

## New York City's Tuberculosis Control Efforts: The Historical Limitations of the "War on Consumption"

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### ABSTRACT

New York City began America's first campaign to control tuberculosis in 1893, and the disease declined until the 1970s. Throughout the 20th century, New York relied on three control strategies: screening, supervised therapy, and detention of noncompliant persons. Officials consistently identified the persistent foci of tuberculosis to be minorities and the poor, and they concentrated efforts among these populations.

Recently, however, in the setting of rising human immunodeficiency virus infection and homelessness, tuberculosis—including multidrug-resistant strains—has returned to New York with a vengeance. Tuberculosis control in the city has been limited by two problems that hamper many public health programs: (1) antituberculosis measures, while appropriately targeting the poor, have been inconsistently funded and poorly coordinated; and (2) efforts have emphasized detection and treatment of individual cases rather than improvement of underlying social conditions. Renewed efforts by New York and other cities must address these limitations. (*Am J Public Health*. 1993;83:758-766)

Tuberculosis, the "captain of the men of death," was the leading killer in New York in 1900, but its prevalence declined during most of the 20th century.<sup>1</sup> Today, its resurgence—including outbreaks of drug-resistant strains—has provoked intense concern among health officials. The situation is particularly severe in New York City, largely due to the high prevalence of human immunodeficiency virus (HIV) disease and homelessness. In response to rising rates of the disease, city officials have recently introduced three control measures: intensive screening among populations at risk, such as the poor and the homeless; improvement of staff and facilities to ensure that patients complete therapy; and detention of individuals who do not take their medications.<sup>2-5</sup>

Such tactics, in fact, are quite old. New York has relied on the same three strategies since it began this country's first antituberculosis campaign in the 1890s. In both the preantibiotic era (1893 to 1945) and the antibiotic era (post-1945), however, this approach has had two major limitations: (1) antituberculosis efforts, while appropriately targeting the poor, have been inconsistent and poorly coordinated; and (2) control measures have dealt with individual health habits rather than addressing the underlying poverty that predisposes individuals to tuberculosis.<sup>6</sup>

The difficulties encountered by New York's antituberculosis campaign highlight two questions that have continually confronted public health officials: (1) What criteria should be used to prioritize among the various preventive health programs? (2) Should public health work only target individual diseases or also advocate larger social reform? New York and other cities designing new strategies to control tuberculosis must address these questions because a temporary revival of traditional

measures alone will likely have only limited success.

### *The Origins of Tuberculosis Control*

Robert Koch's 1882 discovery of the bacterium responsible for tuberculosis (or consumption) convinced many doctors of the infectious nature of the disease. Koch's work indicated that the major avenue of tuberculosis transmission was respiratory secretions between persons. Hermann Biggs of the New York City Health Department became the first official to "translate the new bacteriology into practical use."<sup>6</sup> His 1893 report convinced the department to make tuberculosis reportable and to track down the contacts of infected persons. Other programs included the promulgation of an antiexpectoration ordinance and the establishment of city dispensaries, hospitals, and sanatoriums for the care of the tuberculous. In 1897 the city changed the reporting of tuberculosis cases from voluntary to mandatory.<sup>7-9</sup>

Despite these new policies, tuberculosis remained hard to control and, in an era before the widespread use of x-rays, was often difficult to diagnose. In addition, Biggs' rules generated much opposition. "Anticontagionists," for example, denied that consumption was spread between in-

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dividuals. Rather, they claimed the disease was acquired when persons of a certain genetic predisposition came into contact with "miasmas" emanating from decaying garbage. Further, many private doctors objected strongly to mandatory reporting, believing that the policy violated physician-patient confidentiality; in 1903, Biggs claimed that more than half of the active cases of tuberculosis were still unreported.<sup>8,10</sup>

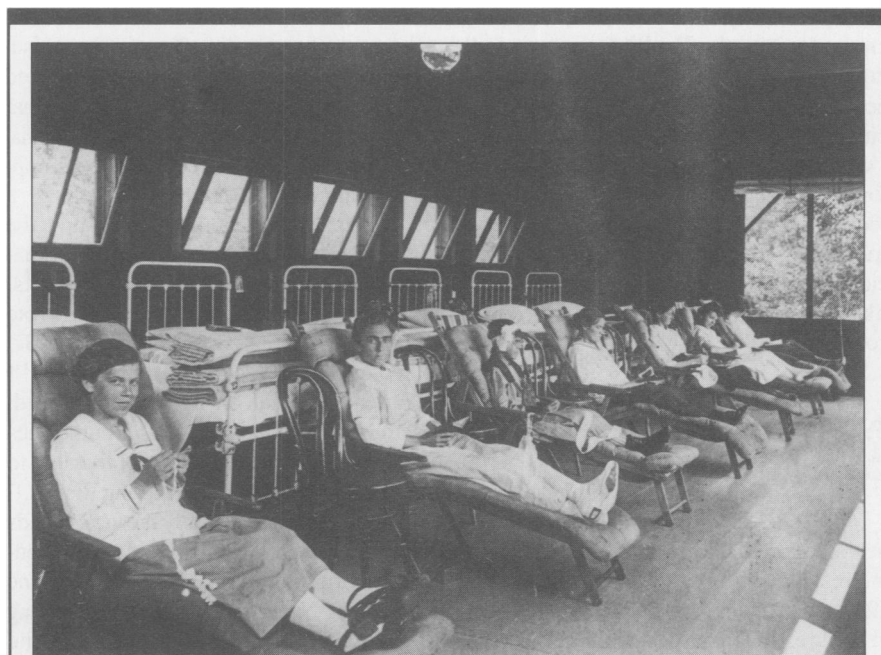
The number of reported cases gradually increased,<sup>7</sup> however, and New York's program would serve as the model for a nationwide "War on Consumption." Private voluntary groups joined the fight. Most notable among these was the National Tuberculosis Association, founded in 1904.<sup>11</sup> Its local affiliate was the New York Tuberculosis and Health Association. The association educated the public about preventing the spread of disease and also participated in the organization of clinics.

