

45. The experience of the San Francisco chest clinic is cited in *ibid.*
46. Sumartojo, "When Tuberculosis Treatment Fails," p. 1316.
47. Brudney and Dobkin, "A Tale of Two Cities," p. 261.
48. Onogé, "Capitalism and Public Health," p. 221. Medical anthropologists are not the only ones who lend importance to factors that cannot be considered central in the shaping of TB pandemics. While René Dubos was at times hard-bitten in his assessments, calling TB "the first penalty that capitalist society had to pay for the ruthless exploitation of labor," he saw the disease as a reflection of humans' failure to adapt harmoniously to the environment. The "anonymous gloom of the industrial cities" of the nineteenth century, where TB flourished, contrasted with the pastoral lifestyle that had reigned prior to the industrial revolution: "The most destitute villager in his native land had learned to adorn the dullness and drudgery of existence with bright ribbons and jolly tunes, and with the pageantry of his church" (Dubos and Dubos, *The White Plague*, pp. 207, 202).
49. For an excellent review, see Porter and McAdam, "The Re-Emergence of Tuberculosis."
50. Bloom and Murray, "Tuberculosis."
51. Addington, "Patient Compliance," p. 741.
52. Sumartojo, "When Tuberculosis Treatment Fails," p. 1312.
53. See the excellent commentary by Barbara Rosenkrantz ("Preface," in Dubos and Dubos, *The White Plague*, p. xxi).
54. McMichael, "The Health of Persons, Populations, and Planets," p. 633.
55. See, for example, Patel, "Problems in the Evaluation of Alternative Medicine."
56. Farmer, "New Disorder, Old Dilemmas."
57. See, for example, Small and Moss, "Molecular Epidemiology and the New Tuberculosis."
58. Sumartojo, "When Tuberculosis Treatment Fails," p. 1318.
59. Rosenkrantz, "Preface," p. xxxiv.

## Optimism and Pessimism in Tuberculosis Control

*Lessons from Rural Haiti*

(1999)

*What the social world has made,  
the social world, armed with knowledge, can undo.*

PIERRE BOURDIEU, *LA MISÈRE DU MONDE*

A survey of the current literature reveals discordant views on the question of progress in the control of tuberculosis. On the one hand, optimistic observers point with understandable pride to advances in our understanding of mycobacterial pathogenesis and to the elaboration of shorter but more effective treatment regimens. Recent years have seen a growing consensus that even six-month-long, multidrug regimens will lead to high cure rates if therapy is directly observed by medical personnel or health workers. The World Health Organization's adoption of DOTS—directly observed therapy, short-course—has been hailed as a victory by experts from around the world.<sup>1</sup> Indeed, the WHO claims that DOTS is "the most important public health breakthrough of the decade."<sup>2</sup> The cure for tuberculosis, in this view, has at last been discovered.

Pessimists, on the other hand, call attention to the widening gulf between the advances reported in the scholarly literature and the degree of effective control in those communities hardest hit by the disease. Some point to the increasing microbial resistance to our best drugs; some point to our lack of an effective vaccine. But deaths from tuberculosis, numbering in the millions, are the most compelling rebuke to optimism.

In fact, it is difficult to document any impact of the new treatment regimens on worldwide tuberculosis incidence: in the current decade, an estimated three hundred million people will become infected with tubercle bacilli; ninety million will develop active tuberculosis; and, if access to care does not become a global

priority, thirty million will die.<sup>3</sup> In projecting changes in the ranked order of the fifteen leading causes of death, Christopher Murray and Alan Lopez predict that tuberculosis alone will hold its unenviable place for the next thirty years, with the exception of HIV disease, all other infectious diseases are projected to drop in rank over the coming three decades. According to a baseline projection, tuberculosis will be the fourth leading cause of death overall in developing countries by the year 2020. Tuberculosis and HIV, which both afflict young adults disproportionately, are the only infectious diseases expected to cause more life years to be lost in 2020 than they cause now.<sup>4</sup>

