

The U-shaped Curve of Concern

Tuberculosis (TB) is back with a vengeance. New case rates are rising precipitously: New York City, 38%; California, 16%; Texas, 17%; USA, 9.4% (1990). This is a paradox because TB is relatively easily diagnosed, treated, controlled, and prevented. Recognizing that even in the face of this rise TB occurs in well-defined population groups, the Secretary of Health and Human Services has endorsed a national plan for the elimination of TB by the year 2010 (1). To support this goal many diverse health care organizations have, in an unprecedented manner, adopted and endorsed a core curriculum on the proper way to diagnose and treat this disease (2,3).

In this issue of the REVIEW, Brudney and Dobkin analyze what may be responsible for the rising rates (4). Their experience is so bleak that at first reading one might mistake it for a theoretical worst-case scenario for TB control or at least a description of TB control in a developing country. However, they present a careful, prospective analysis of a cohort of 224 consecutive patients recently admitted to a large, sophisticated university affiliated urban hospital center in the USA. Their patients, reflecting the usual urban practice of tuberculosis, were 53% alcoholic, 64% intravenous drug and/or crack cocaine abusers, 68% homeless or unstable housing, and 50% human immunodeficiency virus (HIV) infected. Ultimately 178 patients were discharged on TB treatment, but 159 (89%) were lost to follow-up, failing to complete therapy. Of these, 48 patients were readmitted within 12 months with confirmed active TB; 40 of these were discharged on treatment, and another 35 were lost.

The findings of Brudney and Dobkin are extremely important in that they show, in a well-documented manner, that the rise of TB in New York City, and by analogy other urban areas of the US, is not due only to the HIV or homeless problems usually cited by the media, but it reflects the total failure of a public health system, even in the face of previous experience and warnings. These previous experiences and warnings are

the most fascinating aspects of their report. They document the year by year promises and recommendations by august study groups and task forces compared with the stark reality of piecemeal sacking of the program's resources that are directly related to the rise in cases.

The Brudney-Dobkin experience precisely reflects what seems to be a ubiquitous occurrence in public health practice. First, evaluation indicators of a public health program show improvement leading to diminishment of compelling need. Then resources providing fuel and direction for the program are removed. Finally, the incidence of the disease "controlled" begins to rise in proportion to the diminished resources. This phenomenon has been called "the U-shaped curve of concern" (5). One can picture the letter "U" and then compare it with a graph of actual US TB case rate data in figure 1. For this figure, one should recognize that in 1969 Federal Project Grants for TB Control of over \$20 million were provided. From 1970 to 1972 these were completely phased out in favor of block grants to the states which were allocated to TB only if a local priority. Therefore, total TB spending diminished heavily over the next 20 yr. By 1982, Federal Project Grants were again appropriated but only for \$1 million. In 1983, the appropriation was raised to \$5 million, which was continued. Finally, in 1991, a total of only \$9.1 million was appropriated, although Congress had authorized \$36 million. For the past several years, the American Lung Association has requested the full \$36 million authorized, but this request has had to compete with numerous other (political) priorities; the results have been so far unfavorable.

These data can be compared with those of Brudney and Dobkin (4) redrawn for comparison in figure 2, which also is a U-shaped curve. When considering this figure, one should recognize that a major new thrust in TB control through the Lindsay task force occurred in 1968. However, the New York City fiscal crisis followed in 1974 to 1978, and termination of the New York State TB Control

Contract, which previously supported 50% of the program, occurred in 1979 (4). Annual TB spending in New York was \$40 million between 1968 and 1973, and \$23 to 25 million in 1978, not including inflation. Direct Federal Public Health Service support to New York was \$1.4 million in 1979 and \$283,000 in 1980 (4).

TB obviously is a serious worldwide problem. One-third of the world's population is infected with the TB bacillus; 8 million new cases occur annually with 2.5 million deaths caused by the disease (6). The worldwide leading cause of death of *any* infectious disease, TB respects no national or state boundary. Technology for diagnosis, treatment, care, and control are easily available, but these *require* several modalities beyond drugs: directly administered, supervised therapy; careful contact follow up; use of community health workers for surveillance and treatment; hospitalization when necessary; medication provided without cost to the patient; and compliance enhancements and enablers to assure drug taking and follow-up (3). Even including all these critical aspects, treatment of TB, recently described by the World Bank as "one of the most cost effective health interventions available" (7), is cheap. Unfortunately, these critical factors are usually the first to be eliminated for budgetary reasons.

When such support is removed, case rates rise, and increased disease spread occurs. Because medication taking without supervision becomes inconsistent and sporadic, a rise in multidrug resistance with transmission to contacts can be anticipated and indeed has recently and alarmingly been described (8-10) even with

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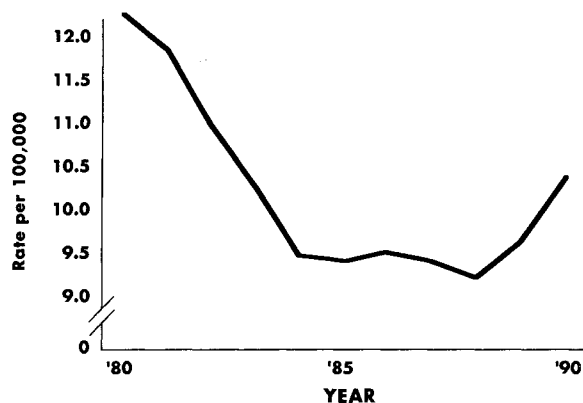


Fig. 1. USA National Tuberculosis Rate/100,000 population 1980 to 1990 (see text).

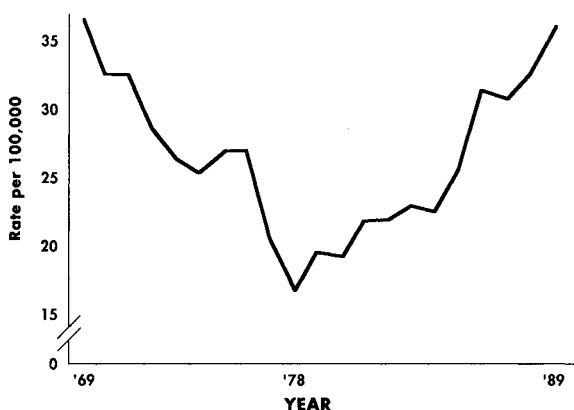


Fig. 2. New York City Tuberculosis Rate/100,000 population 1969 to 1989 (adapted from [4]) (see text).

documented transmission of multidrug-resistant TB to health care workers (9).

Brudney and Dobkin document that the rise in TB rates in their center is largely caused by the failure of the system although the knowledge and technology to reverse this trend have been readily avail-

able. But this is the state of TB control in the United States in the 1990s. The problem is amply defined and well documented, and the solution attainable with dedication, resources, and commitment. Many programs have long demonstrated they have the dedication. Unfor-

tunately and urgently, we still await the resources and commitment.

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