Tuberculosis mortality in New York and elsewhere had begun to decline prior to the start of these public health efforts. Although pulmonary tuberculosis alone caused roughly 425 deaths per 100 000 population in New York in the 1850s, the number had fallen to 237 deaths per 100 000 by 1900. Mortality from all forms of the disease continued to decline, reaching 126 deaths per 100 000 in 1920. By 1945, just before the first antituberculosis drug was introduced, mortality had dropped to 11% of the level in the 1850s: 46 deaths per 100 000 population.<sup>12</sup>

### The Preantibiotic Era

New York's antituberculosis campaign waxed and waned between 1893 and 1945. For example, tuberculosis control "lost its momentum" in the 1920s but revived in the 1930s when the Health Department established a separate Tuberculosis Bureau and improved clinic facilities.<sup>10</sup> Although antituberculosis efforts varied considerably during this era, the city basically relied on three strategies: the screening of at-risk populations, supervised therapy, and the forced detention of infectious patients.

The earliest form of screening, which began in the 1890s, was the examination of sputum from contacts of infected individuals. In the 1920s, officials began using tuberculin skin testing to screen apparently healthy schoolchildren for evidence of the disease. "Rapid paper" x-ray surveying of asymptomatic persons began in 1933.<sup>13-15</sup>



Sanatorium patients receiving bed rest and fresh air treatment, circa 1920. Reprinted with permission of the American Lung Association, New York, NY.

The predilection of tuberculosis to strike poorer neighborhoods had been known for hundreds of years.<sup>16</sup> City statistics repeatedly revealed that tuberculosis mortality in overcrowded Black, Puerto Rican, and other immigrant neighborhoods could be as much as six times that in White neighborhoods. In 1930, for example, the overall tuberculosis death rate among Blacks in New York was 293 per 100 000 population, as opposed to 62 per 100 000 for Whites; among homeless persons and transients living in the Bowery district, the rate approached 350 per 100 000.<sup>1,12,17-20</sup>

Speculating that thousands of poor persons with the disease were probably undiagnosed or unreported, the Health Department, in conjunction with the Milbank Memorial Fund and the federal Works Project Administration, focused x-ray screening on these populations.<sup>14,21</sup> Such studies, not surprisingly, yielded better results than the screening of populations such as schoolteachers. Out of 4716 homeless men screened in the late 1930s, 250 (5.3%) had active tuberculosis; 1919 (2.9%) of 65 459 Harlem relief recipients had active disease.<sup>22</sup>

The second element of New York's campaign against consumption was the establishment of inpatient and clinic facilities to care for the tuberculous. Although numbers varied, between 15 and 25 sanatoriums and hospitals both within and outside the city admitted patients with active disease. Treatment at this time consisted only of bed rest and nutritional sup-

port, with occasional surgery; however, recovery rates for persons with early disease were relatively good.<sup>11,20</sup> Sanatoriums, moreover, served an important public health function: they isolated infectious persons from the community for months to years. Yet existing facilities could house only a small percentage of patients. In 1919, for example, only 4556 (14%) of the city's 32 048 registered cases were institutionalized.<sup>10</sup>

As with screening measures, treatment strategies also stressed the special needs of the poor. In 1922, the Tuberculosis and Health Association and the local Urban League formed the Harlem Tuberculosis and Health Committee, which assisted with the sanatorium placement of Harlem residents.<sup>17</sup> The Health Department sponsored similar programs. In 1922, for example, it began a campaign to track down homeless persons with tuberculosis. In the 1930s, having divided the city into 30 health districts, the department revamped clinics for Blacks and Puerto Ricans in Harlem, and hired Spanish-speaking staff.<sup>18,23</sup>

New York also addressed the issue of noncompliant tuberculosis patients. These persons, termed "rounders," drifted in and out of hospitals.<sup>7</sup> Noncompliant patients came from all social classes, but most were homeless men and alcoholics. Although tuberculosis was often ultimately fatal, patients could often remain alive—and highly contagious—for years. Rounders could thus transmit the

disease to many others. State quarantine laws permitted the Health Department to detain infected patients who were believed to be health hazards. In 1903 the city opened the Riverside Sanatorium for "wilfully careless consumptives under forcible detention."<sup>12,24</sup> Such individuals received little sympathy.<sup>25,26</sup> "Homeless, friendless, dependent, dissipated and vicious consumptives," Biggs wrote, "are likely to be most dangerous to the community."<sup>27(p17)</sup>