Tuberculosis heads the list of diseases dreaded by Haitians, too. "Of all the health problems cited," observes Helen Wiese, "one stands out from the others by virtue of its insidious onset, its tenacity, and its prevalence—pulmonary tuberculosis."<sup>5</sup> The prevalence of tuberculosis in Haiti is estimated to be the highest in the hemisphere. Little is known of the disease's occurrence there during the nineteenth century, but in 1941 James Leyburn wrote that, in a series of seven hundred autopsies performed in the Port-au-Prince General Hospital, 26 percent of the deaths were due to tuberculosis.<sup>6</sup> The United Nations reported that in Haiti in 1944 "tuberculosis was the most important cause of death among hospitalized patients."<sup>7</sup> Linking the high incidence of the disorder to poor sanitation and poverty, the organization predicted that "for many years to come tuberculosis will, it is feared, continue to take a heavy toll of human lives in Haiti."<sup>7</sup>

This prediction has come true. In 1965, the Pan American Health Organization estimated prevalence in Haiti at 3,862 per 100,000 inhabitants.<sup>8</sup> Available data indicate that tuberculosis remains the leading cause of death among individuals between the ages of fifteen and forty-nine. Studies from the Hôpital Albert Schweitzer suggest that, in this age group, tuberculosis causes two to three times as many deaths as the next most common diagnosis.<sup>9</sup>

In recent years, the situation seems to have worsened. The high prevalence of tuberculosis has been further augmented by the advent of HIV. In sanatoriums in urban Haiti during the mid-1980s, some 45 percent of all tuberculosis patients reportedly were co-infected with HIV. In a later survey of over 7,300 ostensibly healthy adults living in a densely populated slum, 70 percent of those screened were tuberculin-positive, and more than 15 percent were HIV-positive. More alarming, community-based screening detected a prevalence of 2,281 active pulmonary tuberculosis cases per 100,000 adults. One study conducted in rural regions found that 15 percent of patients diagnosed with tuberculosis disease were also infected with HIV. In another rural setting, at the Hôpital Albert Schweitzer, 24 percent of all patients with tuberculosis were co-infected with HIV.<sup>10</sup>

Added to this noxious synergy is the emergence of resistance to first-line antituberculous drugs. There are very few published studies of drug resistance in

Haiti, in large part because it is difficult to culture *Mycobacterium tuberculosis* in settings with no reliable source of electricity. One of the few large series including culture data revealed that 22 percent of isolates were resistant to at least one first-line drug.<sup>11</sup>

Although drug resistance presents a new and potentially significant problem, most studies of treatment failure agree that the problem is predominantly one of designing and implementing programs that are appropriate to the needs of the population to be served.<sup>12</sup> In one large town in southern Haiti, fully 75 percent of all patients had abandoned treatment by six months after diagnosis, and over 93 percent had abandoned treatment before the end of one year.<sup>13</sup> Since short-course therapy did not exist at the time of this study, we must assume that the majority of patients in this series were left with partially treated disease.

This essay will describe in some detail one community-based organization's efforts to implement a tuberculosis control program that takes into account the crippling poverty that so often plays a central role in determining who does or does not benefit from interventions. In examining this program, I also want to oppose the "either-or" approach that has led some health advocates, tragically, to adopt a Luddite stance.<sup>14</sup> This position holds that it is acceptable to defer tuberculosis treatment while the "root causes" of the disease are addressed through development projects. But health policy is not a zero-sum game. One of the lessons from rural Haiti is that effective tuberculosis-specific interventions are both urgent and inexpensive and should not be regarded as somehow detracting from the broader development efforts that might well serve to reduce tuberculosis incidence.

