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## The Resurgent Tuberculosis Epidemic in the Era of AIDS: Reflections on Public Health, Law, and Society

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## Articles

### THE RESURGENT TUBERCULOSIS EPIDEMIC IN THE ERA OF AIDS: REFLECTIONS ON PUBLIC HEALTH, LAW, AND SOCIETY

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## INTRODUCTION

"Now I know these rods are alive," breathed Koch. "Now I see the way they grow into millions in my poor little mice—in the sheep, in the cows even. One of these rods, these bacilli—he is a billion times smaller than an ox—. . . but he grows, this bacillus, into millions, everywhere through the big animal, swarming in his lungs and brain, choking his blood-vessels—it is terrible."<sup>1</sup>

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1. PAUL DE KRUIF, *MICROBE HUNTERS* 115 (1926).

It was with this seemingly innocuous scientific observation about anthrax that the microbiologist Robert Koch began the work that led to the discovery that microorganisms cause a number of infectious diseases, such as consumption, erysipelas, and tetanus in humans and in animals.<sup>2</sup> In 1882, Robert Koch reported that consumption, an infectious disease that was responsible for one in every six or seven deaths in the later half of the nineteenth century,<sup>3</sup> was caused by the rapid multiplication of tubercle bacilli,<sup>4</sup> and was transmitted from person to person through airborne particles.<sup>5</sup> Koch's biological discovery led to a change in the definition of tuberculosis. Prior to his discovery, tuberculosis was defined by its symptoms, and was called consumption because the disease actually consumed the body.<sup>6</sup> After the discovery, tuberculosis was defined biologically by its causative agent—the tubercle bacillus.<sup>7</sup>

Koch's scientific observation that tuberculosis was spread person-to-person led to the conclusion that the surest way to impede the

2. Robert Koch, *On Bacteriological Research*, in FROM CONSUMPTION TO TUBERCULOSIS: A DOCUMENTARY HISTORY 291, 296 (Barbara Guttman Rosenkrantz ed., 1994) [hereinafter FROM CONSUMPTION TO TUBERCULOSIS] ("This proof was established in its entirety for a number of infectious diseases, for anthrax, tuberculosis, erysipelas, tetanus, and for various animal diseases, indeed, for nearly all diseases that could be conveyed to animals. In this way it also appeared that whenever one succeeded in establishing the regular and exclusive occurrence of bacteria, they never occurred as accidental concomitants, but only as positively identified pathological parasites.").

3. Alfred Stille, *Review of Four Current Books on Phthisis Pulmonalia and Scrofula*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 97; see Hermann M. Biggs, *The Registration of Tuberculosis*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 331, 336 ("[Consumption] is by far the most fatal disease with which we have to deal, and from both an economic and sanitary standpoint is of vastly greater importance than any other infectious disease, both because of the number of deaths it causes, and the suffering it produces. Its importance is further enhanced because it occurs to the greatest extent in the working period of life, and its victims are cut off at the time of their greatest usefulness.").

4. The Dutch physician, Franciscus Sylvius (1614-1672) deduced from autopsies that consumption was characterized by the formation of nodules, which he named "tubercles." See Dixie E. Snider, *Tuberculosis—The World Situation: History of the Disease and Efforts to Combat It*, in TUBERCULOSIS: BACK TO THE FUTURE 13, 14 (John D.H. Porter & Keith P.W.J. McAdam eds., 1994).

5. Robert Koch, *Etiology of Tuberculosis*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 197, 212-14 (documenting the first reporting of these findings before the Physiological Society of Berlin on March 24, 1882). Before Koch's discovery, most researchers believed that consumption was not a contagious disease; most assumed that it was wholly or partly hereditary. Henry I. Bowditch, *Is Consumption Ever Contagious or Communicated by One Person to Another in Any Manner?*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 43; Charles Rosenberg, *The Bitter Fruit: Heredity, Disease, and Social Thought in Nineteenth Century America*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 154.

6. See A. CASTIGLIONI, HISTORY OF TUBERCULOSIS 1 (1933); THE GENUINE WORKS OF HIPPOCRATES 101-33 (Francis Adams trans., 1939).

7. S. LYLE CUMMINS, TUBERCULOSIS IN HISTORY 182-91 (1949).

spread of tuberculosis was to identify all cases of tuberculosis, and to isolate those with disease from the rest of society.<sup>8</sup> In 1890, Koch made the identification of tuberculosis possible when he developed the tuberculin skin test, which diagnoses the tuberculosis infection.<sup>9</sup> In a speech on bacterial research that same year Koch stated, "Shortly after discovery of the tubercle bacillus, . . . considerations [such as the primary significance of tuberculosis among infectious diseases] led me to seek substances that would be therapeutically useful against tuberculosis."<sup>10</sup>

A treatment for tuberculosis, however, was not discovered until the American microbiologist Selman Abraham Waksman discovered streptomycin in 1944.<sup>11</sup> Waksman wrote: "With the isolation of streptomycin, it was at once recognized that we possessed here a chemotherapeutic agent which, next to penicillin, was bound to revolutionize medicine. . . . Its greatest potentialities were found to lie in its capacity to suppress one of the oldest and most vicious enemies of mankind, tuberculosis."<sup>12</sup> Waksman's discovery of an antituberculin medication, that could cure tuberculosis and render infectious persons noninfectious,<sup>13</sup> led to the ascendancy of biological strategies to combat the tuberculosis epidemic.

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8. See W.H. Frost, *How Much Control of Tuberculosis?*, 27 AM. J. PUB. HEALTH 759, 765 (1937) ("[Among strategies for controlling tuberculosis] the isolation of known open cases is placed first . . . because it is the most direct method that we have for reducing the prevalence of tubercle bacilli in our environment . . .").

9. See Robert Koch, *A Further Communication on a Cure for Tuberculosis*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 356, 359-60 (discussing the various benefits of the test's diagnostic use).

10. *Id.* at 300.

11. SELMAN A. WAKSMAN, MY LIFE WITH THE MICROBES 228-29 (1954); see Stephen S. Hall, *The Comeback Killer*, N.Y. TIMES, Aug. 1, 1993, at 20 (Book Review) (reviewing FRANK RYAN, THE FORGOTTEN PLAGUE: HOW THE BATTLE AGAINST TUBERCULOSIS WAS WON—AND LOST (1991)), a book which provides a compelling historical account of the decades-long search for a treatment for tuberculosis after Koch's initial discovery and the epidemic's haunting parallels to the modern HIV crisis). From the time of Koch, physicians have attempted a bewildering number of medical treatments without empirical evidence of their efficacy. See Charles V. Chapin, *What Changes Has the Acceptance of the Germ Theory Made in Measures for the Prevention and Treatment of Consumption?*, in FROM CONSUMPTION TO TUBERCULOSIS, *supra* note 2, at 260, 270-80 (discussing "the various antiseptic substances employed in the treatment of tubercular consumption since it was placed among the germ diseases").

12. WAKSMAN, *supra* note 11, at 234.

13. In comparing the benefits and adverse reactions of streptomycin, Waksman observed:

When, in time, streptomycin came to occupy an important place in chemotherapy, when the demand for it throughout the world increased at a far greater rate than it could be manufactured, when thousands of patients began to benefit from it, when especially sufferers from such diseases as tubercular meningitis had a

Almost concurrent with these fundamental biological innovations came similarly important changes in social thought.<sup>14</sup> Progressive era reforms during the period from 1890 to 1920 focused on the social conditions that bred tuberculosis: overcrowded housing, poor nutrition, and inadequate sanitation.<sup>15</sup> Reformers observed demographic changes in the tuberculous epidemic.<sup>16</sup> The disease was no longer the social leveler it had been, affecting all classes and races equally.<sup>17</sup> The epidemic now was disproportionately burdening the poor, immigrants, and inner-city dwellers.<sup>18</sup> Accordingly, many reformers of that time devoted themselves to improving the social environment with the hope that social changes would lead to a substantial decline in the tuberculosis epidemic.<sup>19</sup>

In addition to the biological and social strategies designed to curb the tuberculous epidemic, those fighting tuberculosis conceived a third strategy of isolating consumptives and changing behavior. Consumptives were housed outside of town limits in large tent colonies, known as "Bugsvilles" or "Lunger's Camps," or in sanatoria.<sup>20</sup> The separation and isolation of persons with tuberculosis had particular appeal.<sup>21</sup> Consumptives were blamed for tuberculosis and its spread.<sup>22</sup> Many believed that if consumptives led a healthier, moral lifestyle, ceased the "promiscuous" spreading of their sputum, remained isolated while infectious, and completed the full course of

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thirty-five to seventy-five per cent chance of recovery, as compared to none previously, the side reactions began to attract increasing attention.

*Id.* at 235.

14. See RENEE DUBOS & JEAN DUBOS, *THE WHITE PLAGUE: TUBERCULOSIS, MAN AND SOCIETY* 198-204 (1952) (discussing the universal belief that susceptibility to tuberculosis was increased by urban conditions).

15. *Id.* at 203.

16. See Sheila M. Rothman, *Seek and Hide: Public Health Departments and Persons with Tuberculous 1890-1990*, 21 J. L., MED. & ETHICS 289-90 (1993).

17. *Id.*

18. *Id.* The most dramatic illustration of this effect was found in the profoundly differential death rates from tuberculosis between the residents of the fashionable Upper West Side in New York and the overcrowded tenement dwellers of lower Manhattan. *Id.* at 289-90.

19. See DUBOS & DUBOS, *supra* note 14, at 216-20 (attributing the decline in mortality rates from tuberculosis to vastly improved social conditions); see also THOMAS MCKEOWN, *THE ORIGINS OF HUMAN DISEASE* 181 (1988) (concluding that the decline in tuberculous infections is directly attributable to advances in social conditions).

20. Rothman, *supra* note 16, at 293.

21. *Id.* at 292 (discussing the confinement of consumptives and lack of protest of this policy). The idea of a single disease hospital has also been carefully explored, but rejected, for HIV disease. David J. Rothman, *The Single Disease Hospital: Why Tuberculosis Justifies a Departure that AIDS Does Not*, 21 J. L., MED. & ETHICS 296 (1993).

22. Rothman, *supra* note 16, at 290.

medication when drugs became available, the tuberculosis epidemic could be reduced.<sup>23</sup> Therefore, throughout the early to middle part of the nineteenth century, legislatures enacted disease-specific laws, which provided public health officials with considerable authority to control the behavior of persons with tuberculosis.<sup>24</sup>

It does not matter which strategy is considered more fundamental in combating the spread of tuberculosis<sup>25</sup>—the biological prevention and cure offered by treatment, the social transformation of housing, diet, and sanitation, or the isolation of persons with tuberculosis and the alteration of their behavior. What is important is that society had the means to impede the spread of tuberculosis and to reduce the suffering of tuberculosis patients through a public health strategy utilizing all three intervention strategies.

The resurgence of tuberculosis and the rise in drug-resistant cases is neither inexplicable nor unexpected, but rather is the predictable outcome of a complex configuration of biological, social, and behavioral factors that have converged in America over the past decade.<sup>26</sup> This Article examines the biological, social, and behavioral causes of the epidemic, and suggests a comprehensive public health strategy for curtailing tuberculosis and other infectious diseases. When thoughtfully conceived, public health strategies can be implemented that are consistent with the limitations that both constitutional law and disability law place on the authority of the state. While traditional concepts of public health law frequently have focused on individuals, I argue that public health law should focus primarily on aggregate harms to communities. To that end, this Article presents public health strategies for achieving a population-based objective, and theoretical constructs for thinking about constitutional law and disability law.

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23. See *id.* at 290-91; SHEILA M. ROTHMAN, *LIVING IN THE SHADOW OF DEATH: TUBERCULOSIS AND THE SOCIAL EXPERIENCE OF ILLNESS IN AMERICAN HISTORY* 4-9, 187-93 (1994).

24. Centers for Disease Control and Prevention, U.S. Dep't of Health and Human Services, *Tuberculosis Control Laws—United States, 1993*, 42 MORBIDITY & MORTALITY WKLY. REP. 1 (1993) [hereinafter *Tuberculosis Control Laws*]; Lawrence O. Gostin, *Controlling the Resurgent Tuberculosis Epidemic: A 50-State Survey of TB Statutes and Proposals for Reform*, 269 JAMA 255 (1993).

25. For an assessment of the debate between biological medicine and social medicine, see Victor W. Sidel et al., *The Resurgence of Tuberculosis in the United States: Societal Origins and Societal Responses*, 21 J. L., MED. & ETHICS 303 (1993) (emphasizing the need for broader social change to deal with the tuberculosis problem).

26. See Marsha F. Goldsmith, *Medical Exorcism Required as Revitalized Revenant of Tuberculosis Haunts and Harries the Land*, 268 JAMA 174 (1992) (discussing factors, including social and biological factors, that have caused the increase in tuberculosis).

Because the biological facts of tuberculosis broadly affect the legal and social responses to it, Part I of this Article presents a biological description of tuberculosis, its prevalence, and its contemporary interconnections with the HIV epidemic. In particular, Part I focuses on the etiology, diagnosis, transmission, progression, and treatment of tuberculosis, as well as the disease's resistance to antibiotics.

Because long standing public health theories attribute a high proportion of tuberculosis morbidity and mortality to social conditions, Part II of this Article examines the social conditions surrounding the spread of tuberculosis. In particular, Part II examines the relationship between tuberculosis and race, poverty, and homelessness. Part II also explores the dramatic capacity of *Mycobacterium tuberculosis* to spread in congregate settings, and examines the effects of tuberculosis on residents and staff in three congregate settings: prisons and jails, nursing homes, and health care facilities.

Part III of this Article focuses on the exercise of compulsory powers to impede the spread of tuberculosis, in particular, mandatory detention, treatment, and directly observed therapy. In this section, I also present a series of proposals for reconciling public health imperatives with individual rights while providing the greatest aggregate benefit to the population.

## I. TUBERCULOSIS: BIOLOGICAL, CLINICAL, AND EPIDEMIOLOGICAL FOUNDATIONS

The biological realities of infectious diseases powerfully affect legal and social theories about the power of the state to intervene to protect the public health. For example, legal and health policy responses to the modern Human Immuno-Deficiency Virus (HIV) epidemic are informed by the biological facts that HIV is a sexually transmitted, bloodborne disease, which can be transmitted through the transfusion of blood products and the sexual or needle-sharing behavior of adults. HIV can also be transmitted from mother to fetus. Persons infected with HIV are contagious for life, even if asymptomatic. Moreover, there are no biological methods to render persons infected with HIV non-infectious, and pharmacological preventions and treatments are neither fully preventive nor curative.<sup>27</sup> As the following discussion shows, the causal agents, clinical course, and methods of transmission of tuberculosis at first appear markedly dissimilar

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27. Kenneth H. Mayer, *The Natural History of HIV Infection and Current Therapeutic Strategies*, in *AIDS AND THE HEALTH CARE SYSTEM* 21, 22-25 (Lawrence O. Gostin ed., 1990) (discussing the treatment of HIV).

to HIV. However, the ancient disease, tuberculosis,<sup>28</sup> and the new disease, AIDS,<sup>29</sup> are closely intertwined.

### A. Epidemiology: Current Incidence and Prevalence

Tuberculosis was once a universal affliction which caused one out of five deaths in London and one out of three deaths in Paris in the mid-seventeenth century, and which is thought to be the leading cause of death in Europe and North America in recorded history.<sup>30</sup> Today, there is a common misapprehension that, with the exception of AIDS,<sup>31</sup> science has all but conquered infectious diseases.<sup>32</sup> More

28. Tuberculosis is one of the oldest, most persistent, and pernicious diseases in human history. See Joseph H. Bates & William W. Stead, *The History of Tuberculosis as a Global Epidemic*, 77 MED. CLINICS OF N. AM. 1205 (1993) (stating that tuberculosis was initially a disease of lower mammals, and the etiologic agent probably preceded the development of man on earth); Barry R. Bloom & Christopher J.L. Murray, *Tuberculosis: Commentary on a Reemergent Killer*, 257 SCIENCE 1055, 1056 (1992) ("TB of the skin was known as lupus vulgaris and that of [the] bone as Pott's disease, characterized by vertebral fusion and deformity of the spine, which enabled historians to establish the existence of TB from mummies dating from 2000 to 4000 B.C."); Virginia Morell, *Mummy Settles TB Antiquity Debate*, 263 SCIENCE 1686 (1994) (reporting that research utilizing the DNA-amplifying polymerase chain reaction [PCR] technique found a 900 year-old Peruvian mummy that had DNA specific to the tuberculosis bacteria, suggesting that tuberculosis was already present in the New World 500 years before Columbus set foot on Hispaniola); Dan Morse et al., *Tuberculosis in Ancient Egypt*, 90 AM. REV. RESPIRATORY DISEASE 524 (1964) (discussing the presence of tuberculosis in Egypt from early dynastic times, perhaps as early as 3700 BC); MARK CALDWELL, *THE LAST CRUSADE* 9 (1988); L. Lee Tynes, *Tuberculosis: The Continuing Story*, 270 JAMA 2616 (1993); John N. Wilford, *Tuberculosis Found to Be Old Disease in New World*, N.Y. TIMES, Mar. 15, 1994, at C1.

29. See Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *The HIV/AIDS Epidemic: The First 10 Years*, 40 MORBIDITY & MORTALITY WKLY. REP. 357 (1991).

30. Bloom & Murray, *supra* note 28, at 1056.

31. As of the end of 1993, there were 851,628 cumulative cases of AIDS in adults and children reported to the World Health Organization, and it is estimated that, as of that time, over 14 million adults and over 1 million children had been infected with HIV since the start of the pandemic. WORLD HEALTH ORG., *GLOBAL PROGRAMME ON AIDS: THE CURRENT GLOBAL SITUATION OF THE HIV/AIDS PANDEMIC* (1994) [hereinafter GLOBAL PROGRAMME ON AIDS]. In the United States, through September 1993, there had been a cumulative total of 339,250 cases of AIDS reported to the Centers for Disease Control and Prevention. CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, *HIV/AIDS SURVEILLANCE REPORT* 3 (October 1993).

32. As William H. McNeill observed in 1976 in *Plagues and Peoples*:

Ingenuity, knowledge, and organization alter but cannot cancel humanity's vulnerability to invasion by parasitic forms of life. Infectious disease which antedated the emergence of humankind and will last as long as humanity itself, and will surely remain, as it has been hitherto, one of the fundamental parameters and determinants of human history.

WILLIAM H. MCNEILL, *PLAGUES AND PEOPLE* 291 (1976). For an examination of the emergence of new infectious diseases, see CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, *ADDRESSING EMERGING INFECTIOUS DISEASE THREATS: A PREVENTION*

than twenty years ago, the U.S. Surgeon General informed Congress that it was time to "close the book on infectious diseases."<sup>33</sup> However, "infectious diseases have not been eradicated but they remain the largest cause of death in the world today, greater than cardiovascular disease or cancer."<sup>34</sup>

Despite the enticing promise of microbiological identification, prevention and treatment of tuberculosis, the burden of the disease, particularly in the developing world, remains formidable. Some forty years after the introduction of effective drug treatment, the tuberculosis pandemic is still one of the world's most pressing public health problems. Tuberculosis is the leading cause of death associated with infectious diseases globally.<sup>35</sup> In 1990, "an estimated 7.5 million incident cases of TB occurred worldwide"<sup>36</sup> and approximately 1.9 million deaths were attributed to the disease.<sup>37</sup> Moreover, the number of new cases of clinical tuberculosis is expected to increase "from 7.5 million new cases a year in 1990 to 8.8 million in 1995, 10.2 million in 2000, and 11.9 million new cases a year in 2005, an increase of 57.6% over 15 years,"<sup>38</sup> and "nearly 90 million new tuberculosis cases and 30 million tuberculosis deaths are expected to occur through the end of this decade without more effective intervention."<sup>39</sup>

The burden of tuberculosis is particularly daunting in developing countries where the disease accounts for 6.7 percent of all deaths, 18.5 percent of all deaths in adults aged 15 to 59, and 26 percent of avoidable adult deaths.<sup>40</sup> For a disease with a cost effective prevention and cure, the dimensions of the pandemic are sobering. In 1993, tuberculosis was declared a global health emergency by the World Health Organization.<sup>41</sup>

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STRATEGY FOR THE UNITED STATES (1994) [hereinafter ADDRESSING EMERGING INFECTIOUS DISEASE THREATS]; Michael D. Lemonick, *The Killers All Around*, TIME, Sept. 12, 1994, at 62.

33. Bloom & Murray, *supra* note 28, at 1055.

34. *Id.* "[I]n 1991, there were still 4.3 million deaths in children from acute respiratory infections, 3.5 million from diarrheal diseases, 0.88 million from measles, and about 1 million from malaria, . . . [and] 1.5 million cumulative deaths worldwide from AIDS." *Id.*

35. Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Estimates of Future Global Tuberculosis Morbidity and Mortality*, 42 MORBIDITY & MORTALITY WKLY. REP. 961 (1993).

36. *Id.*

37. WORLD HEALTH ORGANIZATION, TB: A GLOBAL EMERGENCY 3 (1994) [hereinafter TB: A GLOBAL EMERGENCY].

38. WORLD HEALTH ORGANIZATION, A REVIEW OF CURRENT EPIDEMIOLOGICAL DATA AND ESTIMATION OF FUTURE TUBERCULOSIS INCIDENCE AND MORTALITY 8 (1993).

39. *Id.* at 12.

40. Christopher J.L. Murray et al., *Tuberculosis*, in DISEASE CONTROL PRIORITIES IN DEVELOPING COUNTRIES 233, 241 (D.T. Jamison et al. eds., 1993).

41. TB: A GLOBAL EMERGENCY, *supra* note 37, at 1.

While tuberculosis has progressed almost unabated in many parts of the world, the industrialized countries of North America and Europe have experienced substantial declines in the burden of the disease.<sup>42</sup> When the U.S. Public Health Service Tuberculosis Program was first created in 1944, there were over 126,000 reported cases of tuberculosis.<sup>43</sup> The rate of tuberculosis in the U.S. declined by an average of 5.6 percent per year from 1953 to 1985.<sup>44</sup> The long standing annual decline in the number of tuberculosis cases led the Department of Health and Human Services to establish an Advisory Council for the Elimination of Tuberculosis (ACET) in 1987.<sup>45</sup> When ACET was established in 1987, it was assumed that tuberculosis was a "preventable, curable, but largely forgotten"<sup>46</sup> disease that realistically could be eliminated by the target year of 2010.<sup>47</sup> Yet, even before the ACET was established, the decline in tuberculosis had ended.<sup>48</sup> From

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42. *Id.* at 2 ("While TB was virtually eliminated in industrialized countries, nothing changed for the developing world . . ."); Hans L. Rieder et al., *Epidemiology of Tuberculosis in the United States*, 11 EPIDEMIOLOGIC REV. 79 (1989) ("Until 1985, the long-term trend in [tuberculosis] incidence over the last three decades has been steadily downward . . .").

43. CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, CORE CURRICULUM ON TUBERCULOSIS 7 (April 1991) [hereinafter CORE CURRICULUM ON TUBERCULOSIS].

44. John A. Jereb et al., *Tuberculosis Morbidity in the United States: Final Data, 1990*, MORBIDITY & MORTALITY WKLY. REP. 23 (Supp. no. SS-3 1991). The annual number of tuberculosis cases in the U.S. decreased from 84,304 in 1953 to 22,255 in 1983, an absolute reduction of 73.6% and a rate reduction of 82.3%. Neil M.H. Graham & Richard E. Chaisson, *Tuberculosis and HIV Infection: Epidemiology, Pathogenesis, and Clinical Aspects*, 71 ANNALS INTERNAL MED. 421 (1993).

45. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Strategic Plan for the Elimination of Tuberculosis in the United States*, 38 MORBIDITY & MORTALITY WKLY. REP. 1 (Supp. no. S-3 1989) [hereinafter *Strategic Plan for the Elimination of Tuberculosis*].

46. Marsha F. Goldsmith, *Forgotten (Almost) But Not Gone, Tuberculosis Suddenly Looms Large on Domestic Scene*, 264 JAMA 165 (1990).

47. In April 1989 the Secretary of Health and Human Services, Louis Sullivan, reiterated the goal of eliminating tuberculosis in the United States by the year 2010. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 5. This goal was not only unachievable at the outset, but its very articulation was disingenuous. To forecast the rapid elimination of tuberculosis was to suggest that a disease that had survived for a millennium could be eradicated in under two decades. More importantly, while the number of cases in the U.S. was declining overall, the disease continued to burden poor urban communities virtually unabated. See Sidel et al., *supra* note 25, at 305 (explaining the long-recognized correlation between low socio-economic status and high rates of tuberculosis).

48. TB: A GLOBAL EMERGENCY, *supra* note 37, at 2 ("In 1985, [the] . . . decline, [in TB cases] stopped and TB cases have been increasing ever since."). The declines similarly ended in other developed countries from 1987 onwards. *Id.*; Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis—Western Europe, 1974-1991*, 42 MORBIDITY & MORTALITY WKLY. REP. 628 (1993). The rates of increase in several of the poorer parts of Eastern Europe and the former Soviet Union have been even greater than the increase in other parts of Europe. WORLD HEALTH ORG., TUBERCULOSIS TRENDS IN EASTERN EUROPE AND THE FORMER USSR ii (1994).

1985 to 1993, the number of reported cases of tuberculosis exceeded by 64,000 the number of cases that had been predicted based on the trend of decline from 1980 through 1984.<sup>49</sup> In 1993, there were 25,313 reported cases of tuberculosis, or 9.8 cases per 100,000 persons,<sup>50</sup> and it was estimated that some 10-15 million Americans, or roughly 7 percent of the population, were infected with mycobacterium tuberculosis.<sup>51</sup> Active tuberculosis causes approximately 1800 to 2000 deaths per year.<sup>52</sup> In some parts of the United States, the rise in cases was even more pronounced than the rise in the entire country. In New York City in the 1980s, for example, tuberculosis rates increased more than three-fold.<sup>53</sup> Because of the increase, the rate of tuberculosis in New York City approached the incidence of tuberculosis in parts of sub-Saharan Africa.<sup>54</sup> Moreover, while tuberculosis characteristically was a disease that disproportionately affected the old, the increased rates of tuberculosis have particularly affected persons twenty-five to forty-four years old, including children and pregnant women.<sup>55</sup> Finally, the distribution of the disease among the popula-

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49. Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Expanded Tuberculosis Surveillance and Tuberculosis Morbidity—United States, 1993*, 43 MORBIDITY & MORTALITY WKLY. RPT. 361 (1994) [hereinafter *Expanded Tuberculosis Surveillance*]; Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Tuberculosis Morbidity—United States, 1992*, 42 MORBIDITY & MORTALITY WKLY. REP. 696 (1993) [hereinafter *Tuberculosis Morbidity*]. The incidence of tuberculosis in the U.S. rose 15.5% from 1984 through 1991. Graham & Chaisson, *supra* note 44, at 421.

50. *Expanded Tuberculosis Surveillance*, *supra* note 49, at 361. This is, in fact, a slight decrease in the 26,673 cases of tuberculosis, or 10.5 cases per 100,000 persons, in 1992. *Tuberculosis Morbidity*, *supra* note 49, at 696. See CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, TUBERCULOSIS STATISTICS IN THE UNITED STATES 1992 (1994) [hereinafter TUBERCULOSIS STATISTICS 1992]; CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, TUBERCULOSIS STATISTICS IN THE UNITED STATES 1991 (1993); CENTERS FOR DISEASE CONTROL & PREVENTION, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, TUBERCULOSIS STATISTICS IN THE UNITED STATES 1990 (1992).

51. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 7; Centers for Disease Control, U.S. Dep't of Health and Human Services, *Screening for Tuberculosis and Tuberculosis Infection in High-Risk Populations: Recommendations of the Advisory Committee for the Elimination of Tuberculosis*, 39 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-8 1990) [hereinafter *Screening for Tuberculosis*].

52. See TUBERCULOSIS STATISTICS 1992, *supra* note 50, at 51.

53. Peter A. Selwyn, *Tuberculosis in the AIDS Era: A New Threat From an Old Disease*, 91 N.Y. ST. J. OF MED. 233 (1991).