### *Problems with Tuberculosis Control*

Despite the Health Department's renewed efforts, it was difficult to maintain interest in antituberculosis work in the 1930s. Not only was the disease insidious in nature, but it also remained hard to cure. The major factor, however, was its declining incidence. By 1930, tuberculosis mortality was roughly one quarter of its 1900 level. Both health officials and the public grew increasingly interested in the prevention of more prevalent, noncommunicable diseases.<sup>28-30</sup> In 1933, for example, New York's Welfare Council published a volume on the control of conditions such as heart disease, cancer, and rheumatism.<sup>31</sup>

The loss of interest in tuberculosis did not go unnoticed. In 1930, City Health Education Director Charles Bolduan reminded officials that the disease was still a "major public health problem"<sup>15</sup>; 7 years later, ex-Health Commissioner Haven Emerson termed neglect of tuberculosis in New York a "disgrace."<sup>32</sup> Commissioner of Hospitals S. S. Goldwater noted in 1937 that no more than 17 000 of the city's 30 000 tuberculous patients "[had] a chance of reaching one of the . . . beds provided."<sup>10</sup>

Such protests notwithstanding, tuberculosis control remained inadequate. Clinic services were insufficient in several parts of the city. The number of inpatient beds available in 1937—5250—had increased only minimally over 20 years. At one point in that same year, the 186-bed Bellevue tuberculosis service reported a census of 268 patients.<sup>33,34</sup> Even when space was available, patients commonly left against medical advice. It was often difficult to convince individuals who were receiving little treatment except for bed rest to remain hospitalized. The Health Department, moreover, detained few patients in the 1920s and 1930s. Not only did officials have difficulty establishing the legal justification for detention,

but many viewed the need to resort to mandatory confinement as a "confession of failure."<sup>23,34,35</sup> Other commentators criticized various aspects of detention, claiming that either it was too costly, it violated personal liberties, or it engendered fear of consumptives, known as phthisisophobia.<sup>7,24</sup>

Despite case-finding efforts and the establishment of special clinics, the situation remained particularly bad for Blacks. Tuberculous Blacks in New York, wrote famed statistician Louis Dublin in 1937, are "for the most part . . . overlooked."<sup>36</sup> Harlem physician George Cannon agreed, stating in 1946 that city health authorities and the mayor were "all but oblivious" to the tuberculosis problem among Blacks.<sup>17</sup> Cannon criticized not only the lack of beds but also the exclusion of Blacks from control efforts, noting that "there is not one practicing Negro physician on the visiting staff of a tuberculosis hospital in the city."<sup>17</sup> Not surprisingly, tuberculosis mortality among Blacks in 1945 remained nearly four and one-half times that among Whites.<sup>12</sup>

The situation was similar for other poor New Yorkers. Given the lack of inpatient beds, screening of at-risk populations often did little more than increase the number of untreated persons known to be tuberculous. In stressing case finding, moreover, the Health Department in the 1930s increasingly left the follow-up and treatment of detected cases to clinics run by voluntary agencies, hospitals, and private physicians. In 1936, only 14% of new cases were under supervision by the Health Department.<sup>37,38</sup> Without a strong coordinating agency, poor tuberculous patients often fell between the cracks. Thus, not only did city officials in the preantibiotic era have difficulty maintaining enthusiasm for tuberculosis control, but efforts targeting the tuberculous poor were inconsistent and lacked organization.

Tuberculosis control in New York had another important limitation. In contrast to 19th-century public health work, which had by definition included the advocacy of social reform, antituberculosis efforts in the 20th century did little to alter the circumstances of the poor—such as homelessness and unemployment—that made them susceptible to the disease.<sup>6,7,30</sup> A few critics proposed broadening the campaign. In 1937, for example, Bailey Burritt of New York's Association for Improving the Condition of the Poor asked those involved in tuberculosis control to "accept . . . the responsibility of insuring adequate attention to the economic and social needs of the family."<sup>36</sup> Louis Dublin believed that public health officials

should work for better housing for the poor.<sup>36</sup> The small Black public health sector, David McBride notes, saw tuberculosis work as part of a larger movement to improve the living conditions of Blacks.<sup>17</sup>

Nevertheless, the basic elements of New York's antituberculosis campaign—health education, screening to detect disease, and the administration of therapy—remained oriented toward individual patients. Tuberculosis prevention, Paul Starr states, moved away "from the broad advocacy of social reform toward more narrow judgments."<sup>36</sup> The conditions that predisposed susceptible populations to tuberculosis persisted.