#### THE PROJE VEYE SANTE EXPERIENCE

Since it was founded in 1984, *Proje Veye Sante* has sought to serve the landless peasants and children of the Peligre basin of Haiti's Central Plateau. The program's catchment area includes settlements scattered around a reservoir, which was created by a hydroelectric dam that flooded the basin in 1956. Sector 1 of the catchment area rings the lake; at the time of this study it encompassed approximately twenty-five thousand individuals, almost all of them peasants living in small villages. Sector 2, more loosely demarcated, consists of a large number of outlying villages and towns contiguous to Sector 1.

Although inhabitants of the villages in Sector 2 were offered the same clinical services available in Sector 1 (consultations with a physician, lab work, and all medication for about eighty cents), they were not served by community health workers; nor did they benefit from activities sponsored by *Proje Veye Sante* such as women's health initiatives, vaccination campaigns, water protection efforts,

and adult literacy groups. These interventions, implemented by community health workers, had proven to be a powerful means of addressing malnutrition, diarrheal disease, measles, neonatal tetanus, malaria, and typhoid fever. Through the community activities, the health workers were able to identify the sick and refer them to the clinic, where, it should be noted, all antituberculous medications were free of charge. (Isoniazid, ethambutol, pyrazinamide, and streptomycin were then on formulary at the clinic.)<sup>15</sup>

Although *Proje Veye Sante* was effective in identifying patients with pulmonary tuberculosis and getting them to the clinic, it became clear during the late 1980s that detection of new cases did not necessarily lead to cure, in spite of our policy of waiving even the eighty-cent fee for any patient diagnosed with tuberculosis. In December of 1988, following the deaths from tuberculosis of three HIV-negative patients, all in their forties, the staff of *Proje Veye Sante* met to reconsider how the care of these individuals had been managed. How had the staff failed to prevent these deaths?

Responses to this question varied. Some community health workers felt that tuberculosis patients who had poor outcomes were the most economically impoverished and thus the sickest. Others, including the physicians present, attributed poor compliance to widespread beliefs that tuberculosis was a disorder inflicted through sorcery, which led patients to abandon biomedical therapy. Still others hypothesized that patients lost interest in chemotherapy after ridding themselves of the symptoms that had caused them to seek medical advice.

Over the next two months, we devised a plan to improve services to patients with tuberculosis—and to test these discrepant hypotheses. Briefly, the new program embraced the goals of finding cases, offering adequate chemotherapy, and providing close follow-up. Although contact screening and BCG vaccination for infants were included in the program, the staff of *Proje Veye Sante* was then most concerned with the care of smear-positive and coughing patients—believed by many to be the most important source of community exposure.

The new program was designed to be aggressive and community-based, relying heavily on community health workers for close follow-up. It was also designed to respond to patients' appeals for nutritional assistance. All residents of Sector 1 diagnosed with pulmonary or extrapulmonary tuberculosis would be eligible to participate in a treatment program featuring—during the first month following diagnosis—daily visits from their village health worker. These patients would receive financial aid of thirty dollars per month for the first three months and would also be eligible for nutritional supplements.

Further, these patients were to receive a monthly reminder from their village health worker to attend clinic. Travel expenses (for example, renting a donkey) would be defrayed with a five-dollar honorarium when they came to the clinic. If a Sector 1 patient did not attend, someone from the clinic—often a physician or

an auxiliary nurse—would visit the no-show's house. A series of forms, including a detailed initial interview schedule and home-visit reports, regularized these arrangements and replaced the relatively limited forms used for other clinic patients.