54. Peter F. Barnes & Susan A. Barrows, *Tuberculosis in the 1990s*, 119 ANNALS INTERNAL MED. 400, 401 (1993).

55. Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Tuberculosis among Pregnant Women—New York City, 1985-1992*, 42 MORBIDITY & MORTALITY WKLY. REP. 605 (1993); Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis Morbidity in the United States: Final Data 1990*, 40 MORBIDITY & MORTALITY WKLY. REP. 23 (1991).

tion is strikingly unequal, with the epidemic affecting substantially greater numbers of poor persons and ethnic minorities.<sup>56</sup>

### B. Causative Agent and Stages of Tuberculosis

Tuberculosis is caused by *Mycobacterium tuberculosis* (*M. TB*) or tubercle bacilli.<sup>57</sup> This bacterium is slow growing and relatively hardy, and can survive outside the body for long periods of time.<sup>58</sup> Tuberculosis infection, or latent tuberculosis, is a condition in which the body harbors a small number of dormant tubercle bacilli.<sup>59</sup> Infection with *M. TB* occurs when tubercle bacilli enter the airways of a noninfected person and lodge in the lungs.<sup>60</sup> The bacilli multiply slowly and usually do not cause any noticeable symptoms.<sup>61</sup> Before the body's immune system begins to mount an effective response, the infection in the lungs is usually well established.<sup>62</sup> After six to eight weeks,<sup>63</sup> the body begins to produce white blood cells that seek out the bacilli. At this point, the standard screening test for tuberculosis, the tuberculin skin test, which involves an injection of purified protein derivative, becomes positive.<sup>64</sup> In the great majority of cases, the body's immune response successfully kills all but a small number of tubercle bacilli

56. See *infra* notes 243-249, 253-254 and accompanying text.

57. *Mycobacterium* is the name of the bacterial family that causes tuberculosis and other infectious diseases in humans and animals. The complex of mycobacterial species that cause tuberculosis includes *M. bovis*, *M. africanum*, and *M. tuberculosis*, which is by far the most common cause of tuberculosis. American Thoracic Society, *Control of Tuberculosis in the United States*, 146 AM. REV. RESPIRATORY DISEASE 1623, 1631 (1992) [hereinafter *Control of Tuberculosis in the United States*]. Earlier this century, *M. bovis*, which causes tuberculosis in cattle, was transmitted to human beings through unpasteurized milk and respiratory exposure to infected cattle, but now *M. bovis* accounts for less than 1% of human tuberculosis cases in North America. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Bovine Tuberculosis—Pennsylvania*, 39 MORBIDITY & MORTALITY WKLY. REP. 201 (1990); OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, THE CONTINUING CHALLENGE OF TUBERCULOSIS 27 n.1 (OTA-H574, 1993) [hereinafter THE CONTINUING CHALLENGE OF TUBERCULOSIS]; Jerrold J. Ellner, *Current Issues in Tuberculosis*, 123 J. LABORATORY & CLIN. MED. 478 (1994).

58. H. William Harris, *Pulmonary Tuberculosis*, in INFECTIOUS DISEASES 405-06 (Paul D. Hoeprich & M. Colin Jordan eds., 4th ed. 1989). The slow reproductive pace of this bacterium and its hardiness are the reasons for two unusual aspects of the disease: (i) the prolonged time necessary to grow the tubercle bacillus in cultures and to determine its sensitivity to drugs; and (ii) the ability of tubercle bacilli to remain infectious while suspended in air for many hours. *Id.* at 406-09.

59. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 9.

60. *Id.*

61. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 31.

62. BARBARA BATES, BARGAINING FOR LIFE: A SOCIAL HISTORY OF TUBERCULOSIS, 1876-1938, 7-8 (1992).

63. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 10.

64. *Id.* at 13.

and the disease enters a dormant or latent stage of extremely variable length.<sup>65</sup> During this dormant period, individuals, though still infected with *M. TB*, are not contagious if they have no symptoms of clinically active pulmonary or laryngeal disease.<sup>66</sup>

Immunocompetent persons,<sup>67</sup> unless they are successfully treated with preventive antituberculosis drug therapy, have approximately a ten percent lifetime risk of developing active tuberculosis after a variable period of dormancy.<sup>68</sup> The risk of developing active tuberculosis is highest shortly after infection occurs and declines thereafter.<sup>69</sup> Only in about three to five percent of cases does the primary *M. TB* infection progress directly to active disease within a year of infection.<sup>70</sup> Unfortunately, medical science cannot reliably predict which infected persons will develop progressive primary tuberculosis or why.<sup>71</sup>

After the first year, individuals infected with *M. TB* face an additional ten percent lifetime risk of reactivation of the existing infection and development of active tuberculosis.<sup>72</sup> In persons with reactivated tuberculosis, the tubercle bacilli, which have remained dormant for years, begin to multiply and cause damage to the infected area.<sup>73</sup> It is not known why reactivation of long-dormant infection occurs in some individuals and not in others, but reactivation can be related to a decline in overall health,<sup>74</sup> a loss of immune function, or a reinfection with *M. TB*.<sup>75</sup>

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65. BATES, *supra* note 62, at 8.

66. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 9, 21. Unlike persons with latent tuberculosis, persons with HIV infection are contagious.

67. Persons with impaired immune systems such as individuals with HIV infection are at substantially greater risk of developing clinical disease after being infected with *M. TB*. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis and Acquired Immunodeficiency Syndrome—Florida*, 35 MORBIDITY & MORTALITY WKLY. REP. 587 (1986) [hereinafter *Tuberculosis and Acquired Immunodeficiency Syndrome—Florida*].

68. Peter A. Selwyn et al., *A Prospective Study of the Risk of Tuberculosis Among Intravenous Drug Users with Human Immunodeficiency Virus Infection*, 320 NEW ENG. J. MED. 545, 549 (1989).

69. BATES, *supra* note 62, at 8.

70. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 30.

71. See Harris, *supra* note 58, at 410.

72. See Selwyn et al., *supra* note 68, at 549.

73. See Harris, *supra* note 58, at 422 (discussing the reactivation of tuberculosis)

74. See *id.* at 422.

75. *Id.* at 422-23. The risk of reinfection is increased in persons with deteriorating immune systems, for example, the elderly or HIV-infected persons, or in those with exposure to very high levels of infectious droplets, including residents or workers in hospitals, prisons, shelters, and other congregate settings. Edward E. Nardell et al., *Exogenous Reinfection with Tuberculosis in a Shelter for the Homeless*, 315 NEW ENG. J. MED. 1570 (1986).

Pulmonary tuberculosis is the most common form of clinically active tuberculosis.<sup>76</sup> Symptoms of primary tuberculosis may include fatigue, fever, night sweats, weight loss, loss of appetite, all accompanied by a chronic cough or a cough that brings up mucus streaked with blood.<sup>77</sup> "Tuberculosis [also] is a systemic disease and may also occur as a pleural effusion, miliary disease (disseminated tuberculosis),<sup>78</sup> in the lymphatic or genitourinary systems, or in any other body organ or tissue."<sup>79</sup> Extrapulmonary tuberculosis can result in meningitis, which is an inflammation of the membranes surrounding the brain and spinal cord.<sup>80</sup> Depending on the primary site of infection, extrapulmonary tuberculosis also can impair breathing, mental capabilities, and movement of the legs.<sup>81</sup>

### C. Multidrug-Resistant Tuberculosis

Resistance to antituberculosis drugs occurs in *M. TB* by random, spontaneous mutations of the bacterial chromosome.<sup>82</sup> There are two ways a patient can develop drug resistant tuberculosis.<sup>83</sup> First, transmitted or primary drug resistance occurs when a person becomes infected with *M. TB* organisms that are already resistant to one or more drugs.<sup>84</sup> In these cases, the drug-resistant strain is passed directly to previously uninfected individuals for whom the standard therapy will fail.<sup>85</sup> Second, acquired or secondary drug resistance occurs when the small number of drug resistant mutants multiply as a result of ineffective antituberculosis therapy.<sup>86</sup> If persons with tuberculosis take their medication in an incomplete or sporadic fashion, or if they receive a suboptimal dosage or an insufficient number of drugs in the regimen,

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76. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 10.

77. *Id.*

78. Miliary tuberculosis is defined as "tuberculosis of various body organs and tissues resulting from millet-like (miliary) lesions or life-threatening meningitis that have been transported through the bloodstream from the initial site of infection (usually the lungs)." THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 116.

79. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 10.

80. Salvada Alvarez & William R. McCabe, *Extrapulmonary Tuberculosis Revisited: A Review of Experience at Boston City and Other Hospitals*, 63 MEDICINE 30 (1984).

81. See *id.* at 31-41 (discussing various manifestations of extrapulmonary tuberculosis).

82. Margarita E. Villarino et al., *The Multidrug-Resistant Tuberculosis Challenge to Public Health Efforts to Control Tuberculosis*, 107 PUB. HEALTH REP. 616 (1992).

83. Michael D. Iseman, *Treatment of Multidrug-Resistant Tuberculosis*, 329 NEW ENG. J. MED. 784 (1993).

84. *Id.*

85. *Id.*

86. *Id.*

then the hardy bacilli survive and can go on to multiply and produce drug-resistant active tuberculosis within months.<sup>87</sup>

While drug resistance is not new,<sup>88</sup> multidrug-resistant tuberculosis has increased significantly since the mid-1980s.<sup>89</sup> From 1982 through 1986, the proportion of new cases resistant to the two most effective antituberculosis drugs, isoniazid and rifampin, was only 0.5 percent.<sup>90</sup> In 1991, a national survey of multidrug-resistant tuberculosis found that 14.2 percent of cases were resistant to at least one drug, and 3.5 percent were resistant to both isoniazid and rifampin.<sup>91</sup> During the last three years, several hundred cases of tuberculosis resistant to at least two front-line drugs have been identified in thirteen states.<sup>92</sup> In many of the cases, the tuberculosis was resistant to seven drugs, including all five front-line drugs.<sup>93</sup>

Large outbreaks of multidrug-resistant tuberculosis have occurred in both Florida and New York.<sup>94</sup> While multidrug-resistant tuberculosis appeared in 13 states, New York City accounted for 61.4 percent of the nation's multidrug-resistant cases.<sup>95</sup> A 1992 survey in New York City found that thirty-three percent of tuberculosis cases had organisms resistant to at least one antituberculosis drug, and nineteen percent had organisms resistant to both of the most effective drugs, isoniazid and rifampin.<sup>96</sup>

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87. *Id.*

88. Georges Canetti, *Present Aspects of Bacterial Resistance in Tuberculosis*, 92 AM. REV. RESPIRATORY DISEASE 687 (1965); Gladys L. Hobby, *Primary Drug Resistance in Tuberculosis: A Review*, 86 AM. REV. RESPIRATORY DISEASE 839 (1962); Rick Weiss, *On the Track of "Killer" TB*, 255 SCIENCE 148 (1992).

89. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Meeting the Challenge of Multidrug-Resistant Tuberculosis: Summary of a Conference*, 41 MORBIDITY & MORTALITY WKLY. REP. 51 (RR-11 1992). See also Jeanne Kassler, *Drug-Resistant Tuberculosis is Surging*, N.Y. TIMES, June 2, 1991, at 1, 8; Rieder et al., *supra* note 42, at 79.

90. *Tuberculosis Control Laws*, *supra* note 24, at 2.

91. Alan B. Bloch et al., *Nationwide Survey of Drug-Resistant Tuberculosis in the United States*, 271 JAMA 665 (1994).

92. Dixie E. Snider, Jr. & William L. Roper, *The New Tuberculosis*, 326 NEW ENG. J. MED. 703 (1992).

93. *Id.*

94. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Nosocomial Transmission of Multiple-Drug-Resistant Tuberculosis Among HIV-Infected Persons—Florida and New York, 1988-1991*, 40 MORBIDITY & MORTALITY WKLY. REP. 585 (1991) [hereinafter *Nosocomial Transmission—Florida and New York*]; Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Outbreak of Multiple-Drug-Resistant Tuberculosis at a Hospital—New York City, 1991*, 42 MORBIDITY & MORTALITY WKLY. REP. 427 (1993).

95. Bloch et al., *supra* note 91, at 667.

96. Thomas R. Frieden et al., *The Emergence of Drug-Resistant Tuberculosis in New York City*, 328 NEW ENG. J. MED. 521 (1993). Several other large pockets of multidrug-resistant tuberculosis have been reported in large urban areas. For example, one hospital in Los Angeles found that 23% of tuberculosis patients with no prior treatment had resistant organisms,

Resistance to isoniazid and rifampin lengthens the course of tuberculosis treatment from six months to eighteen to twenty-four months, increases greatly the cost of treatment,<sup>97</sup> and decreases the cure rate from nearly 100 percent to 40 to 60 percent.<sup>98</sup> Patients with drug-resistant tuberculosis have an eighty-three-fold greater rate of treatment failure, and a two-fold greater rate of relapse than those with drug-susceptible tuberculosis.<sup>99</sup> Moreover, the case fatality rate for tuberculosis resistant to two or more major antibiotics is equivalent to untreated tuberculosis.<sup>100</sup> Finally, the outcome of treatment for persons with multidrug-resistant tuberculosis and the HIV infection is dire. In one study of more than 200 such persons, 72 to 89 percent were dead within 4 to 19 weeks.<sup>101</sup>

#### D. Diagnosis: Testing and Screening

1. *Diagnosing the Infection: The Tuberculin Skin Test.*—Tuberculin skin testing is the standard method of identifying persons infected with *M. TB*. The test, known as the Mantoux test, uses an injection of purified protein derivative into the skin.<sup>102</sup> A swelling of five to fifteen millimeters or more forty-eight to seventy-two hours after the injection indicates a positive test.<sup>103</sup>

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and 59% of tuberculosis patients with a history of prior treatment had resistant organisms. Issachar Ben-Dov & Gregory M. Mason, *Drug-Resistant Tuberculosis in a Southern California Hospital: Trends for 1969 to 1984*, 135 AM. REV. RESPIRATORY DISEASE 1307, 1803 & n.2 (1987). Iseman, *supra* note 83, at 785.

97. Peter S. Arno et al., *The Economic Impact of Tuberculosis in Hospitals in New York City: A Preliminary Analysis*, 21 J.L. MED. & ETHICS 317, 318 (1993).

98. Marion Goble et al., *Treatment of 171 Patients with Pulmonary Tuberculosis Resistant to Isoniazid and Rifampin*, 328 NEW ENG. J. MED. 527 (1993); See Iseman, *supra* note 83, at 784; *Tuberculosis Control Laws*, *supra* note 24, at 2. See also Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Initial Therapy for Tuberculosis in the Era of Multidrug Resistance*, 42 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-7 1993) [hereinafter *Initial Therapy for Tuberculosis*].

99. Iseman, *supra* note 83, at 785.

100. Bloom & Murray, *supra* note 28, at 1056.

101. Iseman, *supra* note 83, at 785. In another study, only 2 of 62 patients with HIV and multidrug-resistant tuberculosis were successfully treated. Margaret A. Fischl et al., *Clinical Presentation and Outcome of Patients with HIV Infection and Tuberculosis Caused by Multiple Drug Resistant Bacilli*, 117 ANNALS INTERNAL MED. 184, 187-88 (1992).

102. J.A. Lunn & A.J. Johnson, *Comparison of the Tine and Mantoux Tuberculin Tests: Report of the Tuberculin Subcommittee of the Research Committee of the British Thoracic Association*, 1 BR. MED. J. 1451, 1452 (1978); see CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 13-15 (discussing the tuberculin skin test).

103. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 13-14. A reaction of 5 mm is classified as positive in persons who have had close contacts with a person with infectious tuberculosis, persons who have abnormal radiographs, and persons who have HIV infection; a reaction of 10 mm is classified as positive in other persons who are at risk of tuberculosis; and a reaction of 15 mm is classified as positive in all persons. *Id.*

The test is not effective, however, in identifying tuberculosis in all people. Some individuals, for example, elderly people and people who have either advanced tuberculosis or HIV infection, have lost the ability to react to the tuberculin skin test because of the declining effectiveness of their immune systems. Such individuals infected with *M. TB* may falsely test negative.<sup>104</sup> In addition, there is considerable variability in sensitivity to tuberculin skin tests among persons who have received the tuberculosis vaccine, known as the bacillus Calmette-Guerin vaccine.<sup>105</sup>

Routine tuberculosis screening of large populations of "children and adults [in the United States] was abandoned during the 1970s and 1980s."<sup>106</sup> However, the tuberculin skin test is still used to screen specific populations and identify those persons infected with the disease who would benefit from preventive therapy. The Public Health Service recommends the screening of a wide variety of groups, including immigrants, residents of congregate settings, and persons with low incomes, impaired immune systems, and drug and alcohol dependencies.<sup>107</sup> Moreover, state statutes require screening for populations in a wide variety of settings ranging from schools, nursing homes, medical facilities and correctional facilities.<sup>108</sup>

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104. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Purified Protein Derivative (PPD)—Tuberculin Anergy and HIV Infection: Guidelines for Anergy Testing and Management of Anergic Persons at Risk of Tuberculosis*, 40 MORBIDITY & MORTALITY WKLY. REP. 27, 29 (RR-5 1991). Individuals with a weakened immune system have a PPD anergy in that they are unable to mount an immune response to a skin-test antigen as a result of immunosuppression. *Id.* at 29. While anergy often occurs in persons infected with HIV, other diseases or conditions can also cause suppression of cellular immunity such as viral infections (measles, mumps, chicken pox), bacterial infections (typhoid fever, pertussis, leprosy, overwhelming tuberculosis), diseases affecting lymphoid organs (Hodgkin's disease, lymphoma), age (newborn or elderly), or stress (surgery, burns). *Id.* Anergy is usually assessed by testing a patient's inability to mount a response to other skin-test antigens to which most healthy people would be expected to react. *Id.*

105. See L. Trnka et al., *Six Years' Experience with the Discontinuation of BCG Vaccination, Cost and Benefit of Mass BCG Vaccination*, 74 TUBERCLE & LUNG DISEASE 288 (1993) (discussing value of not using the BCG vaccine due to its effect on the tuberculin test); but see Evelyn Skotniski, *Post-BCG Tuberculin Testing: Interpreting Results and Establishing Essential Baseline Data*, 84 CANADIAN J. PUB. HEALTH 307 (1993) (disputing belief that the BCG vaccine renders the tuberculin skin test useless). The BCG test has been shown to be of significant diagnostic value, particularly in developing countries. A. Gocmen et al., *Is the BCG Test of Diagnostic Value in Tuberculosis?*, 75 TUBERCLE & LUNG DISEASE 54 (1994). For a discussion of the BCG vaccination for tuberculosis, see *infra* notes 142-154 and accompanying text.

106. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 55-56.

107. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 11-12; *Screening for Tuberculosis*, *supra* note 51, at 1.

108. *Tuberculosis Control Laws*, *supra* note 24, at 22-23.

2. *Diagnosing the Disease.*—Clinically active tuberculosis is diagnosed by examining a patient's history and by performing a tuberculin skin test, a clinical examination, and a radiographic examination.<sup>109</sup> Persons at risk of tuberculosis include persons who have the HIV infection or other medical conditions that increase the risk of tuberculosis, and persons who have had recent contact with persons known to have clinically active tuberculosis.<sup>110</sup> Persons who are immigrants, who are medically underserved, and who live and work in congregate settings, are more likely to have been exposed to tuberculosis and, therefore, are also at greater risk of contracting the disease.<sup>111</sup> Finally, persons who are dependent on illicit drugs and alcohol also have an elevated risk of tuberculosis.<sup>112</sup>

Tuberculin skin testing generally is recommended for persons who have an elevated risk of tuberculosis or for persons who are exhibiting symptoms of active tuberculosis.<sup>113</sup> However, for diagnosing pulmonary tuberculosis, the chest radiograph is usually more helpful than the tuberculin skin test. Pulmonary tuberculosis often results in the formation of a cavity in the lungs and in a progressive deterioration of the lungs that can be detected through a chest radiograph. Nonetheless, "[a]bnormalities on chest radiographs may be suggestive of, but are never diagnostic for, tuberculosis" because many other diseases produce similar or identical-looking images.<sup>114</sup> Therefore, because of the difficulty of diagnosis for all forms of tuberculosis, a positive bacteriologic culture is essential to confirm the diagnosis.<sup>115</sup>

The detection of acid-fast bacilli<sup>116</sup> in stained smears of sputum or other clinical specimens examined microscopically can provide the first bacteriologic clue of tuberculosis. However, this test is not con-

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109. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 21-24; American Thoracic Society, *Diagnostic Standards and Classification of Tuberculosis*, 142 AM. REV. RESPIRATORY DISEASE 725, 726 (1990). Diagnosis of tuberculosis disease in children is particularly difficult because the sputum smear and culture tests often do not reveal the presence of *M. TB*, which may be present in smaller numbers than in adults. See Jeffrey R. Starke & Kym T. Taylor-Watts, *Tuberculosis in the Pediatric Population of Houston, Texas*, 84 PEDIATRICS 28 (1989).

110. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 13-14.

111. *Control of Tuberculosis in the United States*, *supra* note 57, at 1628.

112. In 1993, 7.1% of persons with tuberculosis were drug users and 13% were excessive alcohol users. *Expanded Tuberculosis Surveillance*, *supra* note 49, at 364. See Lloyd N. Friedman et al., *Tuberculosis Screening in Alcoholics and Drug Addicts*, 136 AM. REV. RESPIRATORY DISEASE 1188 (1987); Selwyn et al., *supra* note 68, at 546.

113. See *supra* text accompanying notes 107-108.

114. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 24.

115. *Id.* at 23.

116. Acid-fast bacilli are defined as: "Organisms that retain certain stains even after being washed with acid alcohol. Most are mycobacteria. When seen on a stained smear of

clusive for two reasons. First, the acid-fast bacilli may be non-tuberculosis mycobacteria; second, the acid-fast bacilli may not show up in the test because of the small number of *M. TB* in some sputum samples.<sup>117</sup> It normally takes three to six weeks to obtain the results of a sputum culture.<sup>118</sup> Some laboratories, however, can perform radiometric testing which provides results in ten days, and an emerging technology that uses specialized gene probes "can identify . . . mycobacteria, once grown in pure culture, within 2 to 8 hours."<sup>119</sup> In addition, conventional methods for determining whether mycobacterium are susceptible to antituberculosis drugs can take eight to twelve weeks.<sup>120</sup> Newer radiometric techniques can test for susceptibility to front line drugs in up to three weeks.<sup>121</sup>

The length of time it takes to determine whether an individual has clinically active disease and is susceptible to treatment makes it difficult to make policy decisions about the treatment and isolation of patients. The uncertainty over diagnosis and treatment affects clinical decision-making about whether to treat, and with which combination of drugs. Moreover, until laboratory results are available, it is difficult to determine whether, and when, a person undergoing treatment will be rendered non-infectious. Therefore, just as important as the clinical decision-making is the policy choice of whether to detain a possibly infected person and for how long.

### *E. Transmission and Infectivity*

Tuberculosis is spread primarily by airborne droplets—"droplet nuclei"—produced in the lungs or larynx by a person with clinically active tuberculosis.<sup>122</sup> Droplet nuclei remain suspended in air for prolonged periods and are rapidly distributed by room air currents and ventilation systems in buildings. Droplet nuclei, therefore, remain a potential source of infection within indoor environments until they are diluted, removed, or otherwise inactivated.<sup>123</sup>

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sputum or other clinical specimen, a diagnosis of tuberculosis should be considered." *THE CONTINUING CHALLENGE OF TUBERCULOSIS*, *supra* note 57, at 113.

117. *CORE CURRICULUM ON TUBERCULOSIS*, *supra* note 43, at 22.

118. *Id.*

119. *Id.* at 22. For a detailed discussion of new techniques for diagnosing tuberculosis, see Barnes & Barrows, *supra* note 54, at 401-03.

120. Villarino et al., *supra* note 82, at 620.

121. *THE CONTINUING CHALLENGE OF TUBERCULOSIS*, *supra* note 57, at 71.

122. *CORE CURRICULUM ON TUBERCULOSIS*, *supra* note 43, at 9.

123. *Control of Tuberculosis in the United States*, *supra* note 57, at 1627.

Persons with asymptomatic *M. TB* infection are not contagious.<sup>124</sup> Persons with active clinical tuberculosis are contagious only if they are actually expelling—through coughing, sneezing, talking, or singing—airborne particles containing viable mycobacteria. Moreover, active tuberculosis is usually contagious only where it is manifested in the lungs or larynx.<sup>125</sup> Thus, persons with extrapulmonary tuberculosis who do not have any lung or airway involvement do not pose a risk of infection to others. More importantly, adequate tuberculosis treatment can quickly reduce and eventually eliminate the contagiousness of individuals with drug-susceptible tuberculosis.<sup>126</sup>

Persons with multidrug-resistant tuberculosis, however, may remain infectious for prolonged periods until an effective regimen of drugs is discovered and administered. Persons with untreatable forms of tuberculosis may remain indefinitely contagious.<sup>127</sup> Consequently, while multidrug-resistant tuberculosis does not appear to be more contagious than drug susceptible tuberculosis, delays in the diagnosis and treatment of a person with multidrug-resistant tuberculosis may render the person infectious for a longer period of time. The delay in treatment obviously increases the risk to others.

Even though infectious tuberculosis is an airborne disease that can be transmitted to others breathing the same air, the casual transmission of tuberculosis in crowded spaces such as subways, airplanes, or movie theaters,<sup>128</sup> while possible,<sup>129</sup> is not likely. Tuberculosis is not as contagious as many airborne viral infections, such as measles and chicken pox.<sup>130</sup> The central factors influencing the probability of acquiring *M. TB* infection are the susceptibility of the uninfected individual;<sup>131</sup> the number of viable bacilli present in the air; and the closeness and duration of contact with a contagious person. Environmental conditions such as the volume of airspace, the pres-

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124. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 28.

125. *Id.*

126. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 9.

127. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 29.

128. See, e.g., Joseph A. Califano, *Three-Headed Dog from Hell: The Staggering Public Health Threat Posed by AIDS, Substance Abuse and Tuberculosis*, WASH. POST, Dec. 21, 1992, at A22 (noting that tuberculosis is a highly contagious, deadly disease that "you can catch from the person next to you in a movie theater or classroom").

129. See Bloom & Murray, *supra* note 28, at 1058-59.

130. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 28; Edward A. Nardell, *Dodging Droplet Nuclei: Reducing the Probability of Nosocomial Tuberculosis Transmission in the AIDS Era*, 142 AM. REV. RESPIRATORY DISEASE 501, 501 (1990) ("TB is not usually very contagious compared to some of the airborne viral infections . . .").

131. See *supra* text accompanying notes 110-112.

ence of sunlight, and the adequacy of outside ventilation, also influence the probability of tuberculosis transmission.<sup>132</sup>

Tuberculosis infection is usually transmitted through prolonged contact with a contagious person. Those at greatest risk of contracting the infection, therefore, are the family members of contagious people and the residents and staff of residential facilities.<sup>133</sup> Those who live and work in confined spaces such as tenements, prisons, homeless shelters, nursing homes, and mental hospitals for an extended period of time also are at risk of contacting tuberculosis<sup>134</sup> because crowded living conditions create an environment conducive to the spread of tuberculosis.<sup>135</sup> Health care professionals working in settings with a high prevalence of tuberculosis also have a heightened risk of contracting tuberculosis not only because they come into close contact with infectious patients, but also because they perform, certain cough-inducing medical procedures on patients with contagious tuberculosis, which can result in exposure to airborne tubercle bacilli.<sup>136</sup>

There is a near scientific consensus that effective treatment renders a person with drug susceptible tuberculosis noninfectious after a short period of time.<sup>137</sup> The Centers for Disease Control states that "[u]sually within 2 to 3 weeks after the patient is started on effective therapy, infectivity of respiratory secretions will have diminished enough for the patient to be removed from isolation."<sup>138</sup> Despite this scientific opinion, nearly fifty percent of patients with pulmonary tuberculosis have a positive sputum smear after four weeks of treatment, and forty-four percent have a positive smear after six weeks.<sup>139</sup> These statistics have led at least one investigator to conclude that the assumption that persons with pulmonary tuberculosis are noninfectious soon after the commencement of treatment is unproven.<sup>140</sup>

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132. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 28-29.

133. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 13-14.

134. *Id.*

135. *See infra* notes 314-322 and accompanying text.

136. *See infra* notes 463-466 and accompanying text.

137. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 9.

138. CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH, EDUCATION & WELFARE, ISOLATION TECHNIQUES FOR USE IN HOSPITALS (Richard E. Dixon et al. eds., 2d ed. 1975).

139. Robert C. Noble, *Infectiousness of Pulmonary Tuberculosis After Starting Chemotherapy: Review of the Available Data on an Unresolved Question*, 9 AM. J. INFECTION CONTROL 6, 8 (1991).

140. *Id.* at 10.

*F. Biological Intervention: Vaccination, Prevention, and Treatment*

Biological interventions to prevent tuberculosis infection and to treat the disease prophylactically after infection have been prominent features of public health efforts to combat tuberculosis since the middle part of the century. While it has long been possible to prevent or treat the great majority of cases of tuberculosis, biological interventions are receiving renewed attention due to the resurgence of the tuberculosis epidemic and the emergence of drug-resistant forms of the disease.<sup>141</sup>

1. *Vaccination.*—In 1908, two French researchers, Albert Calmette and Camille Guérin, began work that resulted in the development of the antituberculosis vaccine now known as *Bacillus Calmette-Guérin*, or BCG.<sup>142</sup> Throughout the world, laboratories made their own BCG vaccines from bacillus strains sent from France. These daughter vaccines were never standardized, however, so there are no single bacteriologically identical BCG strains.<sup>143</sup> Vaccines marketed as BCG, therefore, actually comprise a group of related vaccines with varying characteristics.<sup>144</sup>

The BCG vaccine is the most widely used vaccine in the world, with more than three billion doses administered over the past forty years.<sup>145</sup> The World Health Organization has recommended use of the BCG vaccine since the early 1950s, and more than seventy percent of children in the world currently receive the vaccine during infancy or childhood. The vaccine is compulsory in 64 countries and officially recommended in 118 others.<sup>146</sup>

The BCG vaccine does not prevent initial infection with *M. TB*.<sup>147</sup> Rather, it boosts the cellular immune response to *M. TB* infection,

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141. See generally Barnes & Barrows, *supra* note 54, at 400 (summarizing current biological approaches to tuberculosis prevention and treatment).

