglected until a crisis develops” [12].

Whereas public health funding for tuberculosis care has declined, the number of infectious diseases specialists in private practice has increased [13]. This pool of highly trained physicians offers the community expertise in patient management and epidemiology. Clinical expertise is particularly valuable given the co-morbid conditions, such as human immunodeficiency virus (HIV) and hepatitis, associated with tuberculosis [14,15].

Joint ventures for tuberculosis care that unite the private practice community with the health department offer a tremendous potential for effective disease control. Private practitioners could focus on quality health care, whereas the health department would be free to focus on epidemiologic issues, public health interventions, and primary population-based prevention efforts.

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Background

Pierce County had a population of 705,000 in 1999. It is the second largest county in Washington State and

the most demographically diverse. The largest city is Tacoma, which has a population of about 349,000 in the greater metropolitan area. The demographics of the county population have changed appreciably in the last decade, with an increase in the non-Caucasian population from 16% in 1990 to about 20% in 2000. The largest component of the increase is attributed to immigrants from Southeast Asian countries and the South Pacific Islands. There is also a substantial migrant worker population of an estimated 10,000 persons.

The incidence of tuberculosis in Pierce County has declined over the last two decades from 90 new cases in 1980 to 26 new cases in 1995. Reactivation among immigrants accounts for about half of these cases. The frequency of isoniazid resistance has averaged 12% since 1995. Multidrug resistance has been found in only one case in the last 5 years.

Pierce County's health department maintained a tuberculosis control program as required by state law and health regulations. Health department responsibilities included the effective treatment of active cases, contact tracing, screening of high-risk populations in the community, and tuberculosis surveillance. Patients with active disease were initially evaluated by a pulmonary physician. Clinical follow-up was performed primarily by a health department nurse with physician oversight. Public health nursing staff also provided contact tracing, screening of high-risk individuals, and maintaining the tuberculosis control statistics for the county. Outreach staff provided DOT. Patients were seen in a room with negative airflow but with no special air filtration system. DOT has been encouraged in the county since 1980, but was not universally accepted. Reports to the State Department of Health were issued regularly or according to Centers for Disease Control and Prevention (CDC) reporting protocols.

Infections Limited is a group of seven infectious diseases specialists who provide the majority of infectious diseases consultation services for Pierce County and its seven hospitals. The office practice includes a travel clinic, microbiology laboratory, a pharmacy, and an outpatient parenteral antimicrobial therapy program [16,17]. Two of the doctors came to the group practice with prior experience managing a tuberculosis clinic.

When the health department's director and the Board of Health decided to act on the Institute of Medicine's recommendations, plans were developed to contract out medical services for active tuberculosis cases as well as for communicable diseases such as sexually transmitted diseases (STDs). Requests for proposal were written and contracts offered to community medical providers in 1996. A variety of community

clinic systems were funded to provide medical services, but tuberculosis was treated separately with a special request for management. Infections Limited responded with a risk-sharing proposal that was accepted by the Board of Health in October 1996.

Clinic Operations

In January 1997, Infections Limited opened a specially constructed "Chest Clinic." The patient care rooms have a negative airflow HEPA filtration system and a separate entry from a hallway with direct access to the outside of the building [18]. Infections Limited physicians are responsible for the initial workup of immigrants with positive skin tests, the initial evaluation of suspected active cases, and follow-up of all active cases. Patients are scheduled to be seen during a half-day clinic held once each week.

Medications are initially administered in the clinic, then dispensed as DOT by outreach staff with oversight by public health nurses who are employed by the health department. Each patient's daily dose is individually packaged and labeled by the Infections Limited pharmacy. Medication supplies are picked up weekly by the health department outreach personnel.

Health department nurses remain responsible for client case management in collaboration with Infections Limited physicians, and all field epidemiology including contact tracing, screening, and follow-up. Contacts of active cases are referred to their primary care physicians or to a health department contracted primary care clinic. Infections Limited physicians are available as consultants as requested. Health department responsibilities also include data collection and epidemiologic assessment.

Health department tuberculosis staff and the supervising Infections Limited physicians meet weekly to discuss issues and problems and to review statistical information. If the patients have other active medical problems and are being followed by another physician, reports of each visit are sent to them.

Health department staff and Infections Limited physicians have also developed community education programs with presentations to the public as well as physicians about screening and evaluation of patients with tuberculosis.

Methods

To evaluate the cooperative model, cases from the 2 years before the program's implementation (precon-

tract) were compared with those cases seen during the first 12 months of the program (postcontract). Records of all patients diagnosed with tuberculosis at the health department and at Infections Limited were reviewed by a physician during the study years. Patients were excluded if there was an overlap in management between the pre- and postcontract providers if mycobacterial cultures were negative. Multidrug-resistant cases were also excluded to avoid confounding variables in this relatively small sample. Measures of program effectiveness included compliance with DOT, length of time on medication, clinical outcomes, and adherence to CDC treatment recommendations [19].

Cost estimates for the health department were derived from budget, accounting, and staffing records. Infections Limited costs were estimated based on contractor and staffing expenditures.