### *The Antibiotic Era*

Although tuberculosis control in New York lagged during World War II, a strong economy and the discovery of potentially curative drugs rejuvenated efforts. Doctors began prescribing streptomycin in 1946 and isoniazid in 1952.<sup>39</sup> The city began a large-scale campaign to treat patients in the outpatient setting. By 1954, the Health Department reported that nearly all of its roughly 3000 clinic patients were under drug treatment. Reflecting a spirit of optimism, the tuberculosis section of the department's 1954 report was entitled "Towards Victory."<sup>40,41</sup>

The New York Tuberculosis and Health Association, however, was more pessimistic. Although fewer than 15 persons per 100 000 population died from the disease in 1953, the association predicted that tuberculosis would remain a public health problem. Noting the high rate of undetected disease among the poor, malnourished, and particularly the homeless, the association's 1954 report invoked a biblical proverb: "It is difficult to wage a systematic war against 'the pestilence that walketh in darkness.'"<sup>40</sup>

In 1959, New York City Health Commissioner Leona Baumgartner divided the history of tuberculosis into three stages: generalization, localization, and individualization. She noted that the disease was no longer endemic but remained a problem only in localized areas. Her recommendations for reaching such populations were familiar: x-ray screening, and improved clinic and social services.<sup>42</sup> As tuberculosis entered the third stage, that of isolated individuals or small groups, Baumgartner's advice echoed that of noted epidemiologist Wade Frost<sup>43</sup>: it was crucial, she said, to treat the disease "promptly and vigorously." She advo-

cated early institutional care, "provided by compulsory methods, if necessary,"<sup>42</sup> until patients were noninfectious.

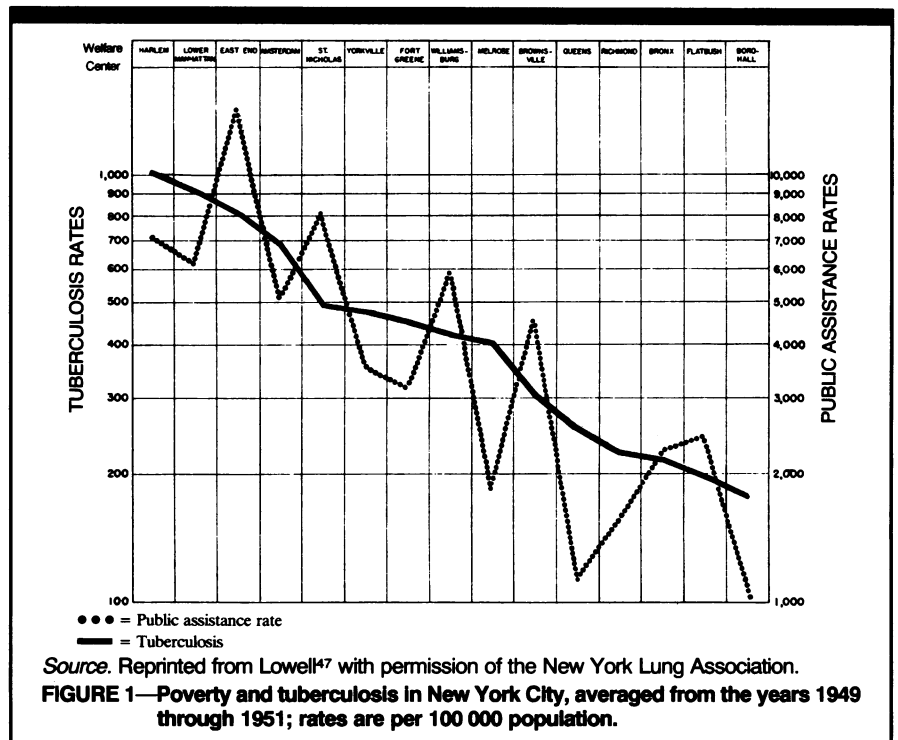
The Health Department had already begun these interventions by the early 1950s. In its effort to "find people who have tuberculosis without knowing it,"<sup>44</sup> the department continued skin testing and recommended that all persons get an x-ray every other year. Mass x-ray surveying had been resumed in 1946 and reached a peak of 1 181 693 films for the years 1955 and 1956.<sup>45,46</sup> Once again, officials noted high rates of disease among Blacks and Puerto Ricans<sup>47</sup> (see Figure 1). Between 1943 and 1950, the rate of new cases in these expanding immigrant communities was three to four times that in White communities, and x-ray screening targeted these populations. In 1954 x-rays of 1944 homeless men revealed 77 cases of active disease. This detection rate of 4% was more than 15 times that of the general population. The city tried innovative approaches to encourage participation in x-ray screening, including free soda, raffles, and appearances by celebrities.<sup>12,41,47-49</sup>

Health officials did acknowledge the difficult social circumstances of the tuberculous, and at times, predisposing factors such as poverty and unemployment were addressed. For example, health officials sent social workers to Harlem to help patients with housing and economic problems, and city agencies funded a work program for homeless men with inactive tuberculosis at a camp outside the city.<sup>46,50</sup> Yet the vast majority of antituberculosis efforts still operated within the dominant public health paradigm: they sought only to detect and treat the disease in individual patients.