142. Bloom & Murray, *supra* note 28, at 1056. At a Pasteur Institute in Lille, France, Calmette and Guérin sought to develop a weakened strain of the bacillus that would confer immunity but not the disease. Working with a strain of bovine tuberculosis, they grew a new generation every three weeks until they noted a strain that was no longer virulent. On the 231st generation, the bovine strain was first used to immunize a child whose mother died of tuberculosis. *Id.*

143. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 63.

144. *Id.*

145. See WORLD HEALTH ORGANIZATION, EXPANDED PROGRAMME ON IMMUNIZATION: UPDATE (May 1991).

146. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 63. See Paul E.M. Fine, *The BCG Story: Lessons From the Past and Implications for the Future*, 11 REV. INFECTIOUS DISEASES S353, S353 (Supp. 2 1989) ("Only the United States and the Netherlands have not used BCG on a national scale.").

147. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 63.

which theoretically reduces the risk of developing active tuberculosis after infection with *M. TB*.<sup>148</sup> The efficacy of the BCG vaccine in preventing disease, however, is not entirely demonstrated. For example, in ten clinical trials, the vaccine's efficacy has ranged from zero to eighty percent.<sup>149</sup> A recent meta-analysis of published literature on the efficacy of the BCG vaccine concluded that, on average, the vaccine reduces the risk of tuberculosis by fifty percent.<sup>150</sup>

In addition to questions surrounding the efficacy of the BCG vaccine, there are also questions about its risks. Adverse reactions to the BCG vaccine are rare in immunocompetent persons, but the frequency of adverse reactions in persons with damaged immune systems are not known.<sup>151</sup> As a result, the BCG vaccine has never been recommended in the U.S. except in the limited circumstances of infants and children at high risk of tuberculosis.<sup>152</sup>

Another problem with the BCG vaccine is that it renders subsequent tuberculin skin tests difficult to interpret. Persons who have been vaccinated may test positive on the skin test for several years after the vaccination even if they are not infected with *M. TB*.<sup>153</sup> Vaccination of large populations in the U.S., therefore, may interfere with existing policies on tuberculosis screening and preventive treatment.<sup>154</sup>

Despite the fact that tuberculosis is the leading cause of death from contagious disease in the world,<sup>155</sup> few efforts have been made to find a more effective vaccination since the BCG vaccine was discovered some seventy years ago. Because the burden of tuberculosis was relatively low, and decreasing in the world's richer countries,<sup>156</sup> the development of an efficacious antituberculosis vaccine did not appear

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148. *Id.*

149. Fine, *supra* note 146, at S535.

150. Graham A. Colditz et al., *Efficacy of BCG Vaccine in the Prevention of Tuberculosis: Meta-Analysis of the Published Literature*, 271 JAMA 698 (1994).

151. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Use of BCG Vaccines in the Control of Tuberculosis: A Joint Statement by the ACIP and the Advisory Committee for the Elimination of Tuberculosis*, 37 MORBIDITY & MORTALITY WKLY. REP. 663, 671 (1988) (discussing the side effects of the BCG vaccine).

152. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 35.

153. See Dixie E. Snider, Jr., *Bacille Calmette-Guerin Vaccinations and Tuberculin Skin Tests*, 253 JAMA 3438 (1985).

154. See Lee B. Reichman, *BCG is Wrong Vaccine for Tuberculosis*, N.Y. TIMES, May 1, 1994, at 16 (If we were to vaccinate all our children, "we would be insuring an unparalleled public health disaster that would inevitably compound and magnify the current epidemic of TB."); Trnka et al., *supra* note 105, at 288 (discussing the 1986 abolition of compulsory mass BCG vaccination of infants born in the Czech Republic).

155. Bloom & Murray, *supra* note 28, at 1055.

156. See *supra* note 42 and accompanying text.

to be economically cost effective. With the unexpected resurgence of tuberculosis in industrialized countries, however, fresh efforts have been made to derive a vaccine using a genetically engineered recombinant BCG vaccine.<sup>157</sup>

2. *Isoniazid Preventive Treatment.*—The antituberculosis drug isoniazid has been used since its introduction in the 1950s to treat the *M. TB* infection to prevent the development of clinically active tuberculosis.<sup>158</sup> Isoniazid preventive treatment is intended to eliminate mycobacteria within the body, significantly reducing the risk of active tuberculosis.<sup>159</sup> Isoniazid administered to infected persons for six to twelve months has effectively prevented the development of active tuberculosis in fifty-four to ninety-three percent of adults<sup>160</sup> and in nearly all children;<sup>161</sup> isoniazid preventive treatment is effective, however, only if the *M. TB* infection is not resistant to isoniazid.<sup>162</sup> Researchers and clinicians believe that the beneficial effects of isoniazid preventive treatment last a lifetime unless a person who underwent

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157. See Anna Aldovini & Richard A. Young, *Humoral and Cell-Mediated Immune Responses to Live Recombinant BCG-HIV Vaccines*, 351 NATURE 479 (1991) (discussing results of use of recombinant BCG vaccine); C.K. Stover et al., *New Use for BCG for Recombinant Vaccines*, 351 NATURE 456 (1991) (discussing recombinant BCG strains which "can elicit long lasting humoral and cellular immune responses to foreign antigens in mice").

158. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 55.

159. See generally Richard J. O'Brien, *Preventive Therapy for Tuberculosis*, in TUBERCULOSIS: BACK TO THE FUTURE, *supra* note 4, at 151.

160. See William C. Bailey et al., *Preventive Treatment of Tuberculosis*, 87 CHEST 128S, 128S (1985) ("Isoniazid prescribed for one year reduced the incidence of tuberculosis during the year of medication by 70 to 80 percent."); Centers for Disease Control, U.S. Dep't of Health and Human Services, *The Use of Preventive Therapy for Tuberculosis Infection: Recommendations of the Advisory Committee for Elimination of Tuberculosis*, 39 MORBIDITY & MORTALITY WKLY. REP. 9 (RR-8 1990) [hereinafter *The Use of Preventive Therapy*] ("isoniazid preventive therapy reduced the incidence of disease by 54%-88%"); International Union Against Tuberculosis Committee on Prophylaxis, *Efficacy of Various Durations of Isoniazid Preventive Therapy for Tuberculosis: Five Years of Follow-up in the IUAT Trial*, 60 BULL. WORLD HEALTH ORGANIZATION 555 (1982) (demonstrating a 75% efficacy). The main reason for the variation in efficacy appears to be the amount of medication actually taken during the year in which INH was prescribed. *The Use of Preventive Therapy*, *supra*, at 6.

161. See Katherine H.K. Hsu, *Thirty Years After Isoniazid: Its Impact on Tuberculosis in Children and Adolescents*, 251 JAMA 1283 (1984); Jerrey R. Starke, *Multidrug Therapy for Tuberculosis in Children*, 9 PEDIATRIC INFECTIOUS DISEASE J. 785 (1990) ("The overall success rate was greater than 95% . . .").

162. While it has not definitively been demonstrated to be effective, the use of rifampin for prevention of tuberculosis is recommended if the infection is resistant to isoniazid or the person cannot tolerate isoniazid. American Thoracic Society, *Treatment of Tuberculosis and Tuberculosis Infection in Adults and Children*, 134 AM. REV. RESPIRATORY DISEASE 355, 362 (1986) [hereinafter *Treatment of Tuberculosis*]; Committee on Isoniazid Preventive Treatment, *Preventive Treatment of Tuberculosis: Report of the National Consensus Conference on Tuberculosis*, 87 CHEST 128 (Supp. 1985).

the isoniazid treatment is reinfected.<sup>163</sup> The U.S. Public Health Service recommends isoniazid preventive treatment for persons at high risk of becoming infected with *M. TB* who have a positive tuberculin skin test reaction and who have not been previously treated.<sup>164</sup>

The widespread use of isoniazid preventive treatment is disputed because, in rare cases, the treatment can cause serious adverse effects. For example, the treatment can cause toxic hepatitis.<sup>165</sup> Decision analyses by researchers comparing the benefits and burdens of isoniazid preventive treatment have produced mixed results.<sup>166</sup> Because of these mixed results, the Centers for Disease Control has recommended that "[u]ntil alternative regimens with drugs posing fewer and less serious side effects are available, IPT will likely be limited to . . . high-risk groups."<sup>167</sup>

3. *The Treatment of Tuberculosis.*—Prior to the advent of antimicrobial drugs in the 1940s, patients with tuberculosis suffered deeply. Descriptions of the pre-antibiotic era were evocative:

The cough in its early stages was "frequent and harassing" and later developed into "hollow rattles" and "graveyard coughs." An initial "ruddiness" of the face gave way to a "deathlike paleness" . . . . The mucous discharge changed color and texture from "green" to "blood streaked"; hemorrhages, measured by teaspoons and cupfuls, occurred more frequently.<sup>168</sup>

163. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 55.

164. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 17-18. Candidates for isoniazid preventive treatment include the following persons regardless of age: persons with HIV, intravenous drug users, persons who have close contacts with infectious tuberculosis cases, recent skin test converters, and persons who have medical conditions that increase the risk of tuberculosis. *Id.* The following persons are candidates for isoniazid preventive treatment only if they are less than 35 years of age: residents of long-term care facilities, foreign born persons from high prevalence countries, and persons from low income populations, including high-risk minorities. *Id.*

165. See Dixie E. Snider, Jr., & Gus J. Caras, *Isoniazid-Associated Hepatitis Deaths: A Review of Available Information*, 145 AM. REV. RESPIRATORY DISEASE 494 (1992).

166. See Manan R. Passannante et al., *Preventive Therapy for the Patient with Both Universal Indication and Contraindication for Isoniazid*, 103 CHEST 825 (1993) (discussing study of tuberculosis treatment options); Dixie E. Snider, Jr., *Decision Analysis for Isoniazid Preventive Therapy: Take It or Leave It?* 137 AM. REV. RESPIRATORY DISEASE 2 (1988) (discussing study on the efficacy of isoniazid).

167. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 62.

168. ROTHMAN, *supra* note 23, at 4 (quoting WILLIAM SWEETSER, TREATISE ON CONSUMPTION 65 (1836)). See BATES, *supra* note 62, at 17-18.

Early primitive treatments focused simply on bed rest, diet and exercise.<sup>169</sup> In the early eighteenth century, it was estimated that deaths from consumption were one in four or five.<sup>170</sup>

From 1944 when Selman A. Waksman first discovered streptomycin, to the introduction of isoniazid<sup>171</sup> and ethambutol in the 1950s, to the availability of rifampin and the rediscovery of pyrazinamide in the 1960s and 1970s, science continued to make progress in the treatment of tuberculosis.<sup>172</sup> These five front-line drugs, taken consistently in the correct combination, make it possible to cure the vast majority of tuberculosis cases. Second-line antituberculosis drugs generally are less effective and more toxic than the front-line drugs. Nevertheless, the second-line drugs may be very important in treating persons infected with tuberculosis strains that have developed resistance to some or all of the standard treatments, and in treating persons experiencing severe side effects from the front-line drugs.<sup>173</sup>

When antimicrobial therapy was first used, drugs were given for eighteen to twenty-four months.<sup>174</sup> The introduction of rifampin in the early 1970s and the use of lower dose pyrazinamide permitted the development of shorter regimens of six to nine months.<sup>175</sup> The current short course treatment regimen recommended in the United States involves the use of three or four front-line drugs over a period of six months.<sup>176</sup> In clinical trials, short course regimens among drug susceptible cases<sup>177</sup> have shown both very high response rates—ninety-eight percent of sputum cultures converted to negative—and very low relapse rates—three percent of tuberculosis cases reactivated during two to five years' observation.<sup>178</sup>

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169. ROTHMAN, *supra* note 23, at 18.

170. SWEETSER, *supra* note 168, at 18.

171. Isoniazid was first synthesized in 1912, but sat on the shelf for 40 years. Bloom & Murray, *supra* note 28, at 1056.

172. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 72-73.

173. See generally *Treatment of Tuberculosis*, *supra* note 162, at 355.

174. WORLD HEALTH ORGANIZATION, TREATMENT OF TUBERCULOSIS: GUIDELINES FOR NATIONAL PROGRAMMES 3 (1993) [hereinafter GUIDELINES FOR NATIONAL PROGRAMMES].

175. *Id.*

176. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 25. The preferred treatment regimen includes two months of daily isoniazid, rifampin, and pyrazinamide, "followed by four months of daily or twice-weekly isoniazid and rifampin." *Id.* A recent update of Public Health Service recommendations suggests an initial four-drug regiment for the treatment of tuberculosis. *Initial Therapy for Tuberculosis*, *supra* note 98, at 2.

177. The success of treatment for multidrug-resistant tuberculosis is much lower. See Sue Etkind et al., *Treating Hard-to-Treat Tuberculosis Patients in Massachusetts*, 6 SEMINARS IN RESPIRATORY INFECTIONS 273 (1991).

178. Debra L. Combs et al., *USPHS Tuberculosis Short-Course Chemotherapy Trial 21: Effectiveness, Toxicity, and Acceptability*, 112 ANNALS INTERNAL MED. 397, 397 (1990); East African/

This often-told glowing story of scientific achievement, however, can be highly misleading. For example, in developing countries and in some inner cities in the United States, the success rate of short course regimens is not the ninety-eight percent demonstrated in controlled clinical trials, but is eighty-five percent or less.<sup>179</sup> Virtually every official publication by governmental or international agencies attribute the low rate of treatment success to "nonadherence," "non-compliance", "recalcitrance", or "failure" on the part of patients.<sup>180</sup> Blaming the person who is ill rather than accepting the responsibility of health agencies masks the problems that truly affect treatment completion.<sup>181</sup>

Certainly, some patients may forget or refuse to complete therapy once they begin to feel better. However, for many patients it is genuinely difficult to complete a course of recommended therapy.<sup>182</sup> First, for routine therapy several combinations of three or four drugs must be taken over a period of six months.<sup>183</sup> For persons with hard to treat cases of multidrug-resistant tuberculosis, experimentation with combinations of numerous drugs may occur over eighteen to thirty-six months.<sup>184</sup> Therefore, completing a tuberculosis treatment regimen requires a planned, disciplined, and well supervised program. Taking any prescribed medication over a long period of time is difficult for those with stable housing and a structured support network of family members and health care professionals. Completing treatment is even more difficult for individuals who have inadequate health care or

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British Medical Research Council, *Results at 5 Years of a Controlled Comparison of a 6-Month and a Standard 18-Month Regimen of Chemotherapy for Pulmonary Tuberculosis*, 116 AM. REV. RESPIRATORY DISEASE 3, 5 (1977); Michael D. Iseman & John A. Sbarbaro, *Short-Course Chemotherapy of Tuberculosis*, 143 AM. REV. RESPIRATORY DISEASE 697 (1991); see *Control of Tuberculosis in the United States*, *supra* note 57, at 1626 ("More than 90% of patients taking the 6-month regimen will have bacteriologically negative sputum within 3 months.");

179. GUIDELINES FOR NATIONAL PROGRAMMES, *supra* note 174, at 3.

180. See *Tuberculosis Control Laws*, *supra* note 24, at 6 (recommending penalties for non-adherence); GUIDELINES FOR NATIONAL PROGRAMMES, *supra* note 174, at 19-21 (recommending strategies for dealing with patient non-adherence).

181. See Mindy T. Fullilove et al., *Psychosocial Issues in the Management of Patients with Tuberculosis*, 21 J.L. MED. & ETHICS 324, 324-25 (1993) (examining how the unmet psychosocial needs of patients with tuberculosis affect their compliance with treatment).

182. Describing his experience, one quarantined patient with multidrug-resistant tuberculosis noted that each day he was compelled to swallow a "witch's brew" of 16 pills that made him perpetually nauseous and put him at risk of psychosis, dizziness, personality change, and hearing loss. "Three times a week there were painful shots as well. He had surgery to drain fluid from his lung, and had grueling surgery to remove his entire right lung and the lining of his chest wall." Elisabeth Rosenthal, *Doctors and Patients Are Pushed to Their Limits by Grim New TB*, N.Y. TIMES, Oct. 12, 1992, at A1.

183. See *supra* note 176 and accompanying text.

184. Iseman, *supra* note 83, at 786-88.

for individuals who are hungry, homeless, mentally ill, or alcohol or drug dependent. Second, while antituberculosis medication is taken orally, some medications are administered by painful intramuscular injections.<sup>185</sup> Third, antituberculosis drugs can cause adverse effects, such as hepatitis,<sup>186</sup> vertigo, hypersensitivity, hearing loss, influenza-like syndrome, and severe gastrointestinal intolerance.<sup>187</sup> Second-line drugs generally are harder to tolerate and are more toxic than the traditional medications.<sup>188</sup>

It is remarkable that despite the global burden of tuberculosis, no new antituberculosis drugs have been approved for general use since rifampin was introduced in 1971. The emergence of drug-resistant tuberculosis and the rising rate of infection with multiple mycobacteria in patients with HIV disease, however, have led to renewed research. As the search for new antituberculosis drugs continues, legal and policy discourse centers on one overarching consideration: what measures would effectively and legally ensure behavioral compliance with the full recommended course of antituberculosis treatment.

*G. Biological and Epidemiological Relationships Between Mycobacterium Tuberculosis and the Human Immunodeficiency Virus*

While the scientific realities of tuberculosis and AIDS could hardly be more different, there exists a remarkable biological and epidemiological association between the two diseases.<sup>189</sup> Globally, tuber-

185. GUIDELINES FOR NATIONAL PROGRAMMES, *supra* note 174, at 30, 37.

186. Snider & Caras, *supra* note 165, at 494.

187. See GUIDELINES FOR NATIONAL PROGRAMMES, *supra* note 174, at 27-41 (discussing each antituberculosis drug and its side effects); see generally Michael Specter, *TB Carriers See Clash of Liberty and Health*, N.Y. TIMES, Oct. 14, 1992, at A1 ("They make it sound so easy . . . I have to take four kinds of pills three times each day. They make me sick sometimes. I have to come here and sit and wait for my pills. I have to wait for two buses just to get here. It takes hours. You know, I don't think many people want to have this sickness.").

188. See Iseman, *supra* note 83, at 788 (discussing the various side effects of second-line drugs, such as ethionamide, which causes diarrhea and profound anorexia).

189. See generally Peter F. Barnes et al., *Tuberculosis in Patients with Human Immunodeficiency Virus Infection*, 324 NEW ENG. J. MED. 1644 (1991) ("unprecedented resurgence in tuberculosis is largely related to HIV epidemic"); Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis and Human Immunodeficiency Virus Infection: Recommendations of the Advisory Committee for the Elimination of Tuberculosis (ACET)*, 38 MORBIDITY & MORTALITY WKLY. REP. 236 (1989) (discussing general association between AIDS and tuberculosis); CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, *TB/HIV: THE CONNECTION—WHAT HEALTH CARE WORKERS SHOULD KNOW* (1993) [hereinafter *TB/HIV: THE CONNECTION—WHAT HEALTH CARE WORKERS SHOULD KNOW*]; Graham & Chaisson, *supra* note 44, at 421; Peter A. Selwyn, *Tuberculosis and AIDS: Epidemiologic, Clinical, and Social Dimensions*, 21 J.L. MED. & ETHICS 279, 280-83 (1993) ("[P]ersons with HIV infection and latent tuberculosis infection have a risk for development of active

culosis is the most common opportunistic disease in persons who have HIV.<sup>190</sup> The health implications of the dual epidemics of tuberculosis and AIDS are potentially staggering, given that one third of the world's population is infected with *M. TB*<sup>191</sup> and that the rates of HIV infection in Asia and Africa are steadily increasing.<sup>192</sup> There are approximately 3.1 million people in the world who are infected with both *M. TB* and HIV.<sup>193</sup> In 1990, four percent of all those infected with tuberculosis also were infected with HIV. By 2000, nearly one in seven of those who have tuberculosis will also have HIV.<sup>194</sup> In African countries where co-infection is most common, the number of tuberculosis cases reported annually has increased by 100 percent during the past five years, and is projected to increase by 41 to 463 percent from 1989 to 2000, depending on the local prevalence of the dual infections.<sup>195</sup>

It is impossible to quantify the interconnection between the dual epidemics of HIV and tuberculosis with precision,<sup>196</sup> but epidemiologic observations have led investigators to believe that the HIV disease is responsible for the majority of unpredicted tuberculosis cases in the United States.<sup>197</sup> The HIV epidemic has fueled the resurgence

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tuberculosis disease which is over 100 times increased compared to people not infected with HIV.”).

190. See Kevin M. De Cock et al., *Tuberculosis and HIV Infection in Sub-Saharan Africa*, 268 JAMA 1581 (1992) (“Tuberculosis is an early opportunistic disease in the course of human immunodeficiency virus (HIV) infection.”); Kevin M. De Cock, *Impact of Interaction with HIV*, in TUBERCULOSIS: BACK TO THE FUTURE, *supra* note 4, at 35.

191. See TB: A GLOBAL EMERGENCY, *supra* note 37, at 2 (discussing the worldwide tuberculosis epidemic).

192. See GLOBAL PROGRAMME ON AIDS, *supra* note 31, at 11.

193. J.F. Murray, *Tuberculosis and Human Immunodeficiency Virus Infection During the 1990s*, 66 BULL. INT’L TUBERC. LUNG DISEASE 21, 22 (1991).

194. TB: A GLOBAL EMERGENCY, *supra* note 37, at 4.

195. Barnes & Barrows, *supra* note 54, at 400; see M. Schulzer et al., *An Estimate of the Future Size of the Tuberculosis Problem in Sub-Saharan Africa Resulting from HIV Infection*, 73 TUBERCLE & LUNG DISEASE 52 (1991).

196. Pulmonary tuberculosis was not added to the AIDS surveillance case definition until 1993; from 1987 through 1992 only extrapulmonary tuberculosis was included in the definition. In 1993, 7,223 cases of AIDS with tuberculosis were reported to the Centers for Disease Control; this represented 6.8% of the total number of AIDS cases reported. Letter from Jeffrey L. Jones, National Center for Infectious Diseases, Division of HIV/AIDS to Lawrence O. Gostin (July 6, 1994) (on file with author) (figures derived from the CDC March 1994 database).

197. The following epidemiologic evidence suggests that the HIV epidemic has significantly contributed to the increase in the reported cases of tuberculosis. First, geographic areas with the highest burden of HIV disease have had the greatest increases in tuberculosis. See *Expanded Tuberculosis Surveillance*, *supra* note 49, at 363; *Tuberculosis and Acquired Immunodeficiency Syndrome—Florida*, *supra* note 67, at 587; Centers for Disease Control, U.S. Dep’t of Health and Human Services, *Tuberculosis and Acquired Immunodeficiency Syndrome—New York City*, 36 MORBIDITY & MORTALITY WKLY. REP. 785 (1987). Second, the demo-

of tuberculosis in major urban areas such as New York, where the number of hospitalizations resulting from co-infection has risen dramatically as compared with the number of hospitalizations associated with tuberculosis alone.<sup>198</sup>

The rate of new tuberculosis cases among persons with AIDS is almost 500 times that of the general population.<sup>199</sup> This astonishing rate is most likely explained by the damage that the HIV disease does to the immune system.<sup>200</sup> Many clinicians have long believed that persons with HIV infection are at increased risk of contracting *M. TB* infection following exposure,<sup>201</sup> and recent investigations of tubercu-

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graphic groups with the highest prevalence of HIV disease, namely Hispanics and African Americans 25 to 44 years old, have had the greatest increases in tuberculosis. See Dixie E. Snider, Jr. et al., *Tuberculosis: An Increasing Problem Among Minorities in the United States*, 104 PUB. HEALTH REP. 646 (1989); William W. Stead et al., *Racial Differences in Susceptibility to Infection by Mycobacterium Tuberculosis*, 322 NEW ENG. J. MED. 422 (1990). Third, rates of extrapulmonary tuberculosis have risen by 18.4% since 1985. The resurgence of extrapulmonary tuberculosis is closely related to the HIV epidemic. Laurence Slutsker et al., *Epidemiology of Extrapulmonary Tuberculosis Among Persons with AIDS in the United States*, 16 CLINICAL INFECTIOUS DISEASES 513, 513 (1993); see Barnes et al., *supra* note 189, at 164; Graham & Chaisson, *supra* note 44, at 421; Richard E. Chaisson et al., *Tuberculosis in Patients with the Acquired Immunodeficiency Syndrome*, 136 AM. REV. RESPIRATORY DISEASE 570 (1987); Selwyn, *supra* note 189, at 280-83.

198. See Arno et al., *supra* note 97, at 319 ("TB+/HIV+ hospitalizations increased by 4,216%, in contrast to an increase of 76% for TB+/HIV- hospitalizations" from 1983 to 1990); Margaret A. Hamburg, *Rebuilding the Public Health Infrastructure: The Challenge of Tuberculosis Control in New York City*, 21 J.L., MED. & ETHICS 352 (1993); Stephen C. Joseph, *New York City, Tuberculosis, and the Public Health Infrastructure*, 21 J.L., MED. & ETHICS 372 (1993). Hospital-based studies in the United States suggest that 10% or more of patients with AIDS have tuberculosis. Selwyn et al., *supra* note 68, at 545. See Hans L. Rieder & Dixie E. Snider, Jr., *Tuberculosis and the Acquired Immunodeficiency Syndrome*, 90 CHEST 469 (1986) (stating that HIV increases the risk of clinically active tuberculosis).

199. See Barnes et al., *supra* note 189, at 1644.

200. For discussions of the immunopathogenesis of tuberculosis, see Arthur M. Dannenberg, Jr., *Delayed-Type Hypersensitivity and Cell Mediated Immunity in the Pathogenesis of Tuberculosis*, 12 IMMUNOLOGY TODAY 228 (1991); Ian M. Orme et al., *T-Cell Response to Mycobacterium Tuberculosis*, 167 J. INFECTIOUS DISEASES 1481 (1993). While HIV infection is the most prominent cause of immunosuppression, there are persons with other conditions that place them at an elevated risk for tuberculosis, for example, silicosis, malnutrition, dependency on intravenous drugs, immunosuppressive therapy, diabetes mellitus, and end-stage renal disease. See *Control of Tuberculosis in the United States*, *supra* note 57, at 1628 (listing medical conditions that increase the risk of tuberculosis).

201. See Selwyn, *supra* note 189, at 281 (discussing the increased risk of primary infection with *M. TB* among immunocompromised hosts). The risk of tuberculosis is particularly high among nonwhites and intravenous drug users with AIDS. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis Prevention in Drug-Treatment Centers and Correctional Facilities—Selected U.S. Sites, 1990-1991*, 42 MORBIDITY & MORTALITY WKLY. REP. 210 (1983) [hereinafter *Tuberculosis Prevention in Drug-Treatment Centers and Correctional Facilities*].

losis outbreaks in congregate settings have strongly supported this clinical perception.<sup>202</sup>

The clinical course of tuberculosis in persons with HIV disease, moreover, is dramatically different from tuberculosis in immunocompetent adults.<sup>203</sup> Tuberculosis often occurs early in the course of HIV infection.<sup>204</sup> There is considerable evidence that HIV infected persons who contract *M. TB* infection face an extraordinarily high risk of developing clinically active tuberculosis. Only ten percent of persons with undamaged immune systems who are infected with *M. TB* are likely ever to develop the active disease.<sup>205</sup> Persons dually infected with HIV and *M. TB*, however, have an eight to ten percent risk *per year* of developing the active disease.<sup>206</sup> Accordingly, persons who are HIV infected are forty times more likely to progress to active tuberculosis following *M. TB* infection than persons who are not HIV infected. Virtually all dually infected patients will develop active tuberculosis if they live long enough. In addition, once HIV infected persons contract *M. TB* infection, they may experience an accelerated progression to active tuberculosis.<sup>207</sup> Co-infected persons also have a distressing prognosis, not only because of the increased risk of developing active tuberculosis, but also because there is some preliminary evidence that tuberculosis might indirectly increase HIV replication and accelerate the progression of the HIV disease.<sup>208</sup>

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202. See Charles L. Daley et al., *An Outbreak of Tuberculosis with Accelerated Progression Among Persons Infected with the Human Immunodeficiency Virus, An Analysis Using Restriction-Fragment-Length Polymorphisms*, 326 NEW ENG. J. MED. 231 (1992) (investigating an outbreak of tuberculosis in a congregate facility for HIV-infected persons); Giovanni DiPerri et al., *Nosocomial Epidemic of Active Tuberculosis Among HIV-Infected Patients*, 2 LANCET 1502 (1989) (analyzing an outbreak of tuberculosis among HIV-infected patients at a hospital); Graham & Chaisson, *supra* note 44, at 425.

203. See Juan Berenguer et al., *Tuberculous Meningitis in Patients Infected with the Human Immunodeficiency Virus*, 326 NEW ENG. J. MED. 668 (1992) (studying the incidence, characteristics, and outcomes of tuberculosis meningitis in patients infected with HIV). The clinical presentation of tuberculosis in persons with HIV infection may be related to their CD4 cell count. Brenda E. Jones et al., *Relationship of the Manifestations of Tuberculosis to CD4 Cell Counts in Patients with Human Immunodeficiency Virus Infection*, 148 AM. REV. RESPIRATORY DISEASE 1292 (1993).

204. Charles P. Theuer et al., *Human Immunodeficiency Virus Infection in Tuberculosis Patients*, 162 J. INFECTIOUS DISEASE 8 (1990).