During the initial enrollment period, between February of 1989 and September of 1990, fifty Sector 1 patients joined the program.<sup>16</sup> Forty-eight of those identified had pulmonary tuberculosis. Seven individuals also had extrapulmonary tuberculosis (for example, tuberculosis of the spine), and two had cervical lymphadenitis ("scrofula") as their sole manifestation of tuberculosis. During the same period, the clinical staff diagnosed pulmonary tuberculosis in 213 patients from outside Sector 1. Many of these patients were from Sector 2, although a few had traveled even greater distances to seek care at the clinic; at least 168 of these individuals returned to the clinic for further care. The first fifty of these patients to be diagnosed formed the comparison group by which the efficacy of the new interventions would be judged. They were a "control group" only in the sense that they did not benefit from the community-based services and the financial aid; all Sector 2 patients continued to receive free care. To test hypotheses regarding patients' beliefs and clinical outcomes, we interviewed all patients regarding their own explanatory models and their experience of tuberculosis.<sup>17</sup>

The mean age of our patients (forty-two years) and the sex ratio (both groups had significantly more women than men) did not vary significantly between the two groups.<sup>18</sup> But indirect economic indicators (for example, years of school attended, ownership of a radio, access to a latrine, a tin roof rather than a thatched roof) suggested that patients from Sector 2 may have been slightly less poor than those from Sector 1. This is not surprising, as several of the villages in Sector 1 are squatter settlements dating from the year the valley was flooded.

### Results

The following discussion explains the findings of the *Proje Veye Sante* study in some detail. These findings are summarized in table 8.1.

**Mortality.** One patient from the Sector 1 group died in the year following diagnosis, although she did not die from tuberculosis. Six patients from Sector 2 died, all, it seems, from tuberculosis; one of these was a young woman who was also seropositive for HIV.

**Sputum Positivity.** The clinical staff attempted to examine sputum for acid-fast bacilli (AFB)<sup>19</sup> whenever patients developed recrudescent symptoms as well as approximately six months after the start of antituberculous therapy. None of the patients from Sector 1 were sputum-positive at six months. One young woman did become sputum-positive during a pregnancy in the subsequent year;

Table 8.1 Characteristics of Tuberculosis in Sector 1 Patients versus Sector 2 Patients

	Sector 1 (N = 50)	Sector 2 (N = 50)
All-cause mortality (18 months follow-up)	1.0 (2%)	6.0 (12%)
Sputum-positive for AFB after 6 months of treatment	0.0	9.0 (18%)
Persistent pulmonary symptoms after 1 year of treatment	3.0 (6%)	21.0 (42%)
Average weight gained/patient/year (lbs.)	9.8	1.9
Return to work after 1 year of treatment	46.0 (92%)	24.0 (48%)
Average number of clinic visits/patient/year	11.6	5.4
Average number of home visits/patient/year	32.0	2.0
HIV co-infection	2.0 (4%)	3.0 (6%)
Number denying the role of sorcery in their illness	6.0 (12%)	9.0 (18%)
One-year disease-free survival	50.0 (100%)	24.0 (48%)

we found that she was infected with HIV and may have been reinfected with a second strain of tuberculosis. Of the Sector 2 cohort, nine patients had acid-fast bacilli demonstrable in their sputum about six months after the initiation of therapy.

*Persistent Pulmonary Symptoms.* After a year of treatment, a thorough history and physical exam were used to screen for persistent pulmonary symptoms such as cough, shortness of breath (dyspnea), and coughing up blood (hemoptysis). Only three patients of the Sector 1 group reported such symptoms, and two of them had developed asthma during the course of their convalescence. Twenty patients in Sector 2, however, continued to complain of cough or other symptoms consistent with persistent or partially treated tuberculosis. One additional patient in this group was an asthmatic without radiographic or other evidence of persistent tuberculosis.

*Weight Gained.* Monitoring body weight revealed marked differences between the two sector groups in the amount of weight gained per patient per year. Correcting for fluctuations associated with pregnancy, Sector 1 patients gained an average of nearly ten pounds during the first year of their treatment. Patients from Sector 2 had an average weight gain of about two pounds per person per year.

*Return to Work.* The vast majority of patients from both groups were peasant farmers or market women whose families relied on their ability to perform physical labor. It is especially notable, then, that one year after diagnosis, forty-six of the Sector 1 patients stated that they were able to return to their work activities. In Sector 2, fewer than half (twenty-four patients) were able to do so.