The availability of antibiotics meant that most tuberculosis patients, following a short hospitalization, could receive the bulk of their treatment as outpatients. Early results of outpatient treatment appeared promising. In one study, 209 of 351 patients, most of whom had advanced tuberculosis, had inactive disease after 2 years of drug therapy. As a result, multiple tuberculosis wards and hospitals in New York closed in the mid-1950s; by the 1970s, all such facilities had disappeared.<sup>10,39,40</sup>

### Problems with Compliance

The simple availability of curative antibiotics, however, did not ensure compliance with therapy.<sup>51</sup> For example, 20% of roughly 1100 patients requiring hospital admission for tuberculosis in early 1953



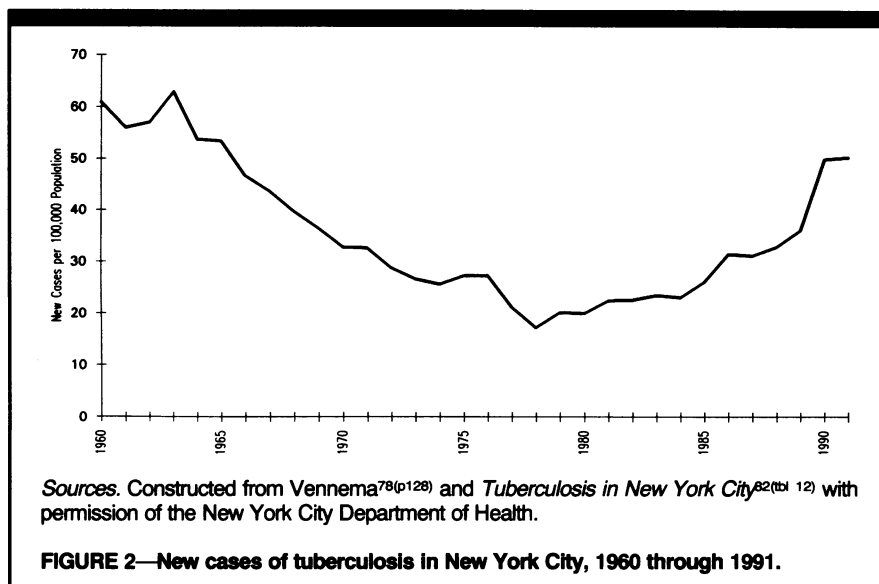
refused; 6 months later, only one fifth of these patients had begun treatment. In addition, of the roughly 9000 tuberculosis patients discharged from municipal hospitals between 1950 and 1954, 25% to 35% left against medical advice. In 1960, the Health Department estimated that 20% of its 6300 outpatients had active disease; most of these had left the hospital against advice.<sup>39,52</sup> The situation had worsened by 1962, when the department noted that "hospitalization is less readily accepted and discharges against medical advice are more frequent."<sup>53</sup>

Compliance with outpatient therapy was also erratic. "Patients attend clinics irregularly and relapse of their disease is common," the department reported in 1962.<sup>53</sup> Random urine testing for isoniazid in clinics in 1970 revealed 25% noncompliance. In 1979, only 53% of Health Department cases indicated completion of the recommended 12-month course of antibiotics.<sup>54,55</sup>

Noncompliance generated concern across the country. Not only did noncompliant patients spread tuberculosis, but irregular use of antibiotics promoted drug resistance. Estimates of resistance to at least one medication in persons with new-onset tuberculosis in 1963 ranged from 3% to 11%.<sup>56,57</sup> A study conducted in New York in the 1970s found evidence of multidrug-resistant organisms and an overall resistance rate to isoniazid of 8% among new and previously treated patients.<sup>58</sup>

Several authors—such as Moulding<sup>59</sup> and Sbarbaro and Johnson<sup>60</sup> in Denver—advocated outpatient programs in which health workers directly supervise the administration of antibiotics to noncompliant persons (now known as directly observed therapy). By decreasing the frequency of antibiotic dosing to twice weekly and the duration of treatment to 6 or 9 months, and by offering patients various inducements such as food and even beer, the Denver group was able to complete therapy in more than 90% of its noncompliant patients.<sup>61-63</sup>

New York initiated similar programs. In the 1960s, the city hired "tuberculosis lay investigators" and public health nurses to track down noncompliant patients by telephone, home visits, and even occasional "tours" of local bars. Harlem Hospital expanded its tuberculosis clinic in the 1970s and instituted a supervised therapy program.<sup>48,64-66</sup> In addition, the New York City Health Department, like others across the country, increasingly began to detain patients who failed supervised therapy. Noncompliant patients, the department reported, "present a continuous challenge to our efforts at public health control."<sup>53,67-69</sup> Empowered by the New York City Health Code, the department obtained detention orders for roughly 80 tuberculosis patients annually between 1968 and 1970.<sup>54,70</sup>



### Control Efforts Wane

By 1960, tuberculosis was no longer among the top 10 causes of death in New York. Mortality continued to decline, reaching a low of 91 deaths in 1985. As a result, although screening and supervision continued, it was harder to justify large-scale spending on tuberculosis. Officials increasingly devoted funding and attention to more prevalent conditions such as heart disease and cancer.<sup>10,52,71</sup> Similarly, private agencies that were originally dedicated to tuberculosis work broadened their programs to include all respiratory diseases. Although such groups had resisted expansion,<sup>11</sup> the declining rate of tuberculosis made it logical to inaugurate campaigns against widespread problems such as cigarette smoking and air pollution. The National Tuberculosis Association changed its name to the National Tuberculosis and Respiratory Disease Association in 1968, and the New York Tuberculosis and Health Association became the New York Lung Association in 1972.<sup>72</sup>