205. Selwyn et al., *supra* note 68, at 549.

206. TB/HIV: THE CONNECTION—WHAT HEALTH CARE WORKERS SHOULD KNOW, *supra* note 189, at 3.

207. See Daley et al., *supra* note 202, at 235 (describing the rapid progression of tuberculosis in an outbreak among HIV infected residents on a congregate living facility).

208. See Graham & Chaisson, *supra* note 44, at 425.

Persons with HIV disease are more likely to be infected with drug-resistant strains of *M. TB*.<sup>209</sup> Ninety percent of the cases of multidrug-resistant tuberculosis identified by the Centers for Disease Control and Prevention in the last two years have been in persons with HIV infection. Persons with AIDS who are infected with multidrug-resistant tuberculosis, moreover, have an extremely poor prognosis, with 70 to 90 percent dying from tuberculosis, "with a median of 4 to 16 weeks from diagnosis to death."<sup>210</sup> Finally, the deaths from major outbreaks of multidrug-resistant tuberculosis within congregate settings, such as shelters,<sup>211</sup> hospitals,<sup>212</sup> correctional institutions,<sup>213</sup> and residential facilities,<sup>214</sup> have occurred disproportionately among persons with HIV infection.<sup>215</sup>

Biological approaches to preventing, treating, and diagnosing tuberculosis among HIV infected persons are extremely important because of the extraordinary health risks posed by dual infection. However, preventing tuberculosis infection in persons with the HIV

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209. In some cases, drug resistance develops because of a patient's failure to complete a course of drug therapy. However, failure to complete antituberculosis drug treatment is not necessarily more common among HIV sero-positive persons than among sero-negative patients. In fact, in a study of patients treated in a large urban public hospital, those with AIDS were significantly less likely than others to be lost to follow-up during anti-tuberculosis therapy. See Karen Brudney & Jay Dobkin, *Resurgent Tuberculosis in New York City: Human Immunodeficiency Virus and the Decline of Tuberculosis Control Programs*, 144 AM. REV. RESPIRATORY DISEASE 745 (1991).

210. Snider & Roper, *supra* note 92, at 704.

211. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis Among Residents of Shelters for the Homeless—Ohio 1990*, 40 MORBIDITY & MORTALITY WKLY. REP. 869 (1991) [hereinafter *Tuberculosis Among Residents of Shelters*] (summarizing results of investigations of tuberculosis cases by the Ohio Department of Health); Charles M. Nolan et al., *An Outbreak of Tuberculosis in a Shelter for Homeless Men*, 143 AM. REV. RESPIRATORY DISEASE 257 (1991) (describing an outbreak of tuberculosis in a shelter for homeless men in Seattle, Washington).

212. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Nosocomial Transmission of Multidrug-Resistant Tuberculosis to Health-Care Workers and HIV-Infected Patients in an Urban Hospital—Florida*, 39 MORBIDITY & MORTALITY WKLY. REP. 718 (1990) [hereinafter *Nosocomial Transmission—Florida*] (reporting findings of ongoing investigation into possible nosocomial transmission of multidrug-resistant tuberculosis at a hospital); *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 585 (analyzing outbreaks of multidrug-resistant tuberculosis in four hospitals).

213. See M. Miles Braun et al., *Increasing Incidence of Tuberculosis in a Prison Inmate Population*, 261 JAMA 393 (1989) (studying tuberculosis cases within correctional facilities); Dixie E. Snider, Jr. & Mary D. Hutton, *Tuberculosis in Correctional Institutions*, 261 JAMA 436 (1989) (commenting on the number of tuberculosis cases in correctional facilities).

214. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis Outbreak Among Persons in a Residential Facility for HIV Infected Persons—San Francisco*, 40 MORBIDITY & MORTALITY WKLY. REP. 649 (1991) [hereinafter *Tuberculosis Outbreak in Residential Facility*].

215. See *infra* notes 442, 469, 473 and accompanying text.

infection is difficult.<sup>216</sup> First, the efficacy of the BCG vaccine has been questioned.<sup>217</sup> Second, the vaccine's safety has not been demonstrated, and since the BCG is an attenuated live virus, it potentially poses a risk to persons with significantly impaired immune systems.<sup>218</sup>

The Centers for Disease Control recommends that persons with both HIV and *M. TB* infection receive isoniazid preventive treatment for twelve months in order to prevent the development of clinically active tuberculosis.<sup>219</sup> Early studies suggest that isoniazid preventive treatment in dually infected persons significantly decreases the incidence of clinically active tuberculosis.<sup>220</sup> The isoniazid preventive therapy is especially important in HIV infected persons, because, if left untreated, dually infected persons will almost inevitably develop active tuberculosis.<sup>221</sup> Active tuberculosis in persons infected with HIV seriously threatens the health of such persons and contributes to the spread of disease.<sup>222</sup> Infection with HIV does not appear to alter the effectiveness of tuberculosis drug treatment. Studies of persons with HIV disease have found that treatment offers significant improve-

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216. While treatment of HIV infected persons for drug-susceptible tuberculosis is usually successful, some researchers have reported relapses in patients after completing a course of treatment. See Robert W. Shafer & W.D. Jones, *Relapse of Tuberculosis in a Patient with the Acquired Immunodeficiency Syndrome Despite 12 Months of Antituberculous Therapy and Continuation of Isoniazid*, 72 TUBERCLE 149 (1991) (describing a patient with AIDS and pleuropulmonary tuberculosis who relapsed with disseminated tuberculosis despite receiving treatment); Gnanj Sunderam et al., *Failure of 'Optimal' Four-Drug Short-Course Tuberculosis Chemotherapy in a Compliant Patient with Human Immunodeficiency Virus*, 136 AM. REV. RESPIRATORY DISEASE 1475 (1987) (describing a tuberculosis patient who relapsed four months after completing a treatment regimen).

217. See *supra* text accompanying note 149.

218. See Pol Boudes et al., *Disseminated Mycobacterium Bovis Infection from BCG Vaccination and HIV Infection*, 262 JAMA 2386 (1989) (commenting on the danger of the BCG vaccine).

219. CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 19.

220. See JAL P. NARAIN ET AL., WORLD HEALTH ORGANIZATION, HIV-ASSOCIATED TUBERCULOSIS IN DEVELOPING COUNTRIES: EPIDEMIOLOGY AND STRATEGIES FOR PREVENTION (1992) (discussing the strategies for tuberculosis control); Jean W. Pape et al., *Effect of Isoniazid Prophylaxis on Incidence of Active Tuberculosis and Progression of HIV Infection*, 342 LANCET 268 (1993) (assessing the efficacy of isoniazid in preventing active tuberculosis in symptom-free HIV-infected individuals). Some studies suggest that isoniazid preventive treatment should be considered for persons who test negative for *M. TB* infection who also have the HIV infection if their CD4 count falls below 400. Ana Guelar et al., *A Prospective Study of the Risk of Tuberculosis Among HIV-Infected Patients*, 7 AIDS 1345 (1993).

221. See *supra* note 207 and accompanying text.

222. See World Health Organization, *Tuberculosis Preventive Therapy in HIV-Infected Individuals: A Joint Statement of the WHO Tuberculosis Programme and the Global Programme on AIDS, and the International Union Against Tuberculosis and Lung Disease*, 68 WKLY. EPIDEMIOLOGIC RECORD 361 (1993).

ment in drug-susceptible tuberculosis compared with untreated persons.<sup>223</sup>

Diagnosing *M. TB* infection or clinically active tuberculosis in persons infected with HIV is very difficult for a number of reasons.<sup>224</sup> First, the damage to the immune system caused by HIV makes the tuberculin skin test unreliable.<sup>225</sup> Studies have demonstrated that twenty-five to fifty percent of otherwise healthy persons with HIV infection who are infected with *M. TB* do not react to a tuberculin skin test. In persons whose HIV infection has progressed to clinical AIDS, fifty to seventy-five percent do not react to the tuberculin skin test.<sup>226</sup> Second, persons with HIV infection often have atypical radiographic presentation of tuberculosis in the lung, and have a higher frequency of extrapulmonary disease.<sup>227</sup> The atypical manifestations of tuberculosis in HIV infected persons, together with human errors in the management of patients, has led to failures and delays in the diagnosis of tuberculosis.<sup>228</sup> The problems with the scientific identification and management of tuberculosis cases among HIV infected persons has meant that many HIV infected patients have not received treatment until long after the tuberculosis was present.<sup>229</sup> These problems with identification also can lead to legal problems when public health officials attempt to detect HIV infected persons who pose a significant

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223. See Chaisson et al., *supra* note 197, at 570 (studying clinical manifestations, response to therapy, and survival of patients with AIDS and tuberculosis; Peter M. Small et al., *Treatment of Tuberculosis in Patients with Advanced Human Immunodeficiency Virus Infection*, 324 NEW ENG. J. MED. 289 (1991) (examining the effectiveness of treatment in patients with AIDS and tuberculosis). But see Laura Monno et al., *Current Problems in Treating Tuberculosis in Italian HIV-Infected Patients*, 74 TUBERCLE & LUNG DISEASE 280 (1993).

224. See Michael J. Given et al., *Tuberculosis Among Patients with AIDS and a Control Group in an Inner-City Community*, 154 ARCHIVES INTERNAL MED. 640 (1994) (stating that vast differences are found in the clinical, roentgenographic, and drug susceptibility characteristics of patients with tuberculosis who did and did not have AIDS); Graham & Chaisson, *supra* note 44, at 421.

225. For a discussion of anergy, see *supra* note 104 and accompanying text.

226. Elisabeth Rosenthal, *HIV Infection Foiling Tests that Detect Deadly TB Germ*, N.Y. TIMES, Dec. 10, 1991, at A1. However, HIV probably does not significantly compromise the diagnostic utility of the sputum smear. Richard Long et al., *The Impact of HIV on the Usefulness of Sputum Smears for the Diagnosis of Tuberculosis*, 81 AM. J. PUB. HEALTH 1326, 1327 (1991).

227. MICHAEL P. JOHNSON & RICHARD E. CHAISSON, TUBERCULOSIS AND HIV DISEASE, AIDS CLINICAL REVIEW 109, 115-16 (Paul Volberding & Marc A. Jacobson eds., 1991).

228. See Barnes et al., *supra* note 189, at 1647 (discussing the problem of delayed diagnosis of tuberculosis). While the sensitivity and specificity of sputum smears in HIV-infected persons has also been questioned, HIV probably does not significantly compromise the diagnostic utility of the sputum smear. Long et al., *supra* note 226, at 1327.

229. Francoise Kramer et al., *Delayed Diagnosis of Tuberculosis in Patients with Human Immunodeficiency Virus Infection*, 89 AM. J. MED. 451, 456 (1990); see Gurdij S. Flora et al., *Undiagnosed Tuberculosis in Patients with Human Immunodeficiency Virus Infection*, 98 CHEST 1056 (1990).

risk of developing clinically infectious tuberculosis and transmitting *M. TB* infection to others.<sup>230</sup>

Finally, persons with HIV infection living and working in crowded facilities have a high risk of contracting and transmitting the *M. TB* infection, and becoming seriously ill before being diagnosed with tuberculosis. As a result, many clinicians are calling for a more aggressive approach to the identification and management of dually infected persons. Proposals range from anergy testing, and routine, or even compulsory HIV screening, to preventive treatment before a diagnosis of *M. TB* infection, and quarantine before a diagnosis of active tuberculosis.<sup>231</sup>

## II. TUBERCULOSIS IN MODERN AMERICAN SOCIETY: THE SOCIAL FOUNDATIONS OF THE DISEASE

Many attribute the long standing decline of tuberculosis to the discovery of antituberculosis therapy. The use of biologic agents to prevent and treat tuberculosis certainly has contributed to the reduction in the epidemic. Yet, chroniclers of the history of disease observe that tuberculosis rates declined dramatically during the nineteenth and first half of the twentieth century, well before the discovery of streptomycin.<sup>232</sup> Moreover, they observe that the antibiotic era only slightly accelerated the reduction in tuberculosis. These observations led many theorists to suggest that it was significant improvements in the social environment, such as better housing, nutrition, and sanitation, that were largely responsible for the long term decline in tuberculosis.<sup>233</sup> The social theory also explains the long recognized correlation between low socioeconomic status and high rates of tuberculosis and other infectious diseases.<sup>234</sup>

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230. See *infra* notes 433-443, 529-547 and accompanying text.

231. See Guelar et al., *supra* note 220, at 1345 (stating that among HIV-infected patients in whom a tuberculin skin test is negative, the risk of developing active tuberculosis is sufficient to consider prophylaxis if the CD4 count falls below 400); Alvin Novick, *Resurgent Tuberculosis in HIV-Infected Persons*, 7 AIDS & PUB. POL'Y J. 3 (1992) (recommending the development of tuberculosis screening programs for vulnerable populations); Rosenthal, *supra* note 226, at A1 (discussing programs recommended to control the tuberculosis epidemic).

232. Sidel et al., *supra* note 25, at 304-05.

233. See, e.g., MICHAEL E. TELLER, *THE TUBERCULOSIS MOVEMENT: A PUBLIC HEALTH CAMPAIGN IN THE PROGRESSIVE ERA* (1988); S.A. KNOPP, *TUBERCULOSIS AS A DISEASE OF THE MASSES AND HOW TO COMBAT IT* (4th ed. & Supp. 1907).

234. *Id.* The most dramatic illustration of this effect was found in the profoundly differential death rates from tuberculosis in Manhattan which fell along class lines. See Rothman, *supra* note 16, at 289-90.

Regardless of whether one accepts fully the theory that the social environment is the leading factor in predicting the spread of tuberculosis, it is important to recognize the broad and growing consensus that the deterioration of social conditions prior to the mid-1980s was critically important to the resurgence of the disease. Moreover, it is important to recognize that efforts to improve the social environment form an integral part of any effective public health program designed to alleviate the burden of tuberculosis.<sup>235</sup> Improving social conditions probably would substantially decrease the morbidity and mortality caused by tuberculosis.

Careful examination of the social foundations of tuberculosis in modern America first requires an understanding of the correlation between tuberculosis and socioeconomic status. Second, it requires an understanding of the role of overcrowded, underventilated congregate facilities in the spread of infection. Finally, it requires an understanding of the lawfulness and effectiveness of compulsory powers used to identify and exclude residents and workers at risk for tuberculosis in congregate facilities.

#### A. *The Societal Origins of the Disease*

It is impossible to prove definitively a causal relationship between the deterioration of social conditions and the rise in tuberculosis since the mid-1980s. Part of the increase certainly is attributable to the HIV epidemic.<sup>236</sup> Yet, in modern America, there is a demonstrable and striking correlation between tuberculosis and poverty, race, homelessness, and the deterioration of the public health and health care systems.<sup>237</sup>

1. *Poverty*.—If social conditions affect the levels of tuberculosis in America, then it is reasonable to assume that social conditions probably began deteriorating in the 1970s, just before the rise in tuberculosis in the 1980s. Census data show that from 1977 to 1990, the period during which the resurgence of tuberculosis began, the poorest 20 percent of the population suffered a 15 percent loss in real

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235. See, e.g., NANCY N. DUBLER ET AL., *THE TUBERCULOSIS REVIVAL: INDIVIDUAL RIGHTS AND SOCIAL OBLIGATIONS IN A TIME OF AIDS* (1992).

236. See, e.g., Bloom & Murray, *supra* note 28, at 1060 (estimating the number of excess cases from 1985 to 1991 that resulted from co-infection with HIV and *M. TB* to be 18,000, with most of the remainder attributable to social conditions and decreases in public health funding).

237. Other diseases also have associations with poverty, including HIV disease. Ernest Drucker, *Epidemic in the War Zone: AIDS and Community Survival in New York City*, 20 INT'L J. HEALTH SERVICES 601, 602 (1990).

income, while the wealthiest one percent of the population had a 110 percent after tax rise in income.<sup>238</sup> While the number of persons below the poverty line dropped from 1959 to the early 1970s, the number of persons below the poverty line rose from the late 1970s through 1991.<sup>239</sup> In 1991, 14.2 percent of the population,<sup>240</sup> or 35.7 million persons, were below the official poverty level, and if valuation methods that excluded noncash benefits such as Medicaid and food stamps were used, then 21.8 percent of the population,<sup>241</sup> or 54.8 million persons, would have been below the official poverty line. Moreover, despite the increased rates of poverty since 1975, the percentage of gross domestic product spent on social welfare has dropped modestly since the early 1970s.<sup>242</sup>

The sub-groups that disproportionately fall below the poverty population are precisely those groups that are most affected by the tuberculosis epidemic. In 1991, nearly 32.7 percent of all African-Americans and 28.7 percent of all Hispanics were living in poverty.<sup>243</sup> One half of the nation's poor were either children<sup>244</sup> or elderly,<sup>245</sup> two groups with elevated rates of tuberculosis.<sup>246</sup>

In addition to social studies and data, epidemiological studies also have demonstrated a strong association between poverty and increased respiratory diseases, including tuberculosis.<sup>247</sup> For example,

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238. Sidel et al., *supra* note 25, at 307 (citing DAVID U. HIMMELSTEIN & STEFFIE WOOLHANDLER, THE NATIONAL HEALTH PROGRAM CHARTBOOK 24 (1992)).

239. See BUREAU OF THE CENSUS, U.S. DEP'T OF COMMERCE, 1993 POPULATION PROFILE OF THE UNITED STATES 28 (1994) [hereinafter 1993 POPULATION PROFILE OF THE UNITED STATES]; SOCIAL SECURITY ADMINISTRATION, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, 1993 ANNUAL STATISTICAL SUPPLEMENT 147-52 (1994).

240. See 1993 POPULATION PROFILE OF THE UNITED STATES, *supra* note 239, at 28.

241. *Id.* at 29.

242. Total social welfare expenditures in the U.S. rose considerably from 8.8 percent of the gross domestic product in 1950 to a high of 19.1 percent in 1975. Since 1975, the percentage of social welfare expenditures has remained around 18.5, despite the rise in the number of persons below the poverty line. SOCIAL SECURITY ADMINISTRATION, *supra* note 239, at 128.

243. 1993 POPULATION PROFILE OF THE UNITED STATES, *supra* note 239, at 29.

244. One-fourth of all children and one half of all African American children were below the poverty line. Sidel et al., *supra* note 25, at 307.

245. 1993 POPULATION PROFILE OF THE UNITED STATES, *supra* note 239, at 29.

246. See Barnes & Barrows, *supra* note 54, at 401 ("Tuberculosis remains a problem at the extremes of life.").

247. The inter-relationship of poverty and tuberculosis is nowhere more evident than in the poorest countries of the world. Haiti, with a rural per capita income of less than \$300 per year, has faced profound health problems worsened by chronic malnutrition. "Of all the health problems cited, one stands out from the others by virtue of its insidious onset, its tenacity, and its prevalence—pulmonary tuberculosis." Paul Farmer et al., *Tuberculosis, Poverty, and "Compliance": Lessons from Rural Haiti*, 6 SEMINARS IN RESPIRATORY INFECTIONS 254, 254 (1991).

over sixty-eight percent of all tuberculosis cases reported in 1993 were among the unemployed.<sup>248</sup> The association between poverty and respiratory disease is the result of a wide variety of health conditions affecting immune function, which disproportionately affect the poor. Such health conditions include stress, alcoholism, malnutrition, cigarette smoking, overcrowded housing, indoor air pollution, low infant birth weight, and heightened exposure to co-infections such as HIV.<sup>249</sup> It is not surprising, therefore, to find a profound synergy between poverty and tuberculosis.

2. *Race*.—Historically, tuberculosis was called the “social leveler” because it affected all races and social and economic classes. In the general population, mortality rates declined in the late nineteenth century. In inner-city ghettos, however, the disease was endemic<sup>250</sup> and mortality rates were high.<sup>251</sup> Today, tuberculosis disproportionately burdens ethnic and racial minorities.<sup>252</sup> Approximately seventy percent of all tuberculosis cases and eighty-six percent of cases in children occur among African-Americans and Latinos.<sup>253</sup> Hispanic persons are four times more likely than non-Hispanic white persons to develop active disease; African-Americans are six times more likely, and Asian-Americans and Pacific Islanders are eleven times more likely.<sup>254</sup> Moreover,

[c]ases among racial and ethnic minorities [are] much younger than non-Hispanic white cases: of the cases among minorities (median age, 40 years), 40 per cent were younger than 35 years of age, while among non-Hispanic white tuberculosis cases (median age of 62 years), only 14 per cent were younger than 35.<sup>255</sup>

The high number of active tuberculosis cases among younger persons in minority households is of concern because it affects the economic

248. *Expanded Tuberculosis Surveillance*, *supra* note 49, at 364.

249. David H. Bor & Paul R. Epstein, *Pathogenesis of Respiratory Infection in the Disadvantaged*, 6 SEMINARS IN RESPIRATORY INFECTIONS 194 (1991).

250. See Rothman, *supra* note 16, at 2.

251. See Marion M. Torchia, *Tuberculosis Among American Negroes: Medical Research on a Racial Disease, 1830-1950*, 32 J. HIST. OF MED. & ALLIED SCI. 252 (1977).

252. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Prevention and Control of Tuberculosis in U.S. Communities with At-Risk Minority Populations, Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 41 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-5 1992) (“[T]he 1990 TB case rate was notably higher for racial/ethnic minorities.”).

253. *Id.*

254. See Rieder et al., *supra* note 42, at 85.

255. *Id.*

viability of minority families and places minority children at increased risk of contracting *M. TB* infection from other children and young adults.

3. *Homelessness*.—For most of this century, tuberculosis has been a significant health problem among the homeless and among residents of hostels, night shelters, inexpensive lodging houses, and single-room occupancy hotels.<sup>256</sup> While homelessness has long been a problem, the number of homeless persons or persons housed in overcrowded, badly ventilated structures began to rise sharply in the late 1970s.<sup>257</sup> Although caused by a wide variety of social factors, including the deinstitutionalization of persons with mental illness, the rise in homelessness generally is associated with increased poverty,<sup>258</sup> sharpened declines in funding for housing,<sup>259</sup> and sustained reductions in the availability of low cost dwellings.<sup>260</sup>

The precise rise in homelessness and the current number of homeless persons is unknown; no national studies of this fundamental social problem have been done. The 1990 census counted over 200,000 homeless persons,<sup>261</sup> but this number is regarded by many as a significant underestimation. Depending on how one defines homelessness and the duration of homelessness, there are between 250,000 and 1,000,000 homeless persons in America,<sup>262</sup> with the most widely cited estimates around 600,000.<sup>263</sup>

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256. See S. Adolphus Knopf, *Tuberculosis as a Cause and Result of Poverty* 63 JAMA 1720, 1721 (1914) ("Cheap lodging houses are veritable breeding places of tuberculosis."); Centers for Disease Control, U.S. Dep't of Health and Human Services, *Prevention and Control of Tuberculosis Among Homeless Persons: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 41 MORBIDITY & MORTALITY WKLY. REP. 13 (RR-5 1992); Carl W. Schiefelbein, Jr. & Dixie E. Snider, Jr., *Tuberculosis Control Among Homeless Populations*, 148 ARCHIVES INTERNAL MED. 1843 (1988). Homeless populations bear disproportionate burdens of many respiratory and nonrespiratory diseases in addition to tuberculosis. See James J. O'Connell, *Nontuberculosis Respiratory Infections Among the Homeless*, 6 SEMINARS IN RESPIRATORY INFECTIONS 247 (1991).

257. INTERAGENCY COUNCIL ON THE HOMELESS, 1990 ANNUAL REPORT 17 (1991).

258. See *supra* text accompanying notes 238-239.

259. Federal housing funds, corrected for inflation, were reduced by 75% during the period 1981 to 1992. Sidel et al., *supra* note 25, at 308.

260. INTERAGENCY COUNCIL ON THE HOMELESS, *supra* note 257, at 20-21.

261. BUREAU OF THE CENSUS, U.S. DEP'T OF COMMERCE, 1990 CENSUS OF POPULATION: GENERAL POPULATION CHARACTERISTICS 1, 51 (1992) [hereinafter 1990 CENSUS OF POPULATION] (reporting 178,638 homeless persons in emergency shelters for the homeless, and 49,734 homeless persons visible in street locations).

262. Carol L.M. Caton, *Homelessness in Historical Perspective*, in HOMELESS IN AMERICA 3, 5 (Carol L.M. Caton ed., 1990).

263. SAR A. LEVITAN & SUSAN SCHILLMOELLER, THE PARADOX OF HOMELESSNESS IN AMERICA 5 (1991).

Persons who are homeless face considerably enhanced risks of morbidity and mortality. For example, one study reported that homeless adults in an inner city had an age adjusted mortality rate nearly four times that of the general population.<sup>264</sup> The high mortality rate among homeless persons and the observance of the social and physical conditions of homeless persons inevitably leads to the conclusion that the homeless are at considerable risk of contracting tuberculosis, developing active tuberculosis, harboring multidrug-resistant bacilli, and transmitting the infection to others.<sup>265</sup>

Many believe that *M. TB* infection among the homeless is highly prevalent. Some studies have shown that, in many inner cities, the level of *M. TB* among the homeless ranges from eighteen to seventy-nine percent.<sup>266</sup> Even this high rate of tuberculosis among homeless persons is likely to be underestimated when one considers that homeless persons are in almost daily close contact with other individuals who are at high risk of tuberculosis. The homeless are comprised predominately of persons who are poor,<sup>267</sup> drug or alcohol dependent,<sup>268</sup> and who have multiple health problems,<sup>269</sup> including the HIV disease.<sup>270</sup> Prolonged, daily contact among such persons in overcrowded, poorly ventilated shelters and other enclosed spaces makes it highly likely that a homeless person would be exposed to *M. TB*.

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264. Jonathan R. Hibbs et al., *Mortality in a Cohort of Homeless Adults in Philadelphia*, 331 NEW ENG. J. MED. 304, 306 (1994).

265. See Brudney & Dobkin, *supra* note 209, at 745 ("The growth of homelessness in the 1980s . . . greatly complicat[ed] tuberculosis treatment and probably promot[ed] further spread of this infection.").

266. Eugene A. Paul et al., *Nemesis Revisited: Tuberculosis Infection in a New York City Men's Shelter*, 83 AM. J. PUB. HEALTH 1743, 1744 (1983) (79% of a sample of homeless men tested positive for *M. TB*); Schieffelin & Snider, *supra* note 256, at 1843 ("The prevalence of latent tuberculosis infection among homeless persons is reported to be 18% to 51%.").

267. See LEVITAN & SCHILLMOELLER, *supra* note 263, at 9-12 (discussing common characteristics shared by homeless people).

268. INTERAGENCY COUNCIL ON THE HOMELESS, *supra* note 257, at 9 ("[O]ver a third of the adult homeless population have chronic alcohol problems and, with some overlap, approximately 10-20% have problems with other drugs.").

269. UNDER THE SAFETY NET: THE HEALTH AND SOCIAL WELFARE OF THE HOMELESS IN THE UNITED STATES 4-5 (Philip W. Brickner & Brian C. Scanlan eds., 1990) [hereinafter UNDER THE SAFETY NET]; COMMITTEE ON HEALTH CARE FOR HOMELESS PEOPLE, INSTITUTE OF MEDICINE, HOMELESSNESS, HEALTH AND HUMAN NEEDS 39 (1988); Arnold Drapkin, *Medical Problems of the Homeless*, in HOMELESS IN AMERICA, *supra* note 262, at 76-78.

270. The incidence of HIV infection in the homeless population is uncertain, but has been shown to exceed 60% in some studies. See Ramon A. Torres et al., *Human Immunodeficiency Virus Infection Among Homeless Men in a New York City Shelter: Association with Mycobacterium Tuberculosis Infection*, 150 ARCHIVES INTERNAL MED. 2030, 2030 (1990) (stating that 62% of homeless men tested in a shelter tested positive for HIV infection).

In addition to being at high risk of contracting *M. TB* infection, homeless persons infected with *M. TB* are also more likely than the general population to develop primary progressive tuberculosis or to reactivate the disease.<sup>271</sup> The marked propensity of many homeless persons to have medical conditions that impair the immune system, including malnutrition, drug and alcohol dependency, and HIV infection place them at greater risk of developing active disease once infected.<sup>272</sup> In one study, active tuberculosis was diagnosed in as many as eighteen percent of homeless persons living in shelters.<sup>273</sup>

Moreover, several outbreaks of multidrug-resistant tuberculosis have been documented among homeless populations.<sup>274</sup> These outbreaks of drug resistant tuberculosis are easy to understand. First, persons who are homeless have sporadic and inadequate access to health care services.<sup>275</sup> Second, homeless persons seldom have family, friends, or other support networks that would help in the long, arduous process of completing a course of tuberculosis treatment. Third, a high proportion of the homeless population suffer from mental illnesses, such as depression and schizophrenia, which make it difficult to follow the lengthy, complicated regimen of therapy.<sup>276</sup> Finally, the

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271. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 40.

272. *Id.* About one-fourth of the homeless are too disabled to work. Largely as a result, the general health and nutrition of this group is extremely poor. The mortality rate among the homeless is approximately five times that of non-homeless persons. INTER-AGENCY COUNCIL ON THE HOMELESS, *supra* note 257, at 9.

273. TORRES et al., *supra* note 270, at 2030.

274. *Tuberculosis Among Residents of Shelters*, *supra* note 211, at 869; Nolan et al., *supra* note 211, at 257.