*Clinic Visits.* As patients were given one month's supply of medication with each visit, the staff of Proje Veye Sante strongly encouraged monthly clinic visits, which served as an indirect measure of a patient's adherence to antituberculous therapy. In the Sector 1 group, the one-visit-per-month ideal was nearly achieved: these patients, who received a small sum for travel expenses, averaged 11.6 visits per year. In the control group, the average number of visits per year was 5.4.

*Home Visits.* Our treatment protocol at that time called for at least 30 grams of intramuscular streptomycin during the first two months of therapy, and community health workers were asked to administer these injections to the patients living in their area. Most patients from Sector 2 had their streptomycin administered by local *pikiris*, or injectionists. (Some lived near licensed practical nurses and received this drug in other clinics.) This is perhaps the chief reason that the number of home visits by members of the Proje Veye Sante staff was far higher in the Sector 1 group than in the Sector 2 group: thirty-two visits in the former versus two visits in the latter.

*HIV Seroprevalence.* The rate of HIV seroprevalence was not substantially different between the two groups. Only two patients from Sector 1 showed serologic evidence of HIV infection; both had lived in urban Haiti for extended periods. One of these patients became smear-positive for acid-fast bacilli during a pregnancy that occurred over a year after she completed her initial course of therapy. She was treated with a new multidrug regimen and remained asymptomatic some sixty months after her initial tuberculosis diagnosis. In the Sector 2 group, similarly, three patients were seropositive for HIV; all had lived in greater Port-au-Prince.

*Etiologic Conceptions about Tuberculosis.* Previous ethnographic research had revealed extremely complex and changing ways of understanding and speaking about tuberculosis among rural Haitians.<sup>20</sup> Open-ended interviews with patients from both sectors permitted us to delineate the dominant explanatory models used by members of both groups. Because several physicians, nurses, and community health workers had hypothesized that a belief in sorcery would lead to higher rates of noncompliance, we took some pains to address this issue with each patient. We learned that few from either group would deny the possibility of sorcery as an etiologic factor in their own illnesses, but we could discern no relationship between avowed adherence to such models and a patient's degree of compliance with a biomedical regimen. The Proje Veye Sante effort demonstrated the relative insignificance of patients' understandings of etiology, when compared to access to financial aid—one marker of the primacy of economic considerations in impoverished settings.

*Cure Rate.* In June 1991, forty-eight of the Sector 1 patients remained free of pulmonary symptoms. Two patients with a persistent cough and/or dyspnea did not meet radiologic or clinical diagnostic criteria for tuberculosis (both had developed bronchospastic disease). Therefore, we judged that none had active pulmonary tuberculosis, giving the participants a cure rate of 100 percent. One of these patients, as noted earlier, was co-infected with HIV but remained asymptomatic sixty months after her initial diagnosis of tuberculosis. We could not locate all the patients from Sector 2, but of the forty patients we examined at more than one year after diagnosis, only twenty-four could be declared free of active disease based on clinical, laboratory, and radiographic evaluation. (Six patients from this group had died during the course of this study.) Even if the four patients lost to follow-up had in fact been cured, that would have left twenty-six others dead or with signs and symptoms of persistent tuberculosis—a cure rate of, at best, 48 percent.