Noting that tuberculosis remained a major problem among the poor and minorities, commentators again warned that the disease should not be ignored. "Apathy and indifference to [New York City's] tuberculosis problem," Irving Mushlin and William Kenney stated in 1964, "are widespread."<sup>48</sup> They, as well as the New York Academy of Medicine, urged greater appropriations to fight the disease.<sup>73</sup> Such funding, however, was not forthcoming. Even the Health Department sounded frustrated in 1962, stating that the "social and economic climate in which tuberculosis breeds is not favorable to its cure."<sup>53</sup>

By the late 1960s, social and political developments had thrown city health agencies into disarray.<sup>74</sup> Although the passage of Medicaid and Medicare legislation in 1965 eased the Health Department's responsibility for care of the poor, it created organizational problems by shifting more care of tuberculous patients to private facilities. In addition, Medicaid did not cover admissions to tuberculosis sanatoriums.<sup>3,75</sup> The city's economic problems culminated with the 1975 fiscal crisis. Cutbacks affected all city agencies, including the Health Department, where staffing was reduced by one quarter.<sup>76</sup> Given the declining mortality rate from tuberculosis, it is hardly surprising that antituberculosis efforts were viewed as expendable. By 1979, New York State, which had financed half of the city's antituberculosis program, had withdrawn its funding, and federal aid for tuberculosis control was cut by 80%.<sup>64</sup>

As in the preantibiotic era, the various components of the antituberculosis campaign were maintained at suboptimal levels. Attempts to track down lost or noncompliant patients virtually ceased. A federally sponsored supervised treatment program that was begun in 1980 never got beyond the pilot level, funding only five to six workers. The Health Department also placed detention on the back burner, forcibly hospitalizing only two patients in 1985.<sup>77</sup>

### The Time Bomb Explodes

Although New York's antituberculosis campaign waned in the 1970s, there was ample evidence that a resurgence of

the disease was brewing. In 1970, for example, the incidence of tuberculosis in the city (32.8 cases per 100 000 population) was twice the national average. Although the mortality from tuberculosis continued to decline until 1985, the number of new cases began to increase steadily in 1979. The proportion of never-treated patients with drug-resistant strains between 1975 and 1982 was 9.6%, compared with the national average of 6.9%.<sup>54,78,79</sup>

Only after the issuance of a 1987 Centers for Disease Control report on tuberculosis in New York did officials begin to see the disease as a "time bomb."<sup>80</sup> Constructed by a 60% rise in poverty between 1969 and 1982,<sup>81</sup> the bomb was ignited by the HIV epidemic after 1982. Between 1979 and 1986, the incidence of tuberculosis in the city increased by 83%, a figure more than triple the national average. By 1991, New York reported 3673 new cases, up from 1307 in 1978 (see Figure 2). More than 80% of those cases were among Blacks and Hispanics; 20% to 30% were among the homeless.<sup>82-84</sup> There were also reports of increased drug resistance, particularly among HIV-positive patients. Of 465 city patients studied in 1991, 19% were resistant to both isoniazid and another first-line drug, rifampin. By January 1992, four city hospitals had reported outbreaks of multidrug-resistant strains causing 80% to 90% mortality.<sup>82,85,86</sup>

Two characteristics of this resurgence are unique: its prevalence among immunosuppressed HIV patients and the presence of multidrug-resistant strains. Persons with acquired immunodeficiency syndrome (AIDS) are hundreds of times more likely to have active tuberculosis than the general population; at one New York tuberculosis clinic, 46% of the patients were HIV seropositive.<sup>85-89</sup> Because many of those infected with HIV in New York are homeless, minorities, and substance users, the virus has intensified the incidence of tuberculosis among populations traditionally most affected by the disease.<sup>90-92</sup> Increasing drug resistance also suggests a historical parallel. Strains resistant to antibiotics may recreate the situation encountered prior to 1945, when there was little effective treatment for tuberculosis, patients remained infectious for prolonged periods, and health care workers were at risk at contracting—and dying from—the disease.

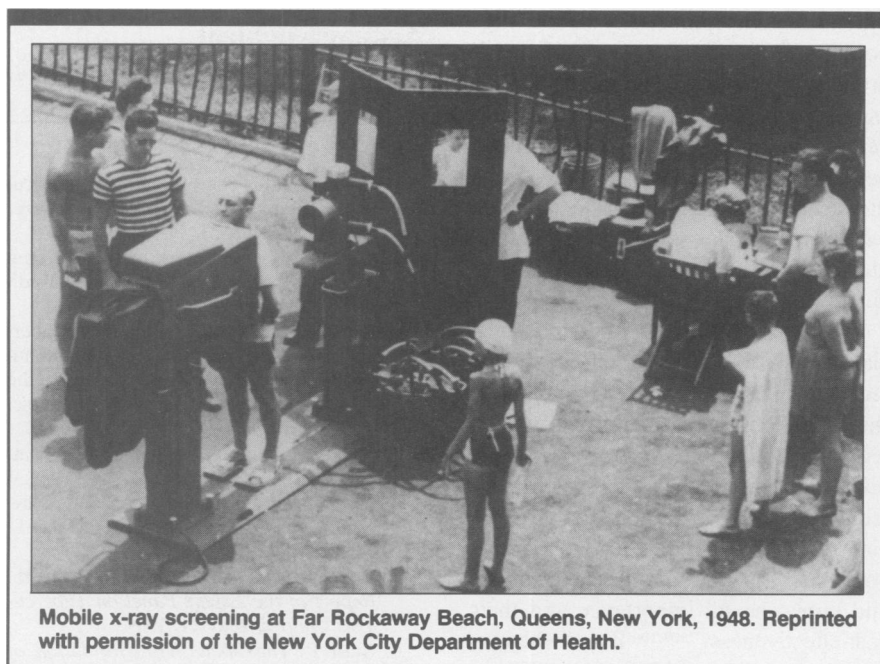
Benefiting from another upsurge in tuberculosis funding, New York has revived its three familiar strategies: screening, supervised therapy, and detention.<sup>2-4,93</sup> In 1988 the Health Department conducted