275. See Irwin Redlener, *Health Care for the Homeless—Lessons From the Front Line*, 331 NEW ENG. J. MED. 327, 327 (1994). Redlener recounts a visit to a family-placement welfare hotel in New York City this way:

On the day of our visit some 1000 children—each with at least one parent—were warehoused under conditions of profound squalor. The building itself, like most welfare hotels in New York, was condemnable under the codes that existed then . . . . Children were everywhere; many were hungry. The parents were frustrated and frightened. From this picture of extreme social disorganization and deprivation emerged another fact of particular concern to a pediatrician: like most of their 11,000 counterparts in other facilities of the welfare system, these homeless children were almost totally deprived of organized or effective access to the health care system.

*Id.*; see also Drapkin, *supra* note 269, at 77 (referring to range of problems in delivering medical care to the homeless, particularly identification and diagnosis problems); UNDER THE SAFETY NET, *supra* note 269, at 70 (describing clinical concerns when providing health care to the homeless).

276. See John Belcher & Beverly G. Toomey, *Psychiatric Disability and Homelessness*, 56 HEALTH & SOCIAL WORK 145 (1988) (examining a group of psychiatric patients following their release to see if deinstitutionalization contributes to homelessness); John R. Belcher & Frederick A. DiBlasio, *The Needs of Depressed Homeless Persons: Designing Appropriate Services*, 26 COMMUNITY MENTAL HEALTH J. 255 (1990) (examining factors of depression in order to

absence of a fixed residence makes it more likely that homeless persons will not receive follow-up care from health workers. All of the above facts suggest that many homeless persons will receive sporadic and poorly supervised antituberculous treatment. Because erratic and incomplete tuberculosis treatment is the primary reason for the development of drug-resistant tuberculosis,<sup>277</sup> the outbreak of multidrug-resistant tuberculosis among the homeless is likely.

Given their enhanced risk of contracting *M. TB*, developing clinical disease, and harboring drug-resistant bacilli, homeless persons provide a reservoir for transmitting tuberculosis to the wider population. Homeless persons may come into contact with others, not only in shelters, but in nursing homes, emergency rooms, mental health facilities, prisons and jails, and drug treatment and methadone maintenance clinics. Such movement of persons with potentially active tuberculosis among a wide variety of congregate settings can fuel the tuberculosis epidemic.

4. *Deterioration of the Health Care and Public Health Systems.*—While the public health system and the health care system have distinct functions, their responsibilities also overlap. The marked deterioration in the capacity of both systems to provide services for the identification, prevention, and treatment of tuberculosis is likely to significantly affect the course of the tuberculosis epidemic.

a. *The Health Care System.*—The health care system is a network of organizations, such as hospitals, health care plans, health insurers, and professionals, namely physicians and nurses, with the primary responsibility of diagnosing, managing, and treating persons with existing infection or disease. But, the health care system also has an important public health function in tuberculosis control since biological interventions to prevent or treat active tuberculosis play a critical role in reducing transmission of the disease.

A substantial and growing proportion of the American population has significantly reduced access to health care.<sup>278</sup> At any given point in time, it is estimated that thirty-five to thirty-seven million persons, or fifteen percent of the population, have no health insur-

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formulate an effective plan to deal with the high incidence of depression among homeless persons).

277. See *supra* text accompanying note 87.

278. See U.S. DEP'T OF HEALTH AND HUMAN SERVICES, HEALTHY PEOPLE 2000: NATIONAL HEALTH PROMOTION AND DISEASE PREVENTION OBJECTIVES 50-51 (1990) (describing health insurance coverage in 1986 and the needs for the future).

ance.<sup>279</sup> In 1980, two-thirds of people living below the poverty line were enrolled in Medicaid. Since then, the number of uninsured individuals has increased over thirty percent,<sup>280</sup> and today, less than forty percent of the people living below the poverty level are enrolled in Medicaid.<sup>281</sup> Many more people in the United States are severely under-insured,<sup>282</sup> and such inadequate insurance coverage also provides a marked barrier to health care access because rising health care costs render treatment unaffordable.<sup>283</sup> Disparities in access to health care, moreover, have been shown to arise on grounds of race, ethnicity,<sup>284</sup> and socioeconomic status.<sup>285</sup>

In the absence of adequate primary health care, individuals with active, infectious tuberculosis will either die,<sup>286</sup> or, more likely, will appear in emergency rooms and public clinics long after they have developed the symptoms of active tuberculosis. In New York City, for example, seventy-nine percent of all tuberculosis-related admissions to hospitals in 1990 came through the emergency room.<sup>287</sup> This statistic has particularly strong public health implications considering that the mean emergency room waiting time for tuberculosis patients entering New York City hospitals was twenty hours,<sup>288</sup> and because emergency

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279. *Id.*

280. Sidel et al., *supra* note 25, at 311.

281. *See id.*; SOCIAL SECURITY ADMINISTRATION, *supra* note 239, at 319 (showing over a 20 year period, the number of Medicaid recipients and the amount of money provided for various types of services).

282. *Number of Uninsured Persons Increases to 36.6 Million in 1991*, DAILY LAB. REP. (BNA), at A11 (Jan. 12, 1993), available in LEXIS, Nexis Library, Omni file (reporting results of the Employee Benefit Research Institute Study); *see* 1993 POPULATION PROFILE OF THE UNITED STATES, *supra* note 239, at 32 ("At the close of 1990, 87% of Americans were covered by health insurance of some type . . ."). For a thoughtful discussion of the numbers of the uninsured and the duration of the period of being uninsured, see, Katherine Swartz, *Dynamics of People Without Health Insurance: Don't Let the Numbers Fool You*, 271 JAMA 64 (1994); Katherine Swartz & Timothy McBride, *Spells Without Health Insurance: Distributions of Durations and Their Link to Point-in-Time Estimates of the Uninsured*, 27 INQUIRY 281 (1990).

283. COMMITTEE ON HEALTH CARE FOR HOMELESS PEOPLE, *supra* note 269, at 79; *see* Edward A. Nardell, *Introduction: Respiratory Infections Among the Economically and Medically Disadvantaged*, 6 SEMINARS IN RESPIRATORY INFECTIONS 183 (1991).

284. Council on Ethical and Judicial Affairs, *Black-White Disparities in Health Care*, 263 JAMA 2344 (1990).

285. Paul H. Wise et al., *Racial and Socioeconomic Disparities in Childhood Mortality in Boston*, 313 NEW ENG. J. MED. 360, 364 (1985).

286. Over five percent of tuberculosis cases reported in the United States are diagnosed at death. Hans L. Rieder et al., *Tuberculosis Diagnosed at Death in the United States*, 100 CHEST 678 (1991).

287. Arno et al., *supra* note 97, at 322.

288. *Id.*

rooms, due to their overcrowding and often poor ventilation, provide environments conducive to the transmission of airborne diseases.<sup>289</sup>

Persons with clinically active tuberculosis, if identified, are likely to be hospitalized irrespective of their health insurance status. Yet hospitals have become increasingly cost conscious; case management, diagnosis related groups (DRGs), and other cost containment methods<sup>290</sup> have resulted in shorter hospital stays. Once a hospital discharges a tuberculosis patient, the patient may not receive follow-up care if there is little or no coordination between the health care system and the public health system. In one New York City hospital, 89 percent of the 178 tuberculosis patients discharged did not receive follow-up treatment.<sup>291</sup> The absence of routine primary care may result in patients taking their medication sporadically and health care providers monitoring patients' progress inconsistently, both of which can lead to a reactivation of the disease and to an increased risk of proliferation of drug-resistant strains.<sup>292</sup>

Cost constraints in the health care system have not only diminished access to health care, but have also resulted in inadequate ventilation and infection control in health care settings. Health care professionals are not adequately trained to identify and treat tuberculosis, and to comply with strict infection control procedures. Accordingly, the health care system itself may facilitate the spread of tuberculosis infection.<sup>293</sup>

*b. The Public Health System.*—The public health system is the organized system of federal, state, and local governmental authorities with primary responsibility for the health of the community.<sup>294</sup> While

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289. *Id.*

290. *See id.* (discussing the problems of payment for treatment rendered to tuberculosis patients who cannot pay).

291. Brudney & Dobkin, *supra* note 209, at 747.

292. *See supra* text accompanying note 87.

293. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Guidelines for Preventing Transmission of Tuberculosis in Health-Care Settings, with Special Focus on HIV-Related Issues*, 39 MORBIDITY & MORTALITY WKLY. REP. 1, 1 (RR-17 1990); Michael D. Decker, *OSHA Enforcement Policy and Procedures for Occupational Exposure to Tuberculosis*, 14 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 689 (1993) (discussing what various health care settings need to do to prevent exposure to tuberculosis and to comply with OSHA regulations); Edward A. Nardell, *Fans, Filters, or Rays? Pros and Cons of the Current Environmental Tuberculosis Control Technologies*, 14 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 681 (1993) (discussing room filtration and air disinfectant methods to prevent the spread of tuberculosis in institutions).

294. *See* INSTITUTE OF MEDICINE, *THE FUTURE OF PUBLIC HEALTH* 165 (1988) (summarizing the various organizations that comprise the public health system, including governmental and non-governmental entities).

clinical medicine focuses primarily on diagnosing and treating individual patients, public health focuses on the vitality of the community.<sup>295</sup> The public health system essentially is concerned with assessing the status of community health, developing health policy for health promotion and disease prevention in large populations, and assuring the delivery of high quality, effective services through licensing and other mechanisms.<sup>296</sup> With respect to tuberculosis control, the primary functions of the public health system include: identifying high risk population groups within geographic areas, and identifying cases of tuberculosis by screening high risk populations; using preventive treatment to prevent the development of active tuberculosis in persons infected; containing the spread of the disease by assuring treatment completion; segregating persons with active disease; assessing and evaluating programs and organizations' compliance with infection control standards; and assessing current technology and encouraging scientific innovation in technology to diagnose and treat tuberculosis.<sup>297</sup>

Health officials, however, have noticed a deterioration of the public health system and a significant reduction in the capacity of health departments to perform public health functions.<sup>298</sup> The decline in national funding for the prevention and control of tuberculosis over the last three decades—including federal grants to the states—explains the deterioration of the public health infrastructure. From 1964 to 1969, funding to the Centers for Disease Control for tuberculosis rose from approximately \$1 million to \$20 million.<sup>299</sup> However, from 1970 through to the early 1980s, funding levels were consistently cut to about \$1 million per year.<sup>300</sup> It was not until the late 1980s, when the resurgence of tuberculosis became well publicized, that funding levels began to steadily increase.<sup>301</sup> In the 1993

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295. *Id.* at 3. In many states, public health statutes provide for cost-free treatment of tuberculosis in community clinics. Gostin, *supra* note 24, at 257-58.

296. INSTITUTE OF MEDICINE, *supra* note 294, at 43.

297. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *National Action Plan to Combat Multidrug-Resistant Tuberculosis*, 41 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-11 1992) (listing objectives of federal agencies combatting multidrug-resistant tuberculosis); *Strategic Plan for the Elimination of Tuberculosis*, *supra* note 45, at 38 (describing a public health plan based on a similar list of objectives).

298. Karen Brudney & Jay Dobkin, *A Tale of Two Cities: Tuberculosis Control in Nicaragua and New York City*, 6 SEMINARS IN RESPIRATORY INFECTIONS 261 (1991); Kristine M. Gebbie, Comment: *Rebuilding a Public Health Infrastructure*, 21 J.L. MED. & ETHICS 368 (1993); Stephen C. Joseph, Comment: *New York City, Tuberculosis, and the Public Health Infrastructure*, 21 J.L. MED. & ETHICS 372 (1993); Hamburg, *supra* note 198, at 354-55.

299. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 95 fig. 7-1.

300. *Id.*

301. *Id.*

fiscal year, the Centers for Disease Control's budget for tuberculosis control activities totaled approximately \$104 million;<sup>302</sup> this figure doubled the previous year's expenditure.<sup>303</sup> To appreciate the extent of the chronic underfunding of tuberculosis control activities since 1970, it is helpful to compare the \$1 million spent annually during the 1970s with the \$380 million, which the CDC estimates is needed annually for the full implementation of the national action plan for the control of tuberculosis.<sup>304</sup>

At the same time that federal funding of tuberculosis control activities was reduced during the 1970s and early 1980s, tuberculosis services in state and municipal health departments were also substantially reduced. For example, in New York City in 1968, \$40 million was spent on tuberculosis and over 1000 beds were dedicated to tuberculosis.<sup>305</sup> By 1978, the City was spending only \$23 to \$25 million annually on tuberculosis and virtually no hospital beds were dedicated to tuberculosis.<sup>306</sup>

Because of the pronounced decreases in funding for tuberculosis at the federal, state, and city levels, health departments began to lose the capacity to respond effectively to the resurgence of tuberculosis.<sup>307</sup> As the number of hospital beds for tuberculosis patients sharply decreased, there was also a decrease in the number of community-based facilities for diagnosing, preventing, and treating tuberculosis.<sup>308</sup>

The personal health care system and the public health system share responsibility for many public health functions. For example, the prevention, diagnosis, and treatment of sexually transmitted diseases, AIDS, tuberculosis, and drug and alcohol dependency are undertaken both by health care providers and health departments. Because they share responsibilities, the two health systems need to coordinate services for tuberculosis and other public health problems. After all, persons with tuberculosis frequently come into contact with a wide variety of agencies and organizations, and without coordina-

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302. *Id.* at 96.

303. *Id.* at 95 fig. 7-1.

304. *Id.* at 96.

305. Brudney & Dobkin, *supra* note 209, at 745.

306. *Id.*

307. See INSTITUTE OF MEDICINE, *supra* note 294, at 19-34 (discussing current cases in the public health system that threaten public health); Eugene Feingold, *Health Care Reform—More than Cost Containment and Universal Access*, 84 AM. J. PUB. HEALTH 727 (1994) (discussing the inability of public health agencies to operate effectively because of inadequate funding).

308. Brudney & Dobkin, *supra* note 209, at 747-48.

tion, each agency or organization may be unaware that a particular person is infectious or failing to take prescribed drugs. Persons with tuberculosis often make multiple appearances in clinics, hospitals, emergency rooms, correctional facilities, homeless shelters and methadone maintenance and other drug treatment centers.<sup>309</sup> Yet, none of these entities may have ready access to information in personal health records or in the tuberculosis registry held by the state public health department. Consequently, infected individuals who are under the joint jurisdiction of social services, correctional authorities, or health care systems, are not readily identified. These individuals pose a considerable risk of spreading the infection in the community or in congregate settings.<sup>310</sup>

Some argue that the nation cannot afford the improvements in housing, health care, and public health needed to reduce the burden of tuberculosis and other infectious diseases on the poor. However, the tuberculosis epidemic has economic implications that reach beyond the poorest sectors of society. The costs of tuberculosis include not only the costs of in-patient and out-patient treatment and supervision of patients, but also the costs of constructing structural changes in large institutions such as hospitals, nursing homes, and correctional facilities to prevent tuberculosis outbreaks among workers and residents. While no national study has examined the total costs of tuberculosis, one group of researchers found that in New York City in 1990, Medicaid paid for fifty-seven percent of the tuberculosis hospitalizations; twenty percent of the hospitalizations were paid for by Medicare and private insurance.<sup>311</sup> In addition, overstretched city hospitals absorbed more than \$56 million in unreimbursed care.<sup>312</sup> The unfortunate irony is that today, the government must spend significantly greater amounts of money to subdue the disease than it would have

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309. See *Tuberculosis Prevention in Drug-Treatment Centers and Correctional Facilities*, *supra* note 201, at 210 (assessing the practicality of on-site tuberculosis screening and treatment in drug treatment centers and correctional facilities); Selwyn et al., *supra* note 68, at 545 (1989); Centers for Disease Control, U.S. Dep't of Health and Human Services, *Transmission of Multidrug-Resistant Tuberculosis Among Immunocompromised Persons, Correctional System—New York, 1991*, 41 MORBIDITY & MORTALITY WKLY. REP. 507 (1992) [hereinafter *Transmission of Multidrug-Resistant Tuberculosis Among Immunocompromised Persons*]; Snider & Hutton, *supra* note 213, at 436.

310. See generally Lawrence O. Gostin, *Health Information Privacy Under a New Health Care System*, 80 CORNELL L. REV. (forthcoming March 1995).

311. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 104. Comparable figures in 16 states show that 36% of hospital admissions with a diagnosis of tuberculosis were paid for by Medicaid, 33% by private health insurance or Medicare, and 11% were not paid. *Id.* at 105 fig. 7-3.

312. Arno et al., *supra* note 97, at 317.

had to spend to control the disease. As the Commissioner of Health of the City of New York aptly observed, "Perhaps this, then, is our bitter medicine, and from it we have learned an important lesson: we must never lose sight of the critical role of public health in maintaining the health of our citizens."<sup>313</sup>

*B. The Role of Over-Crowded and Under-Ventilated Congregate Facilities in the Spread of Tuberculosis*

If a person were to set out to design facilities that efficiently transmit airborne diseases, then that person might well emulate the physical conditions found in congregate settings in America, such as hospitals,<sup>314</sup> nursing homes,<sup>315</sup> mental institutions, correctional facilities,<sup>316</sup> homeless shelters,<sup>317</sup> Indian reservations,<sup>318</sup> residential care homes,<sup>319</sup> and immigrant<sup>320</sup> or migrant worker<sup>321</sup> camps. In many of these settings, residents live, eat, and sleep in small enclosed spaces; beds are inches or feet apart; and buildings are dark and poorly ventilated. Moreover, the residents of many of these congregate facilities are impoverished, malnourished, and overrepresented in populations that have disproportionately high rates of communicable disease, and in populations that have significantly impeded access to health care services.<sup>322</sup>

The United States has one of the highest rates of persons living in congregate settings in the world. The 1990 census reported that ap-

313. Hamburg, *supra* note 198, at 358.

314. See *infra* notes 456-457 and accompanying text.

315. See *infra* note 454 and accompanying text.

316. See *infra* notes 336-345 and accompanying text.

317. See *Tuberculosis Among Residents of Shelters*, *supra* note 211, at 869.

318. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis Outbreak on Standing Rock Sioux Reservation—North Dakota and South Dakota, 1987-1990*, 40 MORBIDITY & MORTALITY WKLY. REP. 204 (1991).

319. See *Tuberculosis Outbreak in Residential Facility*, *supra* note 214; Centers for Disease Control, U.S. Dep't of Health and Human Services, *Transmission of Multidrug-Resistant Tuberculosis from an HIV-Positive Client in a Residential Substance-Abuse Treatment Facility—Michigan*, 40 MORBIDITY & MORTALITY WKLY. REP. 129 (1991).

320. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Tuberculosis Among Foreign-Born Persons Entering the United States: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 39 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-10 1990).

321. See Centers for Disease Control, U.S. Dep't of Health and Human Services, *Prevention and Control of Tuberculosis in Migrant Farm Workers: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 41 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-10 1992).

322. See generally Edward A. Nardell, *Tuberculosis in Homeless, Residential Care Facilities, Prisons, Nursing Homes, and Other Close Communities*, 4 SEMINARS IN RESPIRATORY INFECTIONS 206 (1989) (discussing institutional conditions that are conducive in the spread of tuberculosis).

proximately 6.7 million persons were living in group quarters, with 1.12 million in correctional facilities and 1.77 million in nursing homes.<sup>323</sup> These congregate settings harbor a great deal of disease. In 1993, 3.7 percent of reported cases of tuberculosis were in correctional facilities, 4.5 percent were in long term care facilities, and many more were likely to be in health care facilities.<sup>324</sup> Working in congregate settings also posed an elevated risk, with 3.2 percent of all reported cases of tuberculosis occurring among health care workers.<sup>325</sup>

Moreover, since 1990, the Centers for Disease Control has investigated numerous outbreaks of multidrug-resistant tuberculosis in congregate facilities. Hundreds of workers and residents have developed active multidrug-resistant tuberculosis during these outbreaks; most of the persons infected also were infected with HIV, and seventy-nine to eighty-nine percent died, usually within the first four to six weeks.<sup>326</sup> The rapid transmission of the multidrug-resistant tuberculosis in congregate settings is caused by several factors including the close proximity of residents and workers, the delay in detecting and treating the tuberculosis, and the lack of isolation facilities for infected persons,<sup>327</sup> or adequate ventilation and infection control programs in these facilities.

1. *Tuberculosis in Correctional Facilities.*—A typical day at the pre-arraignment holding pens at the Criminal Courts Building in Brooklyn, New York was recently described as follows:

More than 200 suspects contend for standing room as they wait to be charged with offenses ranging from turnstile-jumping to murder. Cramped and windowless, each 10-by-15 foot cage holds at least a dozen detainees, many of them homeless, drug-addicted and sick. Thousands pass through the pens each month some staying two to three days before returning to the streets or moving on to prison or jail. Yet no one screens them for conditions that might pose a health hazard. One of the city's few concessions to disease control, a ventilation system installed in 1932, hasn't worked for at least six years. A huge fan pushes the same fetid air through the cages day and night.<sup>328</sup>

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323. 1990 CENSUS OF POPULATION, *supra* note 261, at 51.

324. *Expanded Tuberculosis Surveillance*, *supra* note 49, at 364.

325. *Id.* These are likely to be highly conservative figures given the suspected under-reporting of cases of tuberculosis in congregate settings.

326. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 46.

327. *Id.* at 46-47.

328. Geoffrey Cowley, *A Deadly Return*, NEWSWEEK, Mar. 16, 1992, at 53. For another evocative description of New York City holding pens, see Mireya Navarro, *As Suspects Wait*,

While this description is probably an extreme illustration of the health hazards posed by the conditions in correctional facilities, the rate of tuberculosis in correctional facilities is nevertheless more than three times higher than that of the general population.<sup>329</sup> Ten to twenty-five percent of people in correctional facilities are infected with *M. TB*.<sup>330</sup> In 1993, 1177 inmates were receiving treatment for active tuberculosis, almost a 400 percent increase from the mid 1980s. Moreover, correctional facilities reported 45 current and 141 cumulative cases of drug-resistant tuberculosis.<sup>331</sup>

The growth of tuberculosis in large prison systems with high numbers of HIV-infected inmates has been formidable.<sup>332</sup> From 1976 to 1978, the annual incidence of active tuberculosis among New York State inmates was 15.4 per 100,000 and by 1980 this number grew to 105.5 per 100,000.<sup>333</sup> Ninety-five percent of inmates with tuberculosis were also infected with HIV.<sup>334</sup> Other major correctional systems in states such as New Jersey and California also have reported similarly dramatic increases in tuberculosis.<sup>335</sup>

Overcrowding in prisons and jails is also contributing to the growth of tuberculosis in prisons.<sup>336</sup> There are currently more than

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*the Fear of Tuberculosis Rises; In Holding Pens, a Fear of Tuberculosis*, N.Y. TIMES, Jan. 30, 1992, at B1-B2 ("In a basement of the New York City Criminal Courts Building in Brooklyn recently, so many men were crammed into four small holding pens that most had only enough room to stand.").

329. CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, CONTROL OF TUBERCULOSIS IN CORRECTIONAL FACILITIES: A GUIDE FOR HEALTH CARE WORKERS 3 (1992); Centers for Disease Control, U.S. Dep't of Health and Human Services, *Prevention and Control of Tuberculosis in Correctional Institutions: Recommendations of the Advisory Committee for the Elimination of Tuberculosis*, 38 MORBIDITY & MORTALITY WKLY. REP. 313, 313 (1989) [hereinafter *Prevention and Control of Tuberculosis in Correctional Institutions*].

330. See THEODORE M. HAMMETT & LYNNE HARROLD, U.S. DEP'T OF JUSTICE, TUBERCULOSIS IN CORRECTIONAL FACILITIES 7 (1994).

331. *Id.* at 9-11.

332. See Jordan B. Glaser & Robert B. Greifinger, *Correctional Health Care: A Public Health Opportunity*, 118 ANNALS INTERNAL MED. 139 (1993).

333. *Prevention and Control of Tuberculosis in Correctional Institutions*, *supra* note 329, at 313.

334. Braun et al., *supra* note 213; see Perry F. Smith et al., *HIV Infection Among Women Entering the New York State Correction System*, 81 AM. J. PUB. HEALTH 35 (Supp. 1991).

335. *Prevention and Control of Tuberculosis in Correctional Institutions*, *supra* note 329, at 313.

336. There is a substantial literature on prison overcrowding and its effects on inmates and corrections workers. See generally STEPHEN D. GOTTFREDSON & RALPH B. TAYLOR, U.S. DEP'T OF JUSTICE, THE CORRECTIONAL CRISIS: PRISON POPULATIONS AND PUBLIC POLICY (1983); David A. Semanchik, *Prison Overcrowding in the United States: Judicial and Legislative Remedies*, 16 NEW ENG. J. CRIM. & CIV. CONFINEMENT 67 (1990). Many other sources are gathered in NATIONAL INSTITUTE OF JUSTICE CLEARINGHOUSE PROGRAMS, U.S. DEP'T OF JUSTICE, TOPICAL SEARCH: CROWDING IN PRISONS AND JAILS (1993).

1.3 million inmates in prisons and jails in the United States.<sup>337</sup> The number of prisoners under the jurisdiction of state and federal correctional authorities increased 168 percent from 1980 to the end of 1992.<sup>338</sup> In 1992, the federal prison system was operating at 37 percent over capacity, while the state prisons of 43 jurisdictions operated at 118 percent over capacity.<sup>339</sup> A common solution to overcrowding has been to place two persons in a one person cell. In 1986, twenty-five percent of all state prison inmates were so double-celled.<sup>340</sup> Because double celling reduces light, ventilation, and access to medical services, the practice contributes to the creation of an environment conducive to the spread of infectious disease.<sup>341</sup>

From a public health perspective, overcrowding increases the spread of tuberculosis because micro-organisms are more able to find new hosts and to travel shorter distances between hosts.<sup>342</sup> Overcrowding also overwhelms prison ventilation systems. The ventilation systems in prisons were originally designed to provide heating and cooling, not to prevent disease transmission. When a facility is overcrowded, whatever marginal impact the ventilation system may have had in filtering the air of micro-organisms and in providing an exchange of fresh air is greatly reduced.<sup>343</sup>

Inadequate artificial lighting and insufficient exposure to sunlight in prisons also enhance the possibility of transmission of *M. TB*.<sup>344</sup> These factors, along with others documented by prison litigation, including infestation, unwholesome food, and inadequate sanitation,

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337. The number of prisoners under the jurisdiction of federal or state correctional authorities at year-end 1992 reached a record high of 883,593. DARRELL K. GILLARD, U.S. DEP'T OF JUSTICE, PRISONERS IN 1992, 1, 6 (1993). In addition, at mid-year 1991, local jails held an estimated 426,479 persons. LOUIS W. JARKOWSKI, U.S. DEP'T OF JUSTICE, JAIL INMATES 1991 (1993). In 1990, the criminal justice system supervised 2.35% of the adult population in jail or prison, or on probation and parole. This includes 7.9% of all adult African-Americans. LOUIS W. JARKOWSKI, U.S. DEP'T OF JUSTICE, CORRECTIONAL POPULATIONS IN THE UNITED STATES, 1990 5-6 (1992).

338. GILLARD, *supra* note 337, at 1.

339. *Id.* at 6.

340. CHRISTOPHER A. IHNES, U.S. DEP'T OF JUSTICE, POPULATION DENSITY IN STATE PRISONS (1986).

341. See Steven T. Adwell, *A Case for Single-Cell Occupancy in America's Prisons*, 1991 FEDERAL PROBATION 64; NATIONAL INSTITUTE OF CORRECTIONS FACILITIES MONOGRAPH PROJECT, DESIGNS FOR CONTEMPORARY CORRECTIONAL FACILITIES (1985) (advocating single-cell occupancy for a variety of reasons, including protection from communicable diseases).

342. See Bailus Walker, Jr., *Prison Population Pressures: The Epidemiological Basis for Present Density Standards*, 54 J. ENVTL. HEALTH 18 (1991).

343. *Id.* at 20.

344. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 28.

tion, contribute to poor health and disease transmission.<sup>345</sup> Because of the problems associated with overcrowding, the majority of state prison systems are under court order or consent decree to limit the size of their population or improve conditions in the entire system or in major facilities.<sup>346</sup>

Mandatory sentencing for drug offenders not only has fueled the growth in prison populations, but also has changed their composition.<sup>347</sup> The proportion of drug offenders in the Federal Bureau of Prisons is expected to increase from forty-seven percent in 1991 to seventy percent by 1995.<sup>348</sup> An estimated one in four state prisoners used cocaine or crack in the month before their imprisonment, and one in ten used heroin or other opiates.<sup>349</sup> Because of the high rates of drug abuse, correctional inmates have comparatively high rates of HIV infection and AIDS. In 1991, over two percent of all prison inmates were infected with HIV, and twenty-eight percent of all prison deaths were attributable to AIDS.<sup>350</sup> In some correctional systems, one in every five inmates is infected with HIV.<sup>351</sup> Also, inmates generally are poor, undereducated, and considerably overrepresented by minorities.<sup>352</sup>

The disproportionate prevalence of HIV infection and drug dependency, and the low socioeconomic status of most inmates, together with the overcrowded, badly ventilated conditions in most prisons, makes high rates of tuberculosis predictable. As one public health expert warned in 1978, spending time in correctional facilities

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345. See generally Douglas Shenson et al., *Jails and Prisons: The New Asylums?*, 80 AM. J. PUB. HEALTH 655 (1990) (discussing the problem of increasing jail populations and substandard conditions that combine to create a public health crisis).