#### *Explaining Treatment Outcomes*

In an important review of the significance of tuberculosis in developing countries, Christopher Murray, Karel Styblo, and Annik Rouillon estimate that 26 percent of avoidable adult deaths in these countries are due to tuberculosis, making it the greatest cause of avoidable death.<sup>21</sup> The experience of Proje Veye Sante speaks to the discrepant explanations of this colossal failure, since the majority of these deaths occur in settings not unlike Haiti. Although our small numbers do not permit any sweeping conclusions, the project described here suggests that *high cure rates are possible in settings of extreme poverty in which hospital-based care is unavailable even for the critically ill.*

Even after so small a study, we can also advance other pragmatic conclusions. First, projects designed to treat tuberculosis among the very poor must include financial and nutritional assistance, for many of these patients develop reactivation tuberculosis in the setting of malnutrition or concurrent disease. The Proje Veye Sante antituberculosis initiative indicates that, in Haiti at least, hunger and poverty are the prime culprits in treatment failure, just as they are so often responsible for the reactivation of endogenous infection. The factors that govern treatment success or failure there—factors such as initial exposure to mycobacteria, reactivation of endogenous tuberculosis infection, complications, access to therapy, length of convalescence, development of drug resistance, degree of tissue destruction, and, finally, mortality—are determined chiefly by economic variables. Countries held in underdevelopment would do well to invest resources in programs that address patients' nutritional needs while ensuring easy and reliable access to multidrug regimens.

In fact, these interventions may be more important than the choice of regi-

men: although we initially used traditional antituberculous therapy, rather than the short-course multidrug regimens shown to be effective in recent studies, our results are as encouraging as those of Styblo and colleagues, who report a 90 percent cure rate when a six-month course of INH and thiacetazone is preceded by two months of an *in-hospital*, strictly supervised three-drug regimen.<sup>22</sup> Given the high costs of hospitalization, a program that includes financial or nutritional aid may be less expensive—and far more feasible—than the tuberculosis control programs now in place in many poor countries. Similarly, although directly observed therapy would seem to be almost always preferable to unobserved therapy, our experience suggests that high cure rates can be achieved even in sparsely settled, difficult terrain where patients are unable to make daily trips to clinics or health posts.

Second, projects designed to prevent tuberculosis among the very poor must keep in mind a central maxim of tuberculosis control: treatment is prevention. Although the priorities of these projects may differ from those of projects designed for low-prevalence, high-income settings, identification and complete treatment of patients with active pulmonary tuberculosis should be the top priority of tuberculosis control in settings like rural Haiti. Similar conclusions have been advanced in a review of data from throughout the developing world.<sup>23</sup> Experience among New York City's poor might also lead to such conclusions, since in one review of patients diagnosed with tuberculosis at Harlem Hospital, only 11 percent could be shown to have completed therapy.<sup>24</sup>

The eradication of tuberculosis would require that we halt transmission and also prevent the reactivation of quiescent TB infection. We have the tools to do both: treatment of all active cases and, in the majority of quiescent cases, "chemoprophylaxis" with isoniazid. Until there are major redistributions in the current partition of the world's wealth, however, chemoprophylaxis of contacts and of asymptomatic but infected patients who show a positive PPD test result has a limited role to play in poverty-stricken areas. Although a community may have a high level of tuberculosis infection—our own survey suggests that 70 percent of rural Haitian adults are PPD-positive—individuals with active pulmonary disease are those most likely to transmit the disease to others. They are also those most likely to die of tuberculosis. Ideally, however, resources available for tuberculosis control would be increased so that even chemoprophylaxis could be administered as directly observed therapy.

In a sense, the high cure rates we achieved also show that debates over whether to treat tuberculosis or to prevent it are essentially false debates, whose costs are borne, as usual, by the poor. Among those who argue (correctly) that in our time poverty is the ultimate cause of tuberculosis, some make a serious error by advocating that development efforts should take precedence over tuberculosis

treatment. As noted earlier, this Luddite trap remains a peril of modern tuberculosis control. We know how to treat tuberculosis, but development efforts often go awry. The people of the Peligre area know this well, for the hydroelectric dam that immiserated them, and so increased their tuberculosis risk, was billed as a development project.