x-ray screening of shelter residents, and it has resumed skin testing of schoolchildren.<sup>94,95</sup> As noted above, however, the department has made multiple attempts during the century to screen the poor and homeless in areas such as Harlem and the Bowery, and although such programs have at times yielded good results, they are both expensive and time-consuming. In addition, because of the transient nature of such populations, persons with positive x-rays have often been lost to follow-up. And other outreach strategies, such as intensive nursing and clinic services, have been cut back when funding was needed elsewhere.

The Centers for Disease Control suggested another old remedy: opening sanatorium-like facilities for extended care of tuberculosis patients. The city established one such shelter in 1988 and may open others.<sup>5,96</sup> Such facilities, however, also have a problematic history. Not only are they expensive to maintain, especially for patients receiving little care except oral antibiotics, but patients are often unwilling to remain institutionalized, particularly if they are feeling well, and high numbers would likely leave against advice.

The city has reexpanded its directly observed therapy program for noncompliant patients. Officials are again offering incentives such as food coupons and subway tokens to encourage the homeless to appear for daily therapy. The Health Department has also resumed its policy of detaining noncompliant persons; it issued 40 detention orders in 1991.<sup>2</sup> New York has periodically tried mandated treatment measures in the past, both with rounders in the preantibiotic era and with noncompliant patients spreading drug-resistant strains after 1945. Directly observed therapy is extremely labor-intensive, however, and detention requires legal proceedings and locked hospital wards. As a result, such efforts have never been sustained. Detention, moreover, raises a civil liberties question: Will the courts permit the detention of patients who are not actively infectious because they have a history of noncompliance?<sup>77,97,98</sup> Numerous historical examples exist of the use of detention as a social control measure.<sup>99,100</sup>

Familiar problems have hampered New York's recent efforts. For example, out of 1408 x-rays performed on shelter residents in early 1988, only one new case of tuberculosis was found.<sup>95</sup> This low yield may in part reflect concurrent HIV disease, which may mask evidence of tuberculosis. Further, as of November 1991, only 8 to 10 caseworkers had been hired to find and medicate hundreds of homeless



Mobile x-ray screening at Far Rockaway Beach, Queens, New York, 1948. Reprinted with permission of the New York City Department of Health.

tuberculous persons.<sup>83</sup> Brudney and Dobkin found that, despite evidence of the spread of the disease in shelters, the Tuberculosis Bureau had made this homeless unit a "low priority."<sup>64</sup> Thus, cure rates, not surprisingly, remain poor. In a 1990 study of 74 patients at one city clinic, 44% were lost to follow-up.<sup>64</sup>

### Conclusion

For more than a century, health officials have known that tuberculosis is contagious. And while historians have debated the value of control measures,<sup>28</sup> it is clear that certain tactics, such as isolation of infected individuals and completion of drug therapy, are effective. The antituberculosis campaign in New York has consistently instituted measures based on these principles. Yet two problems that confront public health programs have continued to limit the success of such efforts.

The first problem is how public health agencies should best allocate limited resources. As Charles V. Chapin admitted in 1917, health officers often "do not feel sure of the relative values of different lines of health work."<sup>101</sup> Decisions regarding funding allocations must be made both within and between various prevention programs. Factors that may influence funding between programs include the severity of the diseases in question, the prevalence of such diseases in the community, and the publicity those diseases receive.<sup>102</sup> As tuberculosis in New York declined, tuberculosis control became a victim of its own success. Rather than ac-

celerate efforts to eradicate the persistent foci of the disease among poor populations, public and private groups shifted funding to more prevalent problems, such as smoking and heart disease. Thus, screening, supervision, and detention measures for tuberculosis—all of which had been accelerated when funding was available—were cut back.

The second problem is that public health campaigns of this century have generally not addressed the underlying social conditions that allow diseases like tuberculosis to persist.<sup>29,30,103</sup> "It is not enough," Charles E.-A. Winslow wrote, "for the health administrator to develop the soundest possible programme for his own field of social endeavor"; such a plan had to be part of a "larger total programme of social reconstruction."<sup>104</sup> New York officials have long recognized the role of the "plague of poverty" in the spread of tuberculosis. In 1962 the Tuberculosis Bureau conceded the necessity of "a massive assault . . . against [the disease's] real root, which is poverty."<sup>53</sup> Nevertheless, as a result of the structure that public health has assumed, tuberculosis control has sought to detect and treat disease in individual persons rather than address larger societal ills.