346. See Edward I. Koren, *Status Report: State Prisons and the Courts*—January 1, 1992, 7 NAT'L PRISON PROJECT J. 13 (1992); THE NAT'L PRISON PROJECT, ACLU FOUNDATION, REPORT OF ACTIVITIES FOR QUARTER ENDING DECEMBER 31, 1992 6 (1993) (reporting *Palmigiano v. Sundich*, 443 F. Supp. 956 (D.R.I. 1977), which required commissioners to promulgate plans limiting prison population).

347. See American College of Physicians et al., *The Crisis in Correctional Health Care: The Impact of the National Drug Control Strategy on Correctional Health Services*, 117 ANNALS INTERNAL MED. 71 (1992).

348. NATIONAL COMMISSION ON AIDS REPORT: HIV DISEASE IN CORRECTIONAL FACILITIES 15 (1991) [hereinafter NATIONAL COMMISSION ON AIDS REPORT].

349. BUREAU OF JUSTICE STATISTICS, U.S. DEP'T OF JUSTICE, HIV IN U.S. PRISONS AND JAILS (1993), available in Nat'l Econ., Soc. and Envtl. Data Bank, Item 10 JS JAIL JSHI.

350. *Id.*

351. See THEODORE M. HAMMETT ET AL., 1992 UPDATE: HIV/AIDS IN CORRECTIONAL FACILITIES—ISSUES AND OPTIONS 21-27 (1994).

352. Glaser & Greifinger, *supra* note 332, at 139; see also JARKOWSKI, CORRECTIONAL POPULATIONS IN THE UNITED STATES, *supra* note 337, at 5-6.

is an independent risk factor for tuberculosis.<sup>353</sup> The high rate of tuberculosis in prisons is not merely a health hazard for inmates and corrections officers, but also is a health hazard for the general public. Because of the short stays in jails and the overall large population of prisons, more than ten million inmates are released each year.<sup>354</sup> Since the median age of inmates on release is relatively young, persons infected during incarceration have a considerable lifetime risk for developing active tuberculosis.<sup>355</sup>

Despite the well documented health risks that prison conditions create for inmates, corrections workers, and the community, the health services programs in many correctional systems are below standards recommended by professional medical organizations.<sup>356</sup> For example, few correctional facilities meet the rigorous tuberculosis control standards set by the Centers for Disease Control, including requirements for screening and diagnosing tuberculosis and requirements for contact investigations, directly observed therapy, and respiratory isolation.<sup>357</sup>

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353. William W. Stead, *Undetected Tuberculosis in Prison: Source of Infection for Community at Large*, 240 JAMA 2544, 2547 (1978); see Eran Y. Bellin et al., *Association of Tuberculosis Infection With Increased Time in or Admission to the New York City Jail System*, 269 JAMA 2228, 2231 (1993) (concluding that the demonstrated association between jail time and development of tuberculosis suggests that the N.Y.C. jail system may be an important amplification point in the ongoing tuberculosis epidemic).

354. Glaser & Greifinger, *supra* note 332, at 139.

355. See HAMMETT & HARROLD, *supra* note 330, at xi.

356. See American College of Physicians et al., *supra* note 347, at 71 (stating that in 1991, the National Commission on Correctional Health Care accredited only 11% of prisons and 7% of jails).

357. See HAMMETT & HARROLD, *supra* note 330, at 16-17 (finding 40% of jail and prison systems do not have a designated tuberculosis control coordinator). The CDC recommends that each correctional institution designate a tuberculosis control official; carry out tuberculin skin testing at entry or employment and annually thereafter; give chest radiographs within 72 hours of a positive skin test reading or identification of symptoms; submit sputums for smear and culture examination in cases of suspected disease; investigate contacts of suspected cases; place persons with suspected or confirmed disease in respiratory isolation (e.g., housed in an area with separate ventilation to the outside, negative air pressure, and at least 4-6 air exchanges per hour); provide prompt treatment and directly observed therapy for all persons in need of IPT or curative treatment; create a capacity for drug-susceptibility testing; and generally improve the overall environment of the institution, with possible use of ultra-violet lighting. See *Prevention and Control of Tuberculosis in Correctional Institutions*, *supra* note 329, at 314-18.

Tuberculosis strategies in jails may be quite different than for prisons. Inmates in prisons are usually confined for extended periods of time, enabling longer-term treatment, follow-up, and contact investigations. By contrast, some jail inmates stay only a few hours, and most are released within days or weeks. The short length of stay and high turnover present distinct public health problems in the jail system. Accordingly, the CDC is considering revised guidelines to apply to the jail system. See HAMMETT & HARROLD, *supra* note 330, at 16.

a. *Compulsory Powers to Control the Tuberculosis Epidemic in Correctional Facilities.*—The CDC does not explicitly recommend the exercise of public health powers on a compulsory basis. Nor are CDC guidelines regulatory in nature, and therefore, correctional authorities are not required by law to comply with CDC guidelines. Yet, CDC guidelines provide a window into the powerful legal dilemma facing corrections authorities. On the one hand, the failure of corrections authorities to implement a comprehensive program of compulsory public health interventions may violate the Eighth Amendment's proscription on cruel and unusual punishment. On the other hand, compelling an inmate to be tested, treated, or segregated may violate the civil rights of individual prisoners.<sup>358</sup> Accordingly, corrections authorities have had to reconcile the conflict between the individual rights of inmates and the health needs of the correctional population, never fully knowing which of the two approaches the law requires.<sup>359</sup> This confusion over the requirements of the law is fueled by the courts having a generally deferential approach when reviewing the decisions of corrections authorities,<sup>360</sup> even to the point of upholding a wide range of contradictory policies.<sup>361</sup> The courts ostensibly take this

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358. See generally the excellent article by Scott Burris, *Prisons, Law, and Public Health: The Case for a Coordinated Response to Epidemic Diseases Behind Bars*, 47 U. MIAMI L. REV. 291 (1992) (discussing current problems with the public and private health care systems in responding to HIV and AIDS in prisons).

359. In the context of tuberculosis, see the excellent reviews of case law in HAMMETT & HARROLD, *supra* note 330, at 45-51; John Boston, *Highlights of Most Important Cases: Tuberculosis Case a Wake-up Call*, THE NAT'L PRISON PROJECT J., Fall 1992, at 6; Jan Elvin, *TB Comes Back, Poses Special Threat to jails, Prisons*, THE NAT'L PRISON PROJECT J., Winter 1992, at 1.

360. See Monmouth County Correctional Inst. Inmates v. Lanzaro, 834 F.2d 326, 343 (3d Cir. 1987), *cert. denied*, 486 U.S. 1006 (1988) (recognizing prison officials discretion to pursue penological objectives within constitutional limits); Sharon M. Boyne, Note, *Women in Prison with AIDS: An Assault on the Constitution?*, 64 S. CAL. L. REV. 741, 760-61 (1991) (observing that prisoners' claims are reviewed on constitutional grounds); Burris, *supra* note 358, at 322-24. However, in *Casey v. Lewis*, 773 F. Supp. 1365, 1370-72 (D. Ariz. 1991), the court found a violation of the federal Rehabilitation Act of 1973 when corrections officials imposed a blanket ban on the assignment of HIV-infected inmates as food service workers. The mere rational relation of a corrections policy to a legitimate penological interest, the court said, is not relevant to disability law analysis. *Id.* at 1371. The blanket prohibition on HIV-positive inmates did not meet the requirement of individualized determinations set by the Rehabilitation Act. *Id.* at 1373; see *School Bd. of Nassau County v. Arline*, 480 U.S. 273, 285 (1987) ("The fact that some persons who have contagious diseases may pose a serious health threat to others under certain circumstances does not justify excluding from the coverage of [Section 504 of the Rehabilitation Act of 1973] all persons with actual or perceived contagious diseases.").

361. In the prison HIV epidemic, for example, the courts have upheld decisions to segregate, decisions not to segregate, decisions to screen, and decisions not to screen. See sources cited *supra* notes 359-360 and accompanying text; *infra* notes 435-436 and accompanying text.

"hands-off" approach because they lack the expertise needed to examine detailed decisions in prison administration.<sup>362</sup>

Despite this deferential approach, the Supreme Court has recognized a need to balance judicial deference against prisoners' health needs. In *Turner v. Safley*,<sup>363</sup> the Supreme Court formulated a "standard of review for prisoners' claims that is responsive both to the policies of judicial restraint regarding prisoner complaints and [to] the need to protect constitutional rights [of prisoners]."<sup>364</sup> According to the Court, "when prison regulation impinges on inmates' constitutional rights, the regulation is valid if it is reasonably related to legitimate penological interests."<sup>365</sup> This standard of reasonableness applies "even when the constitutional right claimed to have been infringed is fundamental, and the State under other circumstances would have been required to satisfy a more rigorous standard of review."<sup>366</sup> In making this reasonableness inquiry, courts must consider, first, whether there is "a valid, rational connection between the prison regulation and the legitimate governmental interest put forward to justify it," and second, whether there are any "ready alternatives" to the regulation.<sup>367</sup>

Judicial deference to decisions regarding prison administration is certainly appropriate when corrections authorities are making reasonable determinations within the scope of their expertise. Accordingly, courts properly are reluctant to interfere with decisions involving matters such as inmate behavior and prison security and management.<sup>368</sup> The justification for deference when reviewing the health decisions of corrections authorities, however, is far less convincing.

Most of the important standards for protecting prisoner health are established by public health and health care authorities, not corrections officials; standards for protecting health of prisoners arguably fall outside corrections officials' arena of expertise. Moreover, while protection of the health of inmates and corrections workers is related to legitimate penological interests, it is also related to wider societal interests. These societal interests are given voice in guidelines developed with the expertise of public health and health care officials.

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362. *Bell v. Wolfish*, 441 U.S. 520, 547-48 (1979).

363. 482 U.S. 78 (1987).

364. *Id.* at 85 (quoting *Procunier v. Martinez*, 416 U.S. 396, 406 (1974)).

365. *Id.* at 89.

366. *Washington v. Harper*, 494 U.S. 210, 223 (1990).

367. *Turner*, 482 U.S. at 89-90.

368. See *Washington*, 494 U.S. at 223-24; *Rhodes v. Chapman*, 452 U.S. 337, 351 n.16 (1981) (stating that the problems of prison administration are too great for the courts to handle).

When an individual is confined by the state, the state is responsible for assuring that the individual does not come to significant and irreversible harm. Judicial deference to the health decisions of corrections authorities may still be appropriate where public health guidelines are unavailable, ambiguous, or contradictory. However, where public health guidelines are clear and convincing, the case for upholding corrections officials' decisions not to comply with such guidelines loses credibility.<sup>369</sup>

One such clear guideline involves the use of tuberculosis control to prevent the spread of the disease in prison settings. Because tuberculosis can spread through airborne transmission in congregate settings, and because treatment can cure or render noninfectious persons with tuberculosis, public health officials have unanimously favored the use of comprehensive tuberculosis control measures in correctional facilities.<sup>370</sup> Given CDC and other medical guidelines, programs for screening, preventing, treating and controlling tuberculosis in correctional facilities can be properly considered accepted medical practice. Yet, many correctional systems have failed to comply with such guidelines. As a result, much of the litigation relating to tuberculosis has rested on the claim that prison officials have unconstitutionally failed to protect the health of prison inmates and workers.<sup>371</sup> A review of this litigation suggests that compliance with CDC guidelines or some other reasonable health standards may in fact be constitutionally required.<sup>372</sup>

Cases involving the failure of corrections authorities to respond to tuberculosis arose in the 1940s. The early courts took a hands-off

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369. Yet, in the HIV prison epidemic, the courts have frequently upheld the use of compulsory screening and segregation despite the substantial consensus of public health opinion opposing compulsory interventions. See *Laueau v. Manson*, 507 F. Supp. 1177, 1194-95 (D. Conn. 1980) (holding that the failure of prison administrators to adequately screen and segregate inmates carrying communicable diseases violates the Due Process Clause), *rev'd in part, modified in part*, 651 F.2d 96 (2d Cir. 1981); *Feliciano v. Barcelo*, 497 F. Supp. 14, 37-38 (D.P.R. 1979) (requiring prison administrators to screen incoming inmates for tuberculosis, venereal disease, and other diseases); see also NATIONAL COMMISSION ON AIDS REPORT, *supra* note 348 (recommending against mandatory screening and segregation).

370. See *supra* note 357; see also CONTROL OF TUBERCULOSIS IN CORRECTIONAL FACILITIES: A GUIDE FOR HEALTH CARE WORKERS, *supra* note 329, at 3 (outlining measures for the prevention and control of tuberculosis in correctional facilities).

371. See *Lareau*, 507 F. Supp. at 1195 (holding that a failure to screen violated inmates' constitutional rights); *Feliciano*, 497 F. Supp. at 33-34 (requiring medical screening for tuberculosis and other diseases in order to comply with the Eighth Amendment).

372. See *DeGidio v. Pung*, 704 F. Supp. 922, 956 (D. Minn. 1989) (noting that although published guidelines of medical care do not establish absolute standards for measuring the constitutionality of official action, they are "useful measures for determining whether contemporary standards of decency have been met").

approach to tuberculosis control.<sup>373</sup> However, by 1976, several lower courts had upheld prisoner claims regarding inadequate tuberculosis control.<sup>374</sup> Then in 1976, the Supreme Court delivered a seminal decision in *Estelle v. Gamble*.<sup>375</sup> In *Estelle*, the Supreme Court made it clear that the Eighth Amendment does not permit states to disregard the health needs of inmates.<sup>376</sup> The Court reasoned that inmates have no choice but to "rely on prison authorities to treat [their] medical needs; if the authorities fail to do so, those needs will not be met."<sup>377</sup> The Court limited its holding finding that "an inadvertent failure to provide adequate medical care" or a "negligent . . . diagnosis or treatment [of] a medical condition" does not rise to the level of an Eighth Amendment violation.<sup>378</sup> Rather the Court stated that the Eighth Amendment is violated when there has been "deliberate indifference to the serious medical needs of prisoners."<sup>379</sup> Since *Estelle*, at least one lower court has held that "indifference may be shown by 'repeated examples of negligent acts which disclose a pattern of conduct by the prison medical staff' or by showing 'systematic or gross deficiencies in staffing, facilities, equipment or procedures.'"<sup>380</sup> However, the Supreme Court has since ruled that the "deliberate indifference" standard requires an examination of the subjective intent of

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373. See *Bush v. Babb*, 162 N.E. 2d 594, 597 (Ill. App. Ct. 1959) (holding that the failure of jail authorities to provide adequate tuberculosis care was not actionable because jail medical care was "quasi-judicial" and protected by immunity); *State ex rel. Baldwin v. Superintendent*, 192 Md. 712, 63 A.2d 323 (1949) (holding that prisoner's complaint that he had been denied proper treatment for tuberculosis did not afford a basis for habeas corpus relief and "should be addressed to the Board of Correction which is responsible for proper prison management").

374. See, e.g., *Holt v. Hutto*, 363 F. Supp. 194, 200 (E.D. Ark. 1973) (concluding that it "goes without saying that tubercular inmates must be segregated"), modified *sub nom.* *Finney v. Arkansas Bd. of Corrections*, 505 F.2d 194 (8th Cir. 1974).

375. 429 U.S. 97 (1976).

376. *Id.* at 104; see *Harris v. Thigpen*, 941 F.2d 1495, 1504-05 (11th Cir. 1991) ("The Supreme Court has declared that 'deliberate indifference' by corrections authorities to the serious medical needs of its prisoners constitutes the kind of 'unnecessary wanton' infliction of pain that is proscribed by the Eighth Amendment.").

377. *Estelle*, 429 U.S. at 103.

378. *Id.* at 105-06.

379. *Id.* at 104; see also *City of Canton v. Harris*, 489 U.S. 378, 388 (1989) (holding that the failure to adequately train police officers to deal with medical needs of those in police custody amounts to deliberate indifference to the rights of such prisoners); *Hill v. Marshall*, 962 F.2d 1209, 1214 (6th Cir. 1992) (finding that a prison official acts with deliberate indifference to medical needs if he disregards a known or obvious risk), cert. denied, 113 S. Ct. 2992 (1993).

380. *Inmates of Occoquan v. Barry*, 717 F. Supp. 854, 867 (D.C. 1989).

corrections officials,<sup>381</sup> and that the benign intentions of officials may preclude the finding of an Eighth Amendment violation when officials inadvertently fail to take the action necessary to protect the health of inmates.<sup>382</sup>

According to *Estelle*, then, corrections authorities have a responsibility to protect the health of inmates.<sup>383</sup> In the decade following *Estelle*, issues surrounding the constitutionality of tuberculosis policies periodically surfaced in conditions of confinement litigation.<sup>384</sup> These cases suggest that identifying inmates with tuberculosis through some clinically appropriate form may be constitutionally required.<sup>385</sup> For example, in *Lareau v. Manson*,<sup>386</sup> the Court of Appeals for the Second Circuit held that the failure of prison officials to adequately screen newly arrived inmates for communicable diseases constituted "punishment" in violation of the Eighth Amendment and the Due Process Clause.<sup>387</sup> Even though there was no evidence that any prisoner had contracted a communicable disease because of the failure to screen, the court held that the failure to screen indiscriminately created a threat to the health of all the inmates, and therefore, was unconstitutional.<sup>388</sup>

While not all courts have accepted the absolute necessity of tuberculosis screening for the entire corrections population,<sup>389</sup> some

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381. *Wilson v. Seiter*, 501 U.S. 294, 299 & n.1 (1991). The *Wilson* Court stated that a court must inquire into the "prison official's state of mind" to prove a claim of cruel and unusual punishment. *Id.*

382. *See id.* at 305 (holding that "mere negligence" does not satisfy the "deliberate indifference" requirement).

383. *See Estelle v. Gamble*, 429 U.S. 97, 103 (1976).

384. *See Grubbs v. Bradley*, 552 F. Supp. 1052, 1069 (M.D. Tenn. 1982) (noting that prison officials did not comply with internal procedures and state laws for tuberculosis monitoring, reporting, and screening); *Nicholson v. Choctaw County, Ala.*, 498 F. Supp. 295, 299-300, 309 (S.D. Ala. 1980) (noting the failure of corrections authorities to respond adequately to tuberculosis among the jail population); *Feliciano v. Barcelo*, 497 F. Supp. 14, 28, 38 (D.P.R. 1979) (requiring medical screening for tuberculosis and other diseases). *See also HAMMETT & HARROLD, supra* note 330, at 45-49 (reviewing tuberculosis-related litigation involving prisons).

385. *See supra* note 372 and accompanying text.

386. 651 F.2d 96 (2d Cir. 1981).

387. *Id.* at 109.

388. *Id.*; *accord Laaman v. Helgemoe*, 437 F. Supp. 269, 312 (D.N.H. 1977) (noting that the failure to provide for the "discovery of latent and incubating diseases . . . endanger[s] the entire prison community").

389. *See Office of Inmate Advocacy v. Fauver*, 536 A.2d 1306, 1308 (N.J. Super Ct. App. Div.) (rejecting attacks on a regulation which failed to require tuberculosis testing because "there has been no proof that the lack of mandatory tests for venereal disease has resulted in, or is likely to result in, 'medically significant consequences.'"), *cert. denied*, 546 A.2d 549 (N.J. 1988). The regulation at issue did require that all inmates receive a medical examination by a physician. *Id.* at 1307.

clinical determination concerning the risk of tuberculosis must be made for all inmates. This clinical determination may take the form of an initial medical examination of inmates to determine whether "tests are necessary in the opinion of the physician to identify and isolate those who have communicable diseases."<sup>390</sup> Future judicial determinations about the necessity of tuberculosis screening will likely depend on the expected prevalence of tuberculosis in the prison population and on the adequacy of the entire tuberculosis control program in the prison. The more likely tuberculosis outbreaks are, the more likely it is that courts will require tuberculosis screening for the entire corrections population.

In addition to mandatory screening, some lower federal courts have held that the knowing or systematic failure of corrections officers to segregate prisoners with communicable diseases violates the Constitution.<sup>391</sup> However, the practice of segregating prisoners with sexually transmitted diseases finds little support in public health literature because persons who have sexually transmitted diseases pose no risk to the health of other inmates or workers unless such persons engage in either consensual or forced sexual contact. Therefore, if there is no evidence demonstrating an individual's propensity to engage in sexually assaultive behavior, isolation is not warranted on public health grounds. Similarly, it would not be necessary to segregate individuals with *M. TB* infection who showed no signs of clinically active disease since such individuals are not contagious.<sup>392</sup> On the other hand, courts have found that failure to isolate persons with infectious tuberculosis to be actionable under both tort and constitutional theories because of the significant risk posed to those sharing the same air space.<sup>393</sup>

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390. *Lareau*, 651 F.2d at 111.

391. *Lareau v. Manson*, 507 F. Supp. 1177, 1194-95 (D. Conn. 1980). At least one court has suggested that allowing persons with contagious sexually transmitted diseases to remain in the prison population without treatment violated the Texas Jail Standard Commission rule, which requires prison officials to provide prisoners with adequate medical services. *Smith v. Sullivan*, 553 F.2d 373, 380 (5th Cir. 1977).

392. See *Triggs v. Marshall*, No. C-92-3924-DLJ, 1994 WL 109748 at \*8-9 (N.D. Cal. Mar. 21, 1994) (finding the lack of segregation of prisoners infected with *M. TB* not threatening to other inmates). But see *Wilder v. Leak*, No. C-5044, 1992 WL 97678 at \*7 (N.D. Ill. May 4, 1992) (refusing to dismiss civil rights complaint based on failure to separate inmates testing TB-positive from those testing negative).

393. See *McFadden v. State*, 542 So.2d 871, 882 (Miss. 1989) (holding that inmate who contracted tuberculosis from fellow prisoner stated a valid cause of action in litigation alleging intentionally tortious or grossly negligent conduct); *Wilder*, 1992 WL 97678 at \*7 (refusing to dismiss civil rights complaint based on failure of Cook County Department of Corrections to separate persons with tuberculosis from prison population).

In addition to finding a duty to protect prison inmates from contagious disease, some lower federal courts, following *Estelle*, have found that corrections authorities also have a duty, arising under the Eighth Amendment and tort law, not to ignore the medical needs of persons with *M. TB* infection or with tuberculosis.<sup>394</sup> Deliberate indifference to the treatment needs of such prisoners may result in the award of damages for violation of constitutional rights.<sup>395</sup> In *Hill v. Marshall*, the Sixth Circuit Court of Appeals upheld a \$95,000 compensatory damage award and a \$990,000 punitive damage award against a prison official who failed to provide a prisoner with prescribed isoniazid preventive treatment, despite repeated complaints by the prisoner.<sup>396</sup> The court found that the official's actions amounted to a pervasive pattern of indifference to the prisoner's medical needs.<sup>397</sup> Although the corrections official argued that the prisoner had sustained no compensable loss because the prisoner never developed active disease, the court ruled that "Hill ha[d] suffered an actual injury, in that he was prevented . . . from reducing his risk of developing tuberculosis by approximately 90 percent through isoniazid."<sup>398</sup> The court found that because the prisoner received isoniazid intermittently, he suffered a heightened risk of developing drug resistance.<sup>399</sup>

While deliberate indifference to the medical needs of prisoners may constitute a constitutional violation, the simple failure to diagnose or treat tuberculosis may not rise to the level of indifference to medical needs required by the Constitution. But even if corrections officers' actions do not rise to the level of a constitutional violation, inmates may still seek damages under tort law for the negligence of prison officials.<sup>400</sup> In *Plummer v. United States*,<sup>401</sup> the Third Circuit Court of Appeals held that in an action under the Federal Tort Claims Act, prisoners who tested positive for tuberculosis infection could re-

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394. See *Hill v. Marshall*, 962 F.2d 1209, 1213 (6th Cir. 1992) (declaring Eighth Amendment action proper for prison officials' failure to attend to inmates need for tuberculosis medication), *cert. denied*, 113 S. Ct. 2992 (1993).

395. See *id.* at 1215 (holding damages appropriate for Eighth Amendment claim involving denial of medical care).

396. *Id.* at 1209.

397. *Id.* at 1214.

398. *Id.* at 1215.

399. *Id.*

400. See *Williams v. Cook County Jail Medical Staff*, No. 89C 8991, 1991 WL 181072, at \*2 (N.D. Ill. Sept. 11, 1992) (holding that a non-treatment policy does not necessarily result in a constitutional violation although it may constitute a medical malpractice claim).

401. 580 F.2d 72 (3d Cir. 1978).

ceive damages for mental suffering under the state's impact rule.<sup>402</sup> The court found that the state impact rule, which required physical evidence to substantiate a claim of mental distress, was satisfied by showing that the prisoner's body had been invaded by *M. TB*, even though the prisoner never developed clinically active tuberculosis.<sup>403</sup>

A more sustained and thoughtful body of judicial<sup>404</sup> and extrajudicial<sup>405</sup> scholarship has emerged since the resurgence of the tuberculosis epidemic. Simultaneously, the number of prisoner complaints relating to tuberculosis has rapidly risen.<sup>406</sup> One such case, *DeGidio v. Pung*,<sup>407</sup> arose following an outbreak of multidrug-resistant tuberculosis that infected several hundred inmates, at least eight of whom developed clinically active tuberculosis.<sup>408</sup> The Eighth Circuit Court of Appeals observed that prisons were high risk environments for tuberculosis and, as a result, screening and control measures were necessary to prevent outbreaks.<sup>409</sup> The Eighth Circuit upheld the district court's finding that the prison system violated the Eighth Amendment by its "negligent and substandard efforts to remedy [the] tuberculosis epidemic."<sup>410</sup> In upholding the district court's finding, the court

402. *Id.* at 76.

403. *Id.*; *cf. Ogle v. State of New York*, 594 N.Y.S.2d 824 (N.Y. App. Div. 1993) (affirming prisoner's award of damages for the failure of corrections officials to diagnose and treat his tuberculosis, when the officers had ignored a positive skin test, negligently assuming that his symptoms were psychosomatic). *But see Sybert v. United States*, 559 F. Supp. 546 (D.D.C. 1983) (holding that inmate who did not develop clinically active tuberculosis suffered no physical injury and therefore could not recover under Virginia law, which disallows damages for negligent infliction of mental distress absent physical injury).

404. *See, e.g., DeGidio v. Pung*, 704 F. Supp. 922 (D. Minn. 1989) (analyzing prison officials' response to tuberculosis epidemic).

405. *See Burris, supra* note 358, at 291 (advocating a coordinated response to tuberculosis epidemics in prison); Faith Colangelo & Mariana Hogan, *Jails and Prisons—Reservoirs of TB Disease: Should Defendants with HIV Infection (Who Cannot Swim) Be Thrown Into the Reservoir?*, 20 FORDHAM URB. L.J. 467 (1993) (discussing the various responses to tuberculosis epidemics in prisons).

406. Some recent cases include *Brown v. Briscoe*, 998 F.2d 201, 204 (4th Cir. 1993) (holding that requiring an inmate to take BCG vaccination did not constitute a violation of the Eighth Amendment); *Campbell v. Sheahan*, No. 9302479, 1993 WL 401901, at \*9 (N.D. Ill. Oct. 5, 1993) (granting defendant's motion to dismiss a prisoner claim that his tuberculosis was not properly diagnosed and he did not receive adequate treatment); *Haavisto v. Perpich*, 498 N.W.2d 746, 753 (Minn. Ct. App. 1993) (holding that whether physicians acted inconsistently with prisoners' Eighth Amendment rights by failing to properly diagnose was a material issue of fact), *aff'd in part and rev'd in part*, 520 N.W.2d 727 (Minn. 1994); *Ogle*, 594 N.Y.S.2d at 824 (holding that evidence supported conclusion that Department of Corrections violated own guidelines in connection with treatment of patient who tested positive for *M. TB*).

407. 920 F.2d 525 (8th Cir. 1990).

408. *Id.* at 529.

409. *Id.* at 527.

410. *Id.* at 531.

pointed to prison officials' failure to advise inmates of their exposure, to test all inmates after all staff had been tested, and to diagnose and treat cases promptly.<sup>411</sup> The court also rejected the prison's assertion that an intentional deprivation of medical care was necessary to establish deliberate indifference.<sup>412</sup> The court stated: "[A] consistent pattern of reckless or negligent conduct is sufficient to establish deliberate indifference to general medical needs."<sup>413</sup>

In the face of a resurgent epidemic and the possibility of future outbreaks of multidrug-resistant tuberculosis in vulnerable populations of inmates with HIV infection, courts not only have become more sympathetic to prisoner's claims of constitutional violations, but also have become proactive. In *Austin v. Pennsylvania Department of Corrections*,<sup>414</sup> a federal district court granted a preliminary injunction requiring the Pennsylvania Department of Corrections to implement guidelines for the prevention and management of tuberculosis.<sup>415</sup> The court found that there was a probability of irreparable injury to the plaintiff class at fourteen Department of Corrections facilities because "[i]nmates confined at correctional institutions face a higher risk of being infected with TB than the general public due to the close proximity of inmates, the high level of dust particles on which droplet nuclei can become attached and mechanically recirculated air which has not been exposed to sunlight or ultraviolet light."<sup>416</sup>

In other cases, courts have required corrections authorities to spend considerable resources to curb the spread of tuberculosis. For example, a district court in New York required the New York City Department of Corrections to construct forty-two negative pressure isolation rooms at Rikers Island.<sup>417</sup> The court held that all inmates with tuberculosis "must be housed in CDUs [contagious disease isolation units] which must be promptly erected and equipped by the City."<sup>418</sup> Construction of the isolation units cost more than \$12 million.<sup>419</sup>

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411. *Id.* at 533.