Results

The results of the review of the health department records before and after the cooperative program implementation are shown in Table 1. Twenty-eight precontract cases and 20 postcontract cases met the inclusion/exclusion criteria. One hundred percent of all pre- and postcontract patients received DOT. Since the contract began, adherence to CDC guidelines has increased from 79% to 100%. The average use of pyrazinamide and ethambutol has decreased from 17 weeks to 1 week and from 16 weeks to 0.3 weeks, respectively. Total time on therapy has decreased from 43 weeks to 27 weeks. Drug resistance developed in only one case. That case was in the precontract group and related to a nonstandard regimen.

The cost of the tuberculosis control program before the contract was estimated to be \$536,000 with \$384,500 for personnel, \$32,000 for supplies, and \$60,000 for

contracted services. The cost for the year after the contract was instituted was estimated to be \$379,200 with \$232,900 for personnel, \$3400 for supplies, and \$124,000 for contracted services. This included contract payments to Infections Limited, clinics for screening and preventive therapy, plus the health department costs for nursing staff, medications, administrative staff, and their facilities. The health department tuberculosis staff was reduced from 10 to five persons. Savings have been redirected to provide surveillance and a comprehensive outreach and screening to high-risk populations. It has also allowed an aggressive education program for the private provider community regarding adherence to CDC communicable disease control guidelines and protocols.

Infections Limited spent approximately \$30,000 to remodel their offices to provide the chest clinic with a HEPA filter system and to meet state requirements for the care of tuberculosis patients [18]. Infections Limited has been able to pay for their new facilities plus provide care for patients with health department funding over the last 3 years.

Discussion

This cooperative model for tuberculosis care combines the resources of the public health department with the expertise of local private practitioners. The model emerged from a desire to provide better tuberculosis control at lower cost. It is not unusual for a health department to have a physician either working in or directing a tuberculosis clinic. However, a risk-sharing joint venture between the health department and a private practice represents a unique approach to the treatment and control of tuberculosis.

The number of cases of tuberculosis is not great enough to make detailed analysis worthwhile. They are sufficient, however, to demonstrate the effectiveness of the cooperative model compared with the standard public health model.

Part of the benefit of the cooperative model could be ascribed to the expertise of the physicians involved in management under the contract. This is the opposite of the situation described in an article advocating public health control [20]. An infectious diseases specialist could have been simply hired to manage the tuberculosis clinic at the health department but it would not have brought the benefits of management and efficiency and comprehensive patient care available in the private sector.

The joint venture has been beneficial for the public health department. The health department staff has

TABLE 1. A Comparison of Tuberculosis Cases Before and After the Institution of Cooperative Model

	Preprogram (1994–1996)	Postprogram (1997–1999)
Number of cases	28	20
Adherence to CDC guidelines	79%	100%
Patients on DOT	100%	100%
Duration of therapy	43 w	27 w
Excess use of pyrazinamide	17 w	1 w
Excess use of ethambutol	16 w	0.3 w
Treatment failure	5%	0%
Development of resistance	5%	0%
Cost savings	NA	27%

Note. Abbreviation used: DOT, directly observed therapy.

been freed from clinical responsibilities and is now able to focus on public health policy issues. Of monumental importance is that cost savings realized (more than \$390,000) as a consequence of contracting direct clinical care to the private sector has enabled the health department to reinvest in primary population-based prevention efforts. An integrated comprehensive communicable disease control model was established that emphasized a cooperative effort with the private provider community. This resulted in an improved relationship with the health department, raised the standard of treatment protocols, increased reporting of communicable diseases (by 30%), and encouraged the introduction of risk assessment and behavior change in community practice. In addition, efforts were intensified to achieve partner notification of 100% of all reported STDs. In an integrated manner, the department is pursuing population-based behavior change regarding alcohol and tobacco abuse, and domestic violence.

Privatization has also been beneficial for the patients. Patients with tuberculosis are now seen in a state-of-the-art facility. CDC guidelines are followed strictly and there has been a marked reduction in excess medication usage. The 24-hour coverage for medical problems provided for patients by Infections Limited physicians far exceeds that available in most health departments.

Perhaps the greatest benefit of the cooperative model has been the improved relationship between the health department and the community's physicians. A truly collegial atmosphere has developed between the Infections Limited physicians and the health department staff. This change has facilitated the sharing of data and has led to new joint projects focused on antibiotic resistance, telemedicine, and HIV care.

We believe that the cooperative model of tuberculosis care would work in many, but not all, communities. Several factors are required in order for a cooperative program to succeed. First, there needs to be local expertise in tuberculosis care in the private sector. This expertise can be provided by infectious diseases specialists, pulmonologists, or internists. Second, there needs to be an innovative and enthusiastic health department. Finally, there needs to be close communication among all health providers. Our team's weekly meetings are critical for maximizing each patient's care. Although there are concerns about the quality of care for tuberculosis in the private sector [14], an integrated approach can be very effective, especially in small or moderate-sized cities.

Joint venture between the private sector and the health department should be applicable to issues other than tuberculosis control. STDs, HIV, immunizations,

and family planning would all seem to be amenable to a cooperative model.

Conclusions

Tuberculosis control and patient care can be provided with safety, effectiveness, quality, and cost savings through cooperative public and private joint efforts. A risk-sharing model enhances the motivation of both parties to perform well. There is an increasing need to develop creative programs that apply current knowledge, modern technology, information management, medical expertise, and public health surveillance in the control of infectious diseases.

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