## NOTES

1. See Third East African/British Medical Research Council Study, "Controlled Clinical Trial of Four Short-Course Regimens of Chemotherapy for Two Durations in the Treatment of Pulmonary Tuberculosis"; Cohn et al., "A 6z-Dose, 6-Month Therapy for Pulmonary and Extrapulmonary Tuberculosis"; Hong Kong Chest Service/British Medical Research Council, "Controlled Trial of 4 Three-Times-Weekly Regimens and a Daily Regimen All Given for 6 Months for Pulmonary Tuberculosis"; Snider et al., "Supervised Six-Months Treatment of Newly Diagnosed Pulmonary Tuberculosis Using Isoniazid, Rifampin, and Pyrazinamide with and without Streptomycin"; Singapore Tuberculosis Service/British Medical Research Council, "Five-Year Follow-Up of a Clinical Trial of Three 6-Month Regimens of Chemotherapy Given Intermittently in the Continuation Phase in the Treatment of Pulmonary Tuberculosis."
2. See Kochi, "Tuberculosis Control—Is DOTS the Health Breakthrough of the 1990s?" p. 232.
3. World Health Organization Global Tuberculosis Programme, *TB: WHO Report on the Tuberculosis Epidemic 1997*.
4. Murray and Lopez, *The Global Burden of Disease*.
5. Wiese, "The Interaction of Western and Indigenous Medicine in Haiti in Regard to Tuberculosis," p. 40.
6. Lejbourn, *The Haitian People*, p. 275.
7. United Nations, *Mission of Technical Assistance to the Republic of Haiti*, pp. 70-72.
8. Pan American Health Organization, *Reported Cases of Notifiable Diseases in the Americas*, p. 290.
9. For a review of these data, see Feilden et al., "Health, Population, and Nutrition in Haiti."
10. Desormeaux et al., "Widespread HIV Counseling and Testing Linked to a Community-Based Tuberculosis Control Program in a High-Risk Population"; Pape and Johnson, "Epidemiology of AIDS in the Caribbean"; Long et al., "Impact of Human Immunodeficiency Virus Type 1 on Tuberculosis in Rural Haiti."
11. Scaleni et al., "Antituberculous Drug Resistance in Central Haiti." On multidrug-resistant strains in Haiti, see Farmer, Bayona, Becerra, et al., "Poverty, Inequality, and Drug Resistance."
12. Shears, *Tuberculosis Control Programmes in Developing Countries*.
13. Wiese, "Tuberculosis in Rural Haiti."
14. Farmer and Nardell, "Nihilism and Pragmatism in Tuberculosis Control."
15. Rifampin has since replaced streptomycin in the initial treatment of adults with tuberculosis. The clinic also stocks second-line drugs for culture-proven cases of multidrug-resistant tuberculosis.
16. One patient who initially lived in Sector 1 later moved out of the catchment area and was no longer served by a community health worker. This patient, rumored to have died some months after leaving the area, is not considered in any of the data analysis of either group.
17. For a concise review of this methodology, see Kleinman, Eisenberg, and Good, "Culture, Illness, and Care." For an assessment of the methodology's limitations, see Kleinman, *Writing at the Margin*, pp. 5-15.
18. The preponderance of women waned over subsequent years, suggesting a backlog of untreated women facing significant barriers to care.
19. The presence of acid fast bacilli in a sputum sample usually signals the presence of active pulmonary tuberculosis. Although an imperfect test for tuberculosis—as all patients with extrapulmonary disease and many with pulmonary disease will have falsely negative smears—sputum microscopy is the standard test in most settings in the developing world, including Haiti.
20. Farmer, "Sending Sickness" (included in this volume as chapter 2).
21. Murray, Styblo, and Rouillon, "Tuberculosis in Developing Countries."
22. Styblo, "Overview and Epidemiological Assessment of the Current Global Tuberculosis Situation."
23. Murray, Styblo, and Rouillon, "Tuberculosis in Developing Countries."
24. Brudney and Dobkin, "Resurgent Tuberculosis in New York City"; Brudney and Dobkin, "A Tale of Two Cities."