412. *Id.* at 532.

413. *Id.* at 533.

414. Civ. No. A 90-7497, 1992 WL 277511 (E.D. Pa. Sept. 29, 1992).

415. *Id.* at \*1.

416. *Id.* at \*4.

417. *Vega v. Sielaff*, 82-Civ. 6475, 1992 U.S. Dist. LEXIS 5249, at \*7-9 (S.D.N.Y. Apr. 22, 1992).

418. *Id.* at \*1; see also Mitch Gelman, *A Prison Breeding Ground: Jails Incubators for Tuberculosis*, *NEWSDAY*, Mar. 11, 1992, at 23, 86 (listing steps taken in New York to control the spread of tuberculosis in prisons).

419. James Barron, *Panel to Recommend Ways to Fight TB in New York Jails*, *N.Y. TIMES*, June 25, 1992, at B5; see Steven M. Safyer et al., *Tuberculosis in Correctional Facilities: The Tuberculosis Control Program of the Montefiore Medical Center Rikers Island Health Services*, 21 *J.L. MED. &*

In addition to implementing judicially mandated tuberculosis control programs, some corrections authorities have voluntarily implemented tuberculosis control programs which include mandatory tuberculosis screening, aggressive contact investigation, mandatory directly observed therapy, isolation of infectious prisoners, and quarantine of prisoners who fail to comply with treatment regimens.<sup>420</sup> Even though the CDC guidelines are silent on whether such interventions should be compulsory, litigation has begun to emerge based on the theory that such tuberculosis control methods violate the individual rights of prisoners. For example, in *Jolley v. Keane*,<sup>421</sup> a New York court rejected a challenge to mandatory tuberculosis testing. In *Jolley*, a prisoner who refused testing on religious grounds was put on "medical keeplock," which involved 24-hour confinement to his cell.<sup>422</sup> The prisoner requested that he be given the privileges equivalent to those given to inmates who had *M. TB* infection but did not have contagious tuberculosis. In rejecting the prisoner's request, the court found that there is a "rational connection between mandatory testing and the governmental interest of identifying and controlling the spread of tuberculosis. There is also a valid, rational connection between mandatory medical keeplock and the need for an effective medical program that identifies the spread of the disease."<sup>423</sup> Courts also have rejected inmates' claims that they have a right to refuse BCG vaccina-

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ETHICS 342, 347 (1993) (reporting that the initial units cost nearly half a million dollars per cell).

420. See HAMMETT & HARROLD, *supra* note 330, at 15 (discussing measures taken in New York by prison authorities).

421. No. 15 15385 (N.Y. Sup. Ct., Westchester County, Dec. 22, 1992) *cited in* HAMMETT & HARROLD, *supra* note 330, at 47.

422. *Id.*

423. *Id.*; see *Williams v. Keane*, No. 93 Civ. 2977 (PKL), 1994 WL 267865, at \*5 (S.D.N.Y. June 15, 1994) (dismissing prisoner's complaint for failure to exhaust administrative remedies in case where prisoner was kept in medical keeplock for refusal to submit to PPD); *Escoe v. Wankum*, No. 93-2868, 1994 U.S. App. LEXIS 7158, at \*5 (8th Cir. Apr. 14, 1994) (upholding requirement for prisoner to take tuberculin test and isoniazid preventive treatment); *Johnson v. Keane*, No. 92 Civ. 4287 (PKL), 1994 WL 37790, at \*4-5 (S.D.N.Y. Feb. 9, 1994) (upholding prisoner's confinement to cell for refusal to submit to PPD test); *Holmes v. Fell*, 1994 U.S. Dist. LEXIS 8604, at \*3-6 (S.D.N.Y. June 27, 1994) (holding that PPD test administered despite previous positive test did not violate prisoner's constitutional rights); *Byrd v. Reynolds*, No. 92-5627, 1993 U.S. App. LEXIS 6646, at \*2-3 (6th Cir. Mar. 22, 1993) (upholding segregation of prisoner until he submitted to tuberculosis screening); *Harris v. Lopez*, No. 92-2223-TPV, 1992 U.S. Dist. LEXIS 12603, at \*3-4 (N.D. Cal. July 24, 1992) (upholding mandatory isolation where prisoner refused treatment); *Langton v. Commissioner of Correction*, 614 N.E.2d 1002, 1006 (1993) (holding that prisoners had no constitutional right to refuse testing).

tion,<sup>424</sup> isoniazid preventive treatment, or other treatments,<sup>425</sup> within existing standards of medical care.

Although there are few cases reviewing challenges to mandatory health interventions, the courts' approach to such cases in the future could resemble the approach taken by the Supreme Court in *Washington v. Harper*.<sup>426</sup> Emphasizing the leeway given to corrections officials in matters of safety and security, the Court in *Washington* held that the state can forcibly treat a mentally ill inmate with antipsychotic drugs if the inmate is dangerous to himself or others and if the treatment is in the inmate's medical interests.<sup>427</sup> Undoubtedly, the state could demonstrate the necessity of administering medically appropriate tuberculosis treatment if the treatment would benefit the corrections population and the health of the inmates. If courts take an approach similar to the one taken by the Court in *Washington*, then future claims asserting the unconstitutionality of mandatory tuberculosis control programs will probably be rejected.

Claims asserting the right to be free from mandatory tuberculosis control measures are also unlikely to be successful where corrections authorities comply with public health advice. Applying the doctrine of judicial deference,<sup>428</sup> courts would likely find a rational nexus between compulsory interventions and the valid penological goal of protecting the health of inmates and workers. Further, alternative voluntary approaches which permit inmates to refuse to comply with tuberculosis measures would place the corrections population at risk.

Litigation challenging mandatory tuberculosis control measures based on theories of individual rights will have the best chance of succeeding when the interventions are not in compliance with CDC or other public health guidelines. For example, litigation to invalidate segregation of all prisoners with *M. TB* infection or isolation of prisoners who are not currently infectious ought to succeed. In such cases, interference with the constitutionally protected liberty interests of infected inmates would probably not be upheld because of the lack of a

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424. See *Brown v. Briscoe*, 998 F.2d 201 (4th Cir. 1993) (holding that nurse administering vaccination did not violate prisoner's Eighth Amendment rights when prisoner did not consent to vaccination).

425. See *Escoe*, 1994 U.S. App. LEXIS 7158, at \*1 (upholding prison requirement of treatment).

426. 494 U.S. 210 (1990).

427. *Id.* at 227; accord *Riggins v. Nevada*, 112 S. Ct. 1810, 1814-15 (1992) (forcing antipsychotic drug on a convicted prisoner is impermissible absent a finding of overriding justification and a determination of medical appropriateness).

428. See *supra* notes 360-368 and accompanying text.

significant risk to the health of the corrections population.<sup>429</sup> Moreover, even when the intervention complies with public health guidelines, individual-rights litigation still could conceivably succeed when corrections authorities single out some prisoners for treatment while failing to provide an overall safe environment for other inmates. For example, a decision to compulsorily screen, segregate, or require directly observed therapy for only a small subset of similarly situated inmates, while failing to provide adequate ventilation and treatment, might violate both individual and collective rights. The individuals subject to the compulsory interventions might claim an infringement of their protected liberty interests, and the wider corrections population might claim an infringement of their right to be protected from contracting a potentially lethal disease while confined.

Compulsory interventions for tuberculosis control have long been accepted inside and outside of correctional settings.<sup>430</sup> The presumption favoring compulsion in tuberculosis validly can be based on tuberculosis' mode of transmission or treatability. However, it may be incorrect to assume that compulsion of persons with tuberculosis is somehow less intrusive and stigmatic than compulsion of persons with AIDS.

Society has come to think of AIDS as the modern plague, and this mindset is largely responsible for the social ostracism and discrimination associated with the disease.<sup>431</sup> Tuberculosis, a plague of antiquity, is no less socially divisive. Powerful societal fears and prejudices are associated with tuberculosis.<sup>432</sup> The public, failing to understand the critical biological differences between tuberculosis infection and clinically active tuberculosis, may assume that tuberculosis is more transmissible than it is; may fear drug-resistant tuberculosis more than they should; and may regard persons with tuberculosis as recalcitrant and willfully acting to spread the infection. Accordingly, compulsion directed against persons infected with *M. TB* should not be undertaken instinctively, as if compulsion must be the correct way to pro-

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429. See *DeGidio v. Pung*, 704 F. Supp. 922, 924 (D. Minn. 1989) (noting that an infectious condition exists only when the infection develops into clinically active tuberculosis).

430. See *supra* notes 20-24 and accompanying text.

431. See Lawrence O. Gostin, *Preface to the Harvard Model AIDS Legislation Project: A Decade of a Maturing Epidemic: An Assessment for Directions for Future Public Policy*, 16 AM. J.L. & MED. 1 (1990) (discussing public reaction to the AIDS epidemic).

432. See *School Bd. of Nassau County v. Arline*, 480 U.S. 273, 284 (1987) (describing tuberculosis, Justice Brennan said: "[S]ociety's accumulated myths and fears about disability and disease are just as handicapping as are the physical limitations that flow from actual impairment. Few aspects of handicap give rise to the same level of public fear and misapprehension as contagiousness.").

ceed because we have always used compulsion. Rather, the exercise of compulsory power in the corrections context and in the wider community requires rigorous assessment of public health needs, the collection of empirical evidence demonstrating that the intervention will achieve public health purposes, and the examination of equally effective, less restrictive forms of intervention.

*b. Controlling the Dual Epidemics of Tuberculosis and HIV in Correctional Facilities: The Potential for the Enhanced Use of Compulsory Powers Against Persons with HIV Infection.*—The tension between protecting the individual rights of inmates and protecting the health needs of the entire corrections population has been played out dramatically in HIV prison litigation. Courts have vacillated between demands for mandatory HIV screening, result disclosure, and mandatory segregation of infected inmates to protect the public health<sup>433</sup> on the one hand and claims that the exercise of compulsory powers violate the individual rights of inmates on the other.<sup>434</sup> Since HIV is not transmitted through the air, most public health authorities have not recommended mandatory HIV control programs in correctional facilities.<sup>435</sup> Following the recommendations of authorities, some courts have focused on the absence of public health support for compulsory programs in rejecting the decisions of corrections authorities requiring the screening or segregating of inmates infected with HIV.<sup>436</sup> Other courts, however, have refused to invalidate mandatory interventions by corrections authorities, even in the absence of a sci-

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433. See, e.g., *Harris v. Thigpen*, 941 F.2d 1495, 1516-17 (11th Cir. 1991) (upholding Alabama's Corrections Department Regulation requiring HIV testing and segregation of those found to be positive).

434. See *Walker v. Schomer*, 917 F.2d 382 (9th Cir. 1990) (declaring officials must provide evidence of purpose of mandatory HIV screening to justify its implementation); *Nolley v. County of Erie*, 776 F. Supp. 715, 732-34 (W.D.N.Y. 1991) (finding that segregation of inmates with HIV and disclosure of their status violated inmates' constitutional right to privacy).

435. See NATIONAL COMMISSION ON AIDS REPORT, *supra* note 348, at 35-36 (recommending that infected persons participate in prison programs if able and not be isolated); HAMMETT ET AL., *supra* note 351, at 35-47 (declining to advocate mandatory intervention measures); see also Centers for Disease Control, U.S. Dep't of Health and Human Services, *HIV Prevention in the U.S. Correctional System, 1991*, 41 MORBIDITY & MORTALITY WKLY. REP. 389 (1992) (reporting the use of HIV counseling and testing programs in 430 facilities).

436. See, e.g., *Nolley*, 776 F. Supp. at 718-19 (noting CDC recommendation in holding that segregation of HIV-positive inmate violated her constitutional right to privacy and lacked a legitimate penological purpose, and concluding that segregation is so remotely connected to the goal of protecting health of corrections population as to render the policy irrational and arbitrary).

entific foundation for their actions.<sup>437</sup> The net result is that courts have upheld both decisions to segregate and decisions not to segregate, decisions to screen, and decisions not to screen.

A looming issue is whether the relationship between tuberculosis and HIV will shift the balance of interests in prison litigation further toward deference to prison authorities and away from protection of individual rights. The emergence of multidrug-resistant tuberculosis may even propel the courts to consider whether compulsory measures against inmates with HIV infection is constitutionally required to impede the tuberculosis epidemic in correctional facilities.

While few cases dealing with the intersection of the HIV and tuberculosis epidemics in correctional facilities have not yet emerged, courts likely will soon confront arguments that compulsory HIV screening and segregation are necessary to prevent the spread of tuberculosis.<sup>438</sup> As previously discussed, tuberculosis in prisoners with HIV infection is difficult to detect through standard tuberculin skin screening and other diagnostic methods because prisoners with HIV have markedly reduced immune response and unusual clinical presentations of tuberculosis.<sup>439</sup> Persons with HIV infection also are highly likely to develop active, contagious tuberculosis once infected with *M. TB*.<sup>440</sup> Moreover, the onset of symptoms may be rapid and the tubercle bacilli are more likely to be drug resistant.<sup>441</sup> The clusters of morbidity and mortality in correctional settings from multidrug-resistant tuberculosis have mostly occurred among populations who are co-infected with HIV.<sup>442</sup>

Given this relationship between HIV and tuberculosis, corrections authorities may claim that inmates must be screened and segre-

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437. See, e.g., *Harris*, 941 F.2d at 1515 (finding Department of Corrections interest in segregating HIV-positive inmates legitimate); *Dunn v. White*, 880 F.2d 1188, 1195 (10th Cir. 1989) (noting that "the lack of any indication in the record that AIDS is communicable among prisoners who do nothing but live together does not diminish the prison's interest in testing"), *cert. denied*, 493 U.S. 1059 (1990).

438. See, e.g., Catherine Woodard, *TB in N.Y.: Bitter Medicine to Swallow*, *NEWSDAY*, Mar. 8, 1992, at 4 (reporting on Rep. William Dannemayer's use of the tuberculosis epidemic as ammunition for campaign promoting compulsion against persons with HIV).

439. See *supra* notes 224-230 and accompanying text.

440. See *supra* notes 205-207 and accompanying text.

441. See *supra* note 209 and accompanying text.

442. See Centers for Disease Control and Prevention, U.S. Dep't of Health and Human Services, *Probable Transmission of Multidrug-Resistant Tuberculosis in a Correctional Facility—California*, 42 *MORBIDITY & MORTALITY WKLY. REP.* 48, 50 (1993) (noting the high rate of HIV infected persons who contact tuberculosis); *Transmission of Multidrug-Resistant Tuberculosis Among Immunocompromised Persons*, *supra* note 309, at 507-08 (reporting results showing rapid progression of tuberculosis and high mortality rates in those inmates also infected with HIV).

gated for HIV infection to impede the spread of tuberculosis. If such a claim is accepted, persons who are HIV-positive could then be tested for anergy and tuberculosis, considered for isoniazid preventive treatment, and even segregated from the rest of the corrections population on the theory that the HIV-positive person could develop clinically active tuberculosis before it is detected by corrections officials. Although such interventions have never been recommended by the U.S. Public Health Service, courts may find a corrections officials' argument about the necessity of mandatory HIV intervention plausible, and rationally related to legitimate penological interests.

There are, however, strong reasons for courts to reject claims about the necessity of exercising compulsory powers against persons with HIV infection based upon the dangers of co-infection. Decisions to compulsorily screen and segregate inmates are not justified based on HIV infection alone. Because being infected with HIV itself poses no risk to the corrections population, arguments for screening and segregation are rational only if corrections authorities can show some additional risk factor, such as a demonstrated propensity on the part of an individual with HIV to engage in either consensual or coercive sexual or needle sharing behavior. Absent such a showing, compulsory intervention is considerably overbroad, catching in its coercive web many inmates who pose no health hazard to themselves or others. Moreover, the compulsory interventions may violate the liberty and privacy interests of individual inmates if the inmate's serological status is disclosed to others and if they lose privileges that accompany being in the mainstream prison population. Accordingly, the risk that HIV-infected individuals will transmit tuberculosis must be real to justify mandatory intervention.

A thoughtful and well-resourced tuberculosis program decreases the likelihood that tuberculosis will be transmitted through the population. In the rare cases in which conscientious prison surveillance fails to detect cases of *M. TB* infection, prison officials probably will be able to identify persons with clinically active tuberculosis soon after the infected person develops symptoms of tuberculosis. While thoughtful tuberculosis programs will not entirely eliminate the risk of tuberculosis in prisons and jails, systemic approaches to tuberculosis control emphasizing the coordination of a broad range of surveillance, prevention, and treatment services will impede the prison tuberculosis epidemic much more than the introduction of compulsory screening and segregation of HIV-infected inmates.

Correctional facilities need not pose a potent health hazard. To the contrary, properly conceived correctional facilities could present a

public health opportunity. Prior to incarceration, many inmates are in poor health, and many have communicable diseases, which are difficult to identify and treat among the poor, the homeless, and the disenfranchised. Society is ill-served by policies that fail to deal with, and even exacerbate, inmates' diseases during confinement. Eventually, most prisoners are released from jail, and prisoners who have a communicable disease when released will ultimately spread the disease to the wider population. Therefore, it is far more cost effective and beneficial to inmates, their families, and to society to use the period of confinement to reach this otherwise elusive group.<sup>443</sup>

2. *Tuberculosis in Nursing Homes.*—Although elderly persons are, for the first time, no longer the age group with the highest number of tuberculosis cases, they continue to have the highest case rate in the population—19.6 cases per 100,000 persons.<sup>444</sup> In 1992, persons over sixty-five represented some twenty-three percent of all tuberculosis cases,<sup>445</sup> even though persons over sixty-five comprised only about twelve percent of the population.<sup>446</sup> Elderly persons living in nursing homes are at even greater risk of contracting tuberculosis. A CDC study in 29 states showed that the aggregate case rate for nursing home residents was 1.8 times higher than the rate in elderly persons living in the community.<sup>447</sup> In addition, nursing home staff have rates of active tuberculosis three times higher than that expected for other employed adults of similar age, race, and sex.<sup>448</sup>

The problem of tuberculosis in nursing homes will remain a significant one as the population in these facilities continues to grow. It

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443. See Glaser & Greifinger, *supra* note 332 (noting that prevention and treatment protect the community upon the prisoner's release); Robert B. Greifinger et al., *Tuberculosis in Prison: Balancing Justice and Public Health*, 21 J.L. MED. & ETHICS 332, 339 (1993) (discussing the benefits of treatment to prisoners and the surrounding community); see also Lawrence O. Gostin, *The Interconnected Epidemics of Drug Dependency and AIDS*, 26 HARV. C.R.-C.L. L. REV. 113, 163 (1991), (discussing the benefits to society of treatment programs).

444. See Jereb et al., *supra* note 44, at 26.

445. TUBERCULOSIS STATISTICS 1992, *supra* note 50, at 76. In 1987, cases of active tuberculosis among elderly persons accounted for 27% of the total nationwide, suggesting a reduction in the burden of disease among elderly persons over time. See Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly: Recommendations of the Advisory Committee for the Elimination of Tuberculosis*, 39 MORBIDITY & MORTALITY WKLY. REP. 7 (RR-10 1990) [hereinafter *Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly*] (discussing the prevalence of tuberculosis among the elderly).

446. 1990 CENSUS OF POPULATION, *supra* note 261, at 51.

447. Mary D. Hutton et al., *Results of a 29-State Survey of Tuberculosis in Nursing Homes and Correctional Facilities*, 106 PUB. HEALTH REP. 305, 307-08 (1993).

448. See *Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly*, *supra* note 445, at 8.

is estimated that half of all women and one third of all men turning sixty-five will require nursing home care during their life.<sup>449</sup> With extended life expectancies, the population of elderly persons residing in nursing homes may double by the year 2000.<sup>450</sup> The features of nursing home life pose significant health hazards, including the risk of tuberculosis. The concentration of elderly persons in a confined living space is problematic because many residents are in poor health or have suppressed immune systems. Moreover, ten to fifteen percent of residents harbor tubercle bacilli when they enter these facilities, thereby creating a reservoir of infection.<sup>451</sup> While many of these pre-existing infections were acquired many years ago, when the overall prevalence of tuberculosis was higher,<sup>452</sup> clinical disease can reactivate later in life, posing a threat to staff and residents.

In addition to the greater susceptibility of elderly persons to tuberculosis, the environment in many nursing homes is conducive to the spread of tubercle bacilli. In nursing homes two to four residents frequently are placed in a room, which they rarely leave except to eat or participate in recreational activities. These activities often take place in a crowded living area. The sleeping and recreational areas of nursing homes, moreover, may have poor lighting and ventilation, making transmission of infection likely.<sup>453</sup> Further, numerous researchers have found that nursing home patients are often limited in their freedom, and are verbally and physically abused. Researchers have also found that substandard nutrition and living quarters are basic features of nursing home life.<sup>454</sup>

Compounding reports of abuse, malnutrition, and overcrowding are the chronic shortages of adequately trained health care professionals in nursing homes. Nursing homes lack adequate numbers of physicians, nurses, and other trained health care professionals to care for the health needs of residents. Despite regulatory requirements,

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449. Peter Kemper & Christopher M. Murtaugh, *Lifetime Users of Nursing Home Care*, 324 NEW ENG. J. MED. 595, 598 (1991).

450. See *id.* at 595 (discussing the projected increases in the nursing home population).

451. Jai P. Narain et al., *Epidemic Tuberculosis in a Nursing Home: A Retrospective Cohort Study*, 33 J. AM. GERIATRICS SOC'Y 258, 261 (1985).

452. See CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 7 ("[I]n 1944, there were over 126,000 cases [of tuberculosis] . . . . Currently, there are . . . over 20,000 cases reported annually.").

453. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 28-29.

454. See, e.g., Karl Pillemer & David W. Moore, *Abuse of Patients in Nursing Homes: Findings From a Survey of Staff*, 29 THE GERONTOLOGIST 314 (1989); Nicholas Rango, *Nursing-Home Care in the United States: Prevailing Conditions and Policy Implications*, 307 NEW ENG. J. MED. 883, 886 (1982); BRUCE C. VLADECK, UNLOVING CARE: THE NURSING HOME TRAGEDY 3-6 (1980).

many nursing homes utilize either perfunctory health reviews by physicians or mere paper reviews. Moreover, many nursing homes do not have twenty-four-hour nursing coverage, do not have adequate medical supplies and equipment, and do not keep reliable medical records.<sup>455</sup> The bulk of care delivered to nursing home residents is carried out by poorly trained nurse's aides.<sup>456</sup> These nurse's aides and other professionals are often unable to identify, prevent, isolate, or treat cases of tuberculosis.

As a result of the insufficiency of trained health care professionals in nursing homes, there are delays as long as fifteen months in the diagnosis of active cases of tuberculosis.<sup>457</sup> Nursing home workers may suspect patients of having cancer, bronchitis, pneumonia, or a chronic chest cold before tuberculosis is considered. Just as important as the failure of nursing home workers to diagnose tuberculosis is the failure of many nursing homes to comply with infection control standards either because they do not have the knowledge or expertise to comply or because they use sub-optimal procedures to save money.<sup>458</sup>

The explosive growth in the number of nursing home residents, the vulnerability of the nursing home population, and the hazardous environment in many nursing homes, all suggest that fundamental reform is appropriate to protect the health of both residents and staff. Certainly, compliance with CDC guidelines and applicable regulatory requirements is essential.<sup>459</sup> Yet, even after the issuance of guidelines and regulations, the health risks in nursing homes have continued.

Despite the health risks in nursing homes, very little has been done to provide elderly persons with home-based care that would pro-

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455. See Timothy J. Keay & George A. Taler, *Review of Medical Care in Cited Nursing Homes: Key Areas of Deficiency*, 18 QRB 222, 224-27 (1992); John E. Sheridan et al., *Ineffective Staff, Ineffective Supervision, or Ineffective Administration? Why Some Nursing Homes Fail to Provide Adequate Care*, 32 THE GERONTOLOGIST 334, 336 (1992).

456. See V. Tellis-Nayak & Mary Tellis-Nayak, *Quality of Care and the Burden of Two Cultures: When the World of the Nurse's Aide Enters the World of the Nursing Home*, 29 THE GERONTOLOGIST 307, 308-09 (1989) (noting that most patient care is delivered by nurse's aides with only limited training).

457. Narain et al., *supra* note 451, at 261.

458. See Sheila B. Darnowski et al., *Two Years of Infection Surveillance in a Geriatric Long-Term Facility*, 19 AM. J. INFECTION CONTROL 185, 188-89 (1991) (discussing factors contributing to the high risk of infection in nursing homes, including inconsistent immunization practices); Rima F. Khabbaz & James H. Tenney, *Infection Control in Maryland Nursing Homes*, 9 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 159, 161 (1988) (reporting that most nursing home practices fall short of guidelines for acute care hospitals).

459. See *Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly*, *supra* note 445, at 7 (reporting the recommendations of the Advisory Committee for Elimination of Tuberculosis).

tect them from institutional abuse and infectious disease. While states participating in Medicare and Medicaid are required to provide support for nursing homes, funding for home-based services is optional and varies by state.<sup>460</sup> "Half the states have no publicly funded attendant service program and others are limited in their capacity."<sup>461</sup> Recent efforts at national health care reform, moreover, have failed to include substantial support for long-term care, particularly home-based care.<sup>462</sup> The failure to support long-term, home-based care is unfortunate because the risk of communicable disease, including tuberculosis, is only one of the reasons that a shift from institutional to home-based care should be considered.

3. *Tuberculosis in Health Care Facilities: Nosocomial Transmission and Occupational Safety.*—Health care facilities, like prisons and other congregate facilities, present not only a significant health hazard to residents and workers but also present an opportunity for impeding the tuberculosis epidemic. Unfortunately, America's health care settings have often increased the risk of transmission of tuberculosis, rather than systemically intervening in the epidemic.

The association between working or residing in a health care facility and increased risk of tuberculosis is well recognized. Physicians, nurses, and other health care personnel have disproportionately high rates of tuberculosis compared with the general population,<sup>463</sup> and tuberculosis, in some acute<sup>464</sup> and chronic<sup>465</sup> health care facilities, has been endemic.<sup>466</sup> Moreover, nosocomial<sup>467</sup> outbreaks of multidrug-

460. Laura Hershey, *Exit the Nursing Home*, THE PROGRESSIVE 24 (1991).

461. *Id.*

462. See THE WHITE HOUSE DOMESTIC POLICY COUNCIL, THE PRESIDENT'S HEALTH SECURITY PLAN (1993).

463. Elizabeth Barrett-Connor, *The Epidemiology of Tuberculosis in Physicians*, 241 JAMA 33, 33 (1979); K.P. Goldman, *Tuberculosis in Hospital Doctors*, 69 TUBERCLE 237 (1988); Charles E. Haley et al., *Tuberculosis Epidemic Among Hospital Personnel*, 10 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 204, 208-09 (1989).

464. See *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 585; N. Joel Ehrenkrantz & J. Leilani Kicklighter, *Tuberculosis Outbreak in a General Hospital: Evidence of Airborne Spread of Infection*, 77 ANNALS INTERNAL MED. 377 (1972); David L. Horn et al., *Fatal Hospital-Acquired Multidrug-Resistant Tuberculosis Pericarditis in Two Patients with AIDS*, 327 NEW ENG. J. MED. 1816 (1992).

465. See Carole Brennen et al., *Occult Endemic Tuberculosis in a Chronic Care Facility*, 9 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 548 (1988).

466. See Antonio Catanzaro, *Nosocomial Tuberculosis*, 125 AM. REV. RESPIRATORY DISEASE 559 (1982); Mary D. Hutton et al., *Nosocomial Transmission of Tuberculosis Associated with a Draining Tuberculosis Abscess*, 161 J. INFECTIOUS DISEASE 286 (1990).