Numerous groups are now calling for funding increases for antituberculosis work. One coalition has asked the federal government to increase the Centers for Disease Control's 1993 tuberculosis appropriation from \$20 million to \$325 million.<sup>105</sup> Such funding increases, needed to finance directly observed therapy and

other basic programs, should be supported. Given the emergence of multi-drug-resistant strains, there is no disease as contagious and potentially lethal as tuberculosis, particularly for HIV-positive persons. Moreover, as the development of therapies for multidrug-resistant strains will probably take several years, inadequate preventive measures could lead to an epidemic.<sup>106</sup>

Although increased funding is crucial, New York and other cities reviving antituberculosis measures should recall the limitations of past efforts. Another temporary increase of screening, supervised therapy, and detention is not an effective long-range solution. Rather, officials should evaluate various control strategies "on the basis of their clinical and public health importance and their cost-effectiveness."<sup>107,108</sup> If and when tuberculosis again subsides and a different crisis beckons, we should not simply cut back all control strategies to low levels but should instead continue those strategies that have proven effective; otherwise, tuberculosis will again resurge.

Even with adequate funding, however, antituberculosis efforts must address the second historical limitation: the persistence of poverty. Although public health work has helped to control tuberculosis,<sup>28,109</sup> mortality from the disease began to decrease well before such efforts began. Historians have attributed this decline to improvements in housing and nutrition.<sup>110-113</sup> Given this fact, it is important to acknowledge the role that improved living conditions must play in the fight against tuberculosis.

Public health officials cannot hope to rectify social inequality, but recent programs have begun to address this issue. New York, for example, has developed a range of housing options and support services for homeless persons with AIDS (Ellen Alpert, personal communication, September 30, 1992). British groups involved in a similar project hope it will be the first step toward using housing to "prevent disease and promote public health."<sup>114,115</sup> Such programs may even prove cost-effective. A recent study in Haiti showed that tuberculosis patients given economic and nutritional support did better than those merely receiving free health care.<sup>116</sup> As Rene and Jean Dubos noted 40 years ago, the fight against tuberculosis must "increas[e] . . . the resistance of man through a proper way of life."<sup>116</sup> □

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## ABSTRACT

The resurgent tuberculosis epidemic represents—especially in New York City—a failure to maintain a public health infrastructure that was focused on preventing active disease in high-risk populations (i.e., individuals with the human immunodeficiency virus [HIV]) and on treating active tuberculosis patients until cured. Although the tuberculosis problem in New York City and other localities is worsened by homelessness, poverty, and substance abuse, it is possible to bring tuberculosis under control by directing public health resources into targeted programs that enhance compliance with tuberculosis treatment regimen and expand chemoprophylaxis efforts among HIV-infected individuals. These two avenues will decrease, respectively, the number of cases of multidrug-resistant tuberculosis and the total number of new cases. (*Am J Public Health*. 1993;83:766-768)

# Commentary: Tuberculosis in New York City—The Consequences and Lessons of Failure

Sheldon H. Landesman, MD

The resurgent tuberculosis problem of New York City deserves close scrutiny. In his article in this *Public Health Then and Now*, Lerner<sup>1</sup> discusses New York City's three strategies for controlling tuberculosis throughout the 20th century. He suggests that tuberculosis can only be controlled by a sustained commitment to amelioration of the social conditions that promote the transmission of the disease. A review of the current New York City tuberculosis problem suggests, in fact, that a sustained commitment to fund an adequate public health infrastructure could control tuberculosis independent of the need for broader social change.

The current epidemic of tuberculosis in New York City has three components. The first is the increase in cases, which have risen from 1530 in 1979 to 3673 in 1991.<sup>2</sup> In large part this absolute increase can be attributed to the marked propensity of those individuals dually infected with tuberculosis and the human immunodeficiency virus (HIV) to develop active tuberculosis.<sup>3</sup>

The second component is the rise of multidrug-resistant tuberculosis; its origins are somewhat different from those of the overall rise in tuberculosis cases. In April 1991, a joint New York City/Centers for Disease Control survey documented a 19% rate of the multidrug resistant tuberculosis strains among all confirmed cases.<sup>4</sup> Our inability or unwillingness to fund the public health and targeted social-service programs that will enhance completion of tuberculosis treatment and cure of

disease is at the heart of the multidrug-resistant tuberculosis problem. Incomplete and inadequate treatment favors the survival of resistant strains. In 1991, approximately 55% of patients in New York City with tuberculosis completed a full course of tuberculosis treatment.<sup>5</sup> The ability to ensure that patients are treated until cured is complicated by the increase in homelessness and substance abuse and by decreasing public health resources. Substance abuse and its associated maladaptive behaviors contribute greatly to the problem of noncompliance.

The third component of the epidemic is contributed by the nosocomial outbreaks of tuberculosis documented in several New York City hospitals,<sup>6-8</sup> and a New York State prison.<sup>9,10</sup> Transmission of active tuberculosis in shelters and jails is also suspected but has not yet been documented.<sup>11,12</sup> These outbreaks are a result of the combined first two components of the tuberculosis problem. In these institutions, increasing numbers of patients with tuberculosis, many infected and infectious with multidrug-resistant tuberculosis strains,

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**Editor's Note.** See related editorial by Reichman (p 639) in this issue.