467. Nosocomial transmission denotes a new disorder (unrelated to the patient's primary condition) associated with being treated in a hospital. STEADMAN'S MEDICAL DICTIONARY 1063 (25th edition, 1990).

resistant tuberculosis have resulted in high levels of morbidity and mortality among patients in health care facilities.<sup>468</sup> Where outbreaks occur among HIV-infected patients, the mortality rates have ranged from 72 percent to 89 percent, and "the median interval between diagnosis and death [has been] very short, from 4 to 16 weeks."<sup>469</sup> Deaths also have occurred among health care workers who contracted multidrug-resistant tuberculosis occupationally.<sup>470</sup>

Tuberculosis in health care settings can be attributed to a sick and vulnerable patient population, to an environment conducive to transmission of airborne disease, to a highly inadequate tuberculosis prevention, management, and infection control program, and to medical procedures that induce the expulsion of droplet nuclei. The patient population in health care facilities provides a reservoir of infection for the spread of tuberculosis. In addition to all of the known cases of tuberculosis in health care facilities, there are also a great number of unrecognized cases of *M. TB* infection and clinically active tuberculosis.<sup>471</sup> The risk of transmission is highest in areas, such as clinic waiting areas and emergency rooms, where patients with tuberculosis are provided care before diagnosis.<sup>472</sup> In addition, health care facilities also house a vulnerable patient population. For example, there is a disproportionately high number of patients with immunosuppression who are more likely to contract tuberculosis and

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468. See Consuelo Beck-Sague et al., *Hospital Outbreak of Multidrug-Resistant Mycobacterium Tuberculosis Infections: Factors in Transmission to Staff and HIV-Infected Patients*, 268 JAMA 1280 (1992); Samuel W. Dooley et al., *Nosocomial Transmission of Tuberculosis in a Hospital Unit for HIV-Infected Patients*, 267 JAMA 2632 (1992); Brian R. Edlin et al., *An Outbreak of Multidrug-Resistant Tuberculosis Among Hospitalized Patients with the Acquired Immunodeficiency Syndrome*, 326 NEW ENG. J. MED. 1514 (1992); *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 585-87; Margaret A. Fischl et al., *An Outbreak of Tuberculosis Caused by Multiple-Drug-Resistant Tubercle Bacilli Among Patients with HIV Infection*, 117 ANNALS INTERNAL MED. 177 (1992); Horn et al., *supra* note 464, at 1816; Michele L. Pearson et al., *Nosocomial Transmission of Multidrug-Resistant Mycobacterium Tuberculosis: A Risk to Patients and Health Care Workers*, 117 ANNALS INTERNAL MED. 191 (1992).

469. CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, NIOSH RECOMMENDED GUIDELINES FOR PERSONAL RESPIRATORY PROTECTION OF WORKERS IN HEALTH-CARE FACILITIES POTENTIALLY EXPOSED TO TUBERCULOSIS 3 (Sept. 14, 1992) [hereinafter NIOSH]. See *supra* text accompanying note 210.

470. *Nosocomial Transmission—Florida*, *supra* note 212, at 718; Samuel W. Dooley et al., *Multidrug-Resistant Tuberculosis*, 117 ANNALS INTERNAL MED. 257 (1992); Pearson et al., *supra* note 468, at 191.

471. The exact prevalence of unrecognized infection and disease in health care settings is unknown because of the absence of systematic screening of patients and workers.

472. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings, with Special Focus on HIV-Related Issues*, 39 MORBIDITY & MORTALITY WKLY. REP. 1, 3 (RR-17 1990) [hereinafter *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings*].

progress quickly to clinically active tuberculosis. Moreover, patients who are being treated for conditions which result in immunosuppression and those who are given immunosuppressive medication—for example, persons receiving transplants or undergoing chemotherapy for certain cancers—also have an increased risk of tuberculosis. The most significant concern is for the high numbers of persons in hospitals with both diagnosed and undiagnosed HIV infection and AIDS.<sup>473</sup> Accordingly, health care settings present significant concerns about the spread of tuberculosis both because of the high reservoir of clinically active disease and because of patients' vulnerability.

Health care facilities, like other congregate settings, also provide an environment conducive to the transmission of airborne disease.<sup>474</sup> Droplet nuclei are so small that air currents keep them airborne and spread them throughout a hospital room or building,<sup>475</sup> and while the public probably believes that hospitals provide a safe and protected environment, hospitals are often badly ventilated, overcrowded buildings with inadequate natural lighting. Moreover, many hospitals have highly inadequate tuberculosis control, prevention, and management programs which fail to meet many of the standards set in CDC guidelines.<sup>476</sup> As a matter of fact, post-incident investigations of multidrug-resistant tuberculosis outbreaks have revealed that many cases of tuberculosis were undiagnosed or were diagnosed and treated after a delay.<sup>477</sup> The failure to quickly diagnose tuberculosis results in the exposure of staff and other patients to contagious patients. Investigations also revealed that the sources of *M. TB* infection were not controlled; that there was considerable microbial contamination of

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473. See DiPerri et al., *supra* note 202, at 1502 (chronicling the outbreak of nosocomial tuberculosis in a group of HIV-infected hospital patients); Robert S. Janssen et al., *HIV Infection Among Patients in U.S. Acute Care Hospitals*, 327 NEW ENG. J. MED. 445 (1992).

474. *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings*, *supra* note 472, at 3.

475. *Diagnostic Standards and Classification of Tuberculosis*, *supra* note 109, at 725; NIOSH, *supra* note 469, at 6-7.

476. See *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 589; *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings*, *supra* note 472, at 1 (recommending the early identification and treatment of persons with active tuberculosis and the prevention of the spread of infectious droplet nuclei by source control methods, reduction of microbial contamination of indoor air, and careful surveillance of *M. TB* transmission). The CDC is currently updating its guidelines as a result of continued outbreaks of multidrug-resistant tuberculosis. Draft Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Facilities, Second Edition: Notice of Comment Period, 58 Fed. Reg. 52,810 (1993) [hereinafter CDC Draft Guidelines].

477. *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 588; see *Nosocomial Transmission—Florida*, *supra* note 212, at 719 ("For some patients who presented with nonpulmonary complaints, TB was not initially suspected, and they were not placed in AFB isolation.").

indoor air; and that there was not careful surveillance of tuberculosis transmission.<sup>478</sup> In some outbreaks, hospitals had tuberculosis isolation rooms with positive air pressure relative to the hallway,<sup>479</sup> facilitating the escape of droplet nuclei to busy corridors. In one outbreak, exhaust air from a sputum induction room was recirculated into an HIV clinic.<sup>480</sup> In addition, hospital isolation rooms often lacked appropriate negative pressure ventilation to keep droplet nuclei from entering the ventilation system, and spreading into patient rooms and waiting areas.<sup>481</sup> Visitors and staff often entered isolation areas wearing no masks.<sup>482</sup> Finally, in one study, patients with known active tuberculosis were not placed in isolation rooms at all.<sup>483</sup>

The vulnerable patient population, poorly ventilated buildings, and inadequate infection control in health care settings place patients and health care professionals at risk of acquiring a disease that they did not have before entering. While the risk of contracting tuberculosis is high for all health care patients and professionals, the risk is even higher for health care workers who conduct diagnostic or treatment procedures that stimulate patient coughing or other induction of droplet nuclei.<sup>484</sup> Nosocomial transmission has been associated with procedures such as autopsy,<sup>485</sup> bronchoscopy,<sup>486</sup> open abscess irriga-

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478. *Id.* at 719-20. See generally Beck-Sague et al., *supra* note 468 (listing factors related to the transmission of tuberculosis to staff and HIV-infected patients); *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings*, *supra* note 472, at 1 (discussing the spread of tuberculosis in health care settings); Nardell, *supra* note 130, at 502 (advising hospitals on how to reduce the risk of tuberculosis transmission); Pearson et al., *supra* note 468, at 191.

479. Karim A. Adal et al., *The Use of High-Efficiency Particulate Air-Filter Respirators to Protect Hospital Workers from Tuberculosis: A Cost-Effectiveness Analysis*, 331 NEW ENG. J. MED. 169, 171 (1994).

480. Beck-Sague et al., *supra* note 468, at 1284.

481. *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 589.

482. *Id.* at 588.

483. Pearson et al., *supra* note 468, at 194.

484. See *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings*, *supra* note 472, at 3 (listing procedures to protect health care workers from tuberculosis); NIOSH, *supra* note 469, at 8 (recommending procedures to protect health care workers treating patients with tuberculosis).

485. Rune Lundgren et al., *Tuberculosis Infection Transmitted at Autopsy*, 68 TUBERCLE 147 (1987); Harvey S. Kantor et al., *Nosocomial Transmission of Tuberculosis From Unsuspected Disease*, 84 AM. J. MED. 833 (1988).

486. Catanzaro, *supra* note 466, at 560-61.

tion,<sup>487</sup> sputum induction and aerosol treatments,<sup>488</sup> and endotracheal intubation and suctioning with mechanical ventilation.<sup>489</sup>

a. *Risk Assessment and Public Health Regulation: The Fallacy of the Zero-Risk Assumption.*—Health care facilities certainly have some duty to their staff and patients to protect them from new infections to which they are exposed as a consequence of employment or hospitalization. The pervasive failure of many health care facilities to comply with public health guidelines for the prevention of *M. TB* transmission has been called “unacceptable” by the National Institute for Occupational Safety and Health.<sup>490</sup> NIOSH’s statutory mandate holds it responsible for developing standards to ensure that “no worker will suffer impaired health or functional capacities or diminished life expectancy as a result of his [or her] work experience.”<sup>491</sup> Based on its legislative mandate, NIOSH has developed an operational philosophy of “public health prudence,” which holds that “when faced with uncertainty, it is better to err in favor of human life and health than in favor of any competing value.”<sup>492</sup>

Based upon this operational philosophy, the CDC has issued a highly comprehensive set of draft guidelines for preventing the transmission of tuberculosis in health care facilities.<sup>493</sup> In addition to standard recommendations concerning the detection, prevention, and management of tuberculosis,<sup>494</sup> the guidelines offer detailed instructions for engineering controls in health care settings.<sup>495</sup> These guidelines have become very controversial. The CDC draft guidelines recommend that general ventilation systems in health care settings be

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487. Hutton et al., *supra* note 466, at 288-89.

488. Centers for Disease Control, U.S. Dep’t of Health and Human Services, *Mycobacterium Tuberculosis Transmission in a Health Clinic—Florida*, 38 MORBIDITY & MORTALITY WKLY. REP. 256 (1989).

489. See Haley et al., *supra* note 463, at 204 (discussing a tuberculosis outbreak that occurred after a patient had been intubated).

490. NIOSH, *supra* note 469, at 16.

491. Occupational Safety and Health Act of 1970 § 410, 29 U.S.C. § 669 (1988).

492. NIOSH, *supra* note 469, at 5. NIOSH cites in support of its position, *United Steelworkers v. Marshall*, 647 F.2d 1189 (D.C. Cir. 1980).

493. CDC Draft Guidelines, *supra* note 476.

494. *Id.* at 52,813. The guidelines recommend assignment of responsibility for tuberculosis control to specific hospital authorities responsible for careful assessment of the risk, and development of a tuberculosis control plan, with periodic reassessment; detection of patients who may have active tuberculosis; management of patients in ambulatory care settings and emergency rooms; management of hospitalized patients with tuberculosis; reduction in the risk of cough-inducing clinical procedures; education and training of workers; counseling, screening and evaluation of workers; and coordination with local Health Departments. *Id.*

495. *Id.* at 52,832.

designed to move air from clean areas through the infectious source and then to the exhaust.<sup>496</sup> In addition, the CDC advises health care facilities serving populations with a high prevalence of tuberculosis to use additional engineering controls, such as ultraviolet germicidal irradiation<sup>497</sup> and high efficiency particle air filtration.<sup>498</sup>

Opponents of the CDC guidelines charge that, given the limited empirical data demonstrating the efficacy of each of these engineering controls, compliance with these standards is too costly.<sup>499</sup> The CDC recommendation that health care workers use respirators with high efficiency particulate air filters (HEPA respirators) in isolation rooms for patients with possible active disease is especially controversial.<sup>500</sup> In October 1993, the Occupational Safety and Health Administration (OSHA) announced that it would require the use of HEPA respirators and a respiratory protection program.<sup>501</sup> Commentators have estimated that preventing a single case of occupational tuberculosis during the next 41 years by implementing the proposed requirements for HEPA respirators and a respiratory-protection program

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496. *Id.* at 52,834.

497. *Id.* at 52,820. UV units can be installed in a room or corridor to irradiate the air in the upper portion of the room, or can be installed in ducts to irradiate air passing through the ducts. *Id.* at 52,821. While many clinicians and experts in hospital engineering controls believe that ultraviolet germicidal irradiation is safe and effective, there is still dispute over the sufficiency of empirical evidence. See CALIFORNIA DEPARTMENT OF HEALTH SERVICES, USING ULTRAVIOLET RADIATION AND VENTILATION TO CONTROL TUBERCULOSIS (1990); Janet M. Macher, *The Use of Germicidal Lamps to Control Tuberculosis in Healthcare Facilities*, 14 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 723 (1993); Richard L. Riley & Edward A. Nardell, *Clearing the Air: The Theory and Application of Ultraviolet Air Disinfection*, 139 AM. REV. RESPIRATORY DISEASE 1286 (1989).

498. Airliners, laboratories, and submarines have had experience in using HEPA filtration to remove airborne contaminants, including airborne bacteria. HEPA filters are expected to remove the vast majority of droplet nuclei. CDC recommends the use of HEPA filters in hospital exhaust ducts. *Id.* at 52,821. See Nardell, *supra* note 293, at 683 (addressing the merits of air filtrators as an approach to air disinfectant).

499. For example, there is considerable disagreement over the reliability, practicality, and cost of building ventilation. Compliance with CDC and EPA standards for building ventilation would require major renovations and substantial maintenance. For older buildings, compliance with the guidelines would require near total building reconstruction. Nardell, *supra* note 293, at 681-82. As to the limitations of HEPA filtration and UVGI, see Robert L. Marier & Tim Nelson, *A Ventilation-Filtration Unit for Respiratory Isolation*, 14 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 700 (1993); Macher, *supra* note 497, at 723.

500. CDC Draft Guidelines, *supra* note 476, at 52,821.

501. Memorandum from Roger A. Clark, Directorate of Compliance Programs, to OSHA Regional Administrators (Oct. 8, 1993), reprinted in 14 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 694 (1993) (citing 29 C.F.R. § 1910.134(a)(2), which requires that respirators be provided when necessary to protect employee health.); see Michael D. Decker, *OSHA Enforcement Policy for Occupational Exposure to Tuberculosis*, 14 INFECTION CONTROL & HOSP. EPIDEMIOLOGY 689 (1993) (discussing OSHA's mandatory guidelines).

would cost from \$1.3 to \$18.5 million in one hospital alone.<sup>502</sup> HEPA respirators have also been criticized for clinical reasons because the hooded, gas-mask type structure frightens patients, stigmatizes patients with tuberculosis, and interferes with patient communication by muffling the voice.<sup>503</sup>

Tuberculosis control in health care settings epitomizes the two extremes of health regulation, with each extreme representing an error in judgment. At one end are the 1990 CDC guidelines for preventing the transmission of tuberculosis in health care settings.<sup>504</sup> These guidelines are not regulatory in nature and have been widely ignored. The result of noncompliance has been tragic outbreaks of tuberculosis among patients and staff in health care settings.<sup>505</sup> In every outbreak, once hospitals complied with the guidelines, the health hazard was rapidly brought under control.<sup>506</sup> At the other extreme is the attempt by regulatory agencies such as the EPA and OSHA, to compel the use of expensive engineering controls and special respiratory masks in the absence of empirical data suggesting their cost effectiveness.<sup>507</sup>

In seeking to ensure the safety of health care workers and patients, it is important to measure the health hazards against the common risks incurred in daily life. Some of the regulatory standards, such as the HEPA respirator, are aimed at reducing the risks in health care settings to such a minute level that the risks would probably fall below the risks encountered every day. Seeking to meet a standard of near zero risk is not only inconceivable,<sup>508</sup> but potentially counterproductive. Spending scarce resources on highly expensive, unproven

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502. Adal et al., *supra* note 479, at 171.

503. *Id.* at 172; Rebecca Voelker, *New Guidelines Prompt Debate Over TB Control*, AM. MED. NEWS, Oct. 19, 1992, at 1 (quoting Michael Iseman: "I do not think, as a clinician, I could ever see myself going to a patient's bedside in a Darth Vader mask. It would create such a surreal, dehumanizing, stigmatizing image that I couldn't live with it.").

504. See *Nosocomial Transmission—Florida and New York*, *supra* note 94, at 586 (summarizing the CDC recommendations for preventing the transmission of tuberculosis in health care settings).

505. See *supra* notes 477-483 and accompanying text.

506. Adal et al., *supra* note 479, at 171.

507. NIOSH candidly admits that "the evidence is not adequate to confidently assess both the *efficacy* and *reliability* of various currently recommended procedures for preventing the transmission of tuberculosis in health-care facilities." NIOSH, *supra* note 469, at 5. *But see* *United Steelworkers v. Marshall*, 647 F.2d 1189 (D.C. Cir. 1980) (OSHA "cannot let workers suffer while it awaits the Godot of scientific certainty.").

508. See Edward A. Nardell et al., *Theoretical Limits of Protection Achievable by Building Ventilation*, 144 AM. REV. RESPIRATORY DISEASE 302 (1991) (concluding that "[a]t levels of ventilation considered optimal for comfort purposes, only half of the observed [*M. TB*] infections would have been prevented.").

technologies incurs a significant opportunity cost in that such spending reduces the amount of money that can be spent on more cost-effective policies.

*b. Compulsory Screening and Exclusion of Health Care Professionals Infected with M. TB.*—Screening for *M. TB* is required for certain populations in forty-four states, including eleven states that require tuberculin skin testing for employees of medical facilities.<sup>509</sup> The CDC recommends that all health care workers be screened for tuberculosis.<sup>510</sup> Screening persons for tuberculosis has long been justified on the grounds that the test itself is neither intrusive nor stigmatic. However, the assumption that tuberculosis testing is less invasive and less stigmatic than other medical testing is difficult to defend. For reasons suggested earlier, tuberculosis has been, and remains, a highly stigmatizing medical condition.<sup>511</sup> To focus on the noninvasive nature of the tuberculin skin test, and other screening tests like the HIV test, misses the mark. The important fact is what the test reveals to the patient and to others; the importance of the results justifies a requirement of informed consent.

Despite workers' legitimate claims that compulsory tuberculin skin testing infringes on important personal interests, courts will most likely uphold *M. TB* screening programs which comply with the Americans with Disabilities Act (ADA). Decisions by health care facilities to compulsorily test and exclude workers are governed by the ADA which prohibits discrimination.<sup>512</sup> The ADA explicitly prohibits em-

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509. *Tuberculosis Control Laws*, *supra* note 24, at 10.

510. *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings*, *supra* note 472, at 1, 4, 14; CDC Draft Guidelines, *supra* note 476, at 52,814, 52,823; see *Screening for Tuberculosis*, *supra* note 51, at 1 (discussing groups for whom screening is recommended).

511. See *supra* note 432 and accompanying text.

512. Americans with Disabilities Act of 1990, 42 U.S.C. § 12112(d) (Supp. IV 1992); 29 C.F.R. 1630.2 (1993). The legislative history, as well as decisions under the Rehabilitation Act and ADA show that asymptomatic infection, such as HIV infection, can be considered a current disability or regarded as a disability within the meaning of 42 U.S.C. § 12102(2). See *Doe v. Centinela Hosp.*, 57 U.S.L.W. 2034 (C.D. Cal. June 29, 1988) (holding that an HIV-positive individual is an "individual with a handicap within the meaning of the 1973 Rehabilitation Act"); Lawrence O. Gostin, *Impact of the ADA on the Health Care System*, in *IMPLEMENTING THE AMERICANS WITH DISABILITIES ACT: RIGHTS AND RESPONSIBILITIES OF ALL AMERICANS* 175 (Lawrence O. Gostin & Henry A. Beyer eds., 1993) [hereinafter Gostin, *Impact of the ADA*]; see also Chai R. Feldblum, *Medical Examinations and Inquiries Under the Americans with Disabilities Act: A View from the Inside*, 64 TEMP. L. REV. 521 (1991) (chronicling the development of the ADA); Chai R. Feldblum, *Workplace Issues: HIV and Discrimination*, in *AIDS AGENDA: EMERGING ISSUES IN CIVIL RIGHTS* 271 (Nan Hunter & William Rubenstein eds., 1992) (discussing HIV as a disability under the 1973 Rehabilitation Act and the ADA).

employers from subjecting job applicants to medical tests, examinations or inquiries.<sup>513</sup> Therefore, it is clear that health care providers could not require applicants to submit to a tuberculin skin test, a chest X-ray, or inquiry about whether they are infected with tuberculosis.

The ADA does, on the other hand, allow employers to require medical examinations, including *M. TB* screening, after an offer of employment has been made, provided that all entering employees are subjected to the same examination and provided that the medical information is kept confidential.<sup>514</sup> Employers who test and examine employees cannot, however, withdraw a job offer to a qualified person due to a disability, such as a positive tuberculin skin test result, detected during the examination.<sup>515</sup> It appears, therefore, that the CDC's recommendation for tuberculin skin testing of all applicants for medical employment is lawful provided that the testing is post-offer, universal, and confidential, and provided that adverse employment decisions are not based on impermissible grounds, such as exclusion of infected individuals who are otherwise qualified for the job in question.<sup>516</sup>

The ADA permits compulsory medical examinations or inquiries of current employees only if the examinations are job-related and consistent with business necessity.<sup>517</sup> Tuberculin skin testing is likely to be upheld as job-related and consistent with business necessity because such testing is part of a program recommended by regulatory and fed-

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In cases where state law requires health care facilities to engage in these policies or where the facility is operated by the government, decisions are also subject to constitutional review. See *Glover v. Eastern Neb. Community Office of Retardation*, 867 F.2d 461 (8th Cir.) (holding that mandatory blood testing is a search and seizure, which must comply with the reasonableness standards of the Fourth Amendment), *cert. denied*, 493 U.S. 932 (1989). Given the position that adjudication of these questions under disability law provides a more focused review than under constitutional law, this part of the Article uses the Americans with Disabilities Act as the primary lens. See Lawrence O. Gostin, *The Americans with Disabilities Act and the Corpus of Anti-Discrimination Law: A Force for Change in the Future of Public Health Regulation*, 3 HEALTH MATRIX—J. LAW & MED. 89, 91 (1993) [hereinafter Gostin, *The Americans with Disabilities Act*] (proposing "a standard of review under the ADA for the future regulation of public health powers").

513. 42 U.S.C. § 12112(d)(2)(A). The ADA does not, however, proscribe inquiries as to whether the applicant can safely perform certain job-related functions such as administering aerosolized pentamidine for a physician specializing in infectious diseases. *Id.* § 12112(d)(2)(B).

514. *Id.* § 12112(d)(2) & (3).

515. *Id.* § 12112(b)(6).

516. *Id.* § 12112(d).

517. *Id.* § 12112(d)(4). Employers may, however, conduct voluntary medical examinations which are part of an employee health program that includes tuberculosis screening. *Id.*

eral health authorities designed to prevent nosocomial infections of patients and workers.<sup>518</sup>

Courts are also likely to uphold tuberculosis screening of health care professionals under the Constitution. Constitutional claims under the Fourteenth Amendment only arise when the state either requires private facilities to test for tuberculosis or when a state-operated hospital performs the test itself.<sup>519</sup> Tuberculosis testing, which may be either required by the state or performed by state hospitals, is unlikely to trigger strict constitutional scrutiny since such testing does not impact on a fundamental right.<sup>520</sup> Therefore, tuberculosis testing of health care professionals will probably be upheld because such testing is reasonably designed to detect infectious conditions that pose a potential risk to patients and other providers, and because, as one court that upheld the constitutionality of tuberculosis screening in hospitals in New York stated, such testing is "not arbitrary and capricious, but [is] rational and well tailored to meet . . . health problems faced by different medical institutions."<sup>521</sup>

Not only is tuberculin skin testing legally permissible but it is also viewed as ethically justified because the identification of tuberculosis infection provides substantial therapeutic benefits to the infected individual. After identification, the infected individual can receive preventive treatment, which significantly reduces the probability of progression to clinically active tuberculosis.<sup>522</sup> In addition, screening protects the public health because persons, whose infection has been identified, are less likely to become infectious. Moreover, it is easier to maintain surveillance over persons whose infection has been identi-

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518. Under Equal Employment Opportunity Commission (EEOC) regulations, periodic medical monitoring of current employees is permitted under the ADA if it is job-related and consistent with business necessity. 29 C.F.R. § 1630.14(c).

519. Where the state takes a sample of blood or other bodily fluid to perform the test, the Fourth Amendment also may be applicable. See *Skinner v. Railway Executives Ass'n*, 109 S. Ct. 1402 (1989) (holding that drug or alcohol tests mandated or authorized by the Federal Railroad Administration Regulations were reasonable under the Fourth Amendment, even without a warrant, because of a compelling government interest). But see *Glover v. Eastern Neb. Community Office of Retardation*, 867 F.2d 461 (8th Cir. 1989) (invalidating mandatory testing of employees for hepatitis K and HIV virus under the Fourth Amendment because risk of disease transmission to clients was negligible).

520. See *infra* notes 593-595 and accompanying text. For example, the court in *Ritterband v. Axelrod*, 562 N.Y.S.2d 605 (1990), deemed the invasion of privacy inherent in an *M. TB* test de minimis because the publication of the results was only to a limited number of public officials. *Id.* at 611.

521. *Ritterband*, 562 N.Y.S.2d at 608. Courts have also upheld the constitutionality of testing in other contexts such as in schools. *Conlon v. Marshall*, 59 N.Y.S.2d 52 (1945).

522. See Ronald Bayer et al., *The Dual Epidemics of Tuberculosis and AIDS: Ethical and Privacy Issues in Screening and Treatment*, 81 AM. J. PUB. HEALTH 649, 650-51 (1993).

fied to ensure that the person is rapidly isolated if he or she progresses to clinically active tuberculosis.<sup>523</sup>

In sum, the biological facts of tuberculosis, which include the airborne mode of transmission, the ability to prevent progression to clinically active tuberculosis, and the ability to cure and remove the infectious condition, all suggest that tuberculin skin testing of health care workers is legally and ethically justified. Compulsory screening for HIV infection in health care settings, however, is a different case because there is no airborne transmission of HIV and because there is no effective biological prevention or cure for HIV. The question discussed in the following section is whether the increased risk of tuberculosis among persons with HIV provides a new justification for HIV screening of health care workers.

*c. Compulsory Screening and Exclusion of Health Care Professionals Infected with HIV.*—Some health care workers are at considerable risk of contracting *M. TB* or developing clinically active tuberculosis. Consider the case of an HIV-infected health care professional working in an environment with a high prevalence of tuberculosis. The worker may routinely be called upon to diagnose and treat tuberculosis, and may be required to engage in cough or sputum inducing procedures that elevate the risk of tuberculosis transmission. If the health care professional with HIV infection contracts *M. TB*, particularly a drug resistant strain, then he or she is likely to develop difficult to treat clinically active tuberculosis. The biological realities of co-infection suggest that HIV-infected health care professionals are at considerable risk when working in health care settings with a high prevalence of tuberculosis. HIV-infected health care professionals also may pose a risk to other professionals and patients, particularly HIV-infected patients, if the workers develop active tuberculosis and spread the infection to others before being detected and isolated.

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523. The purpose of *M. TB* screening is ostensibly to provide preventive treatment for infected persons, and to increase surveillance to protect against undetected progression to active disease. In order to uphold screening programs, the health care facility would have to demonstrate that it responded to a positive tuberculin skin test by providing isoniazid preventive treatment and more active surveillance. The ADA would not permit a blanket decision to exclude a qualified *M. TB*-infected person with no signs of active, contagious disease because there is no significant risk to the worker or others. Cf. *School Bd. of Nassau County v. Arline*, 480 U.S. 273 (1987) (holding that under Section 504 of the Rehabilitation Act of 1973, 29 U.S.C. § 794, school board must inquire as to whether the risk of tuberculosis infection precluded a teacher from being qualified, and holding that, if so, the school board must provide the teacher with reasonable accommodations in teaching or some other position).

Accordingly, some may argue that health authorities should know the HIV status of health care workers. After all, tuberculosis screening programs for health care workers, which are recommended by the CDC and required in many states,<sup>524</sup> will fail to identify tuberculosis in HIV-infected persons who are anergic and therefore do not react to the tuberculin skin test.<sup>525</sup> Consequently, health care facilities that develop comprehensive tuberculosis identification programs may be unaware of the workers who pose the greatest health risk—the workers who are dually infected with HIV and tuberculosis. Because of the risks associated with co-infection and because of the difficulty of identifying tuberculosis in HIV-infected persons, health authorities, long resistant to the concept of compulsory HIV policies, may begin to revisit the issue of mandatory HIV screening and mandatory exclusion of HIV-infected workers from health care settings.<sup>526</sup>

The debate in academic and policy quarters about the civil rights of HIV-infected health care professionals has been contentious. To some, the admittedly remote risk of HIV transmission justifies the exclusion of HIV-infected professionals from medical practice. The most thoughtful proponents of exclusion and the CDC<sup>527</sup> at least limit the use of compulsory interventions to those health care workers engaged in the practice of exposure-prone procedures.<sup>528</sup>

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524. See *supra* text accompanying note 509.

525. See *supra* note 104 and accompanying text.

526. See Rorie Sherman, *TB Hysteria, Repeated?*, NAT'L L.J., June 29, 1992, at 1, 33 (citing questions that could arise concerning whether employers can restrict employment rights of HIV-infected health care workers who may come into contact with active tuberculosis patients); Sanford Kuvin, *Control of TB Depends on AIDS Testing*, N.Y. TIMES, Apr. 1, 1992, at A24 (letter to the editor) (arguing that mandatory HIV testing and reporting should be universal).

527. Centers for Disease Control, U.S. Dep't of Health and Human Services, *Recommendations for Preventing Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Patients During Exposure-Prone Invasive Procedures*, 40 MORBIDITY & MORTALITY WKLY. REP. 1 (RR-8 1991); see also Larry Gostin, *CDC Guidelines on HIV or HIV-Positive Health Care Professionals Performing Exposure-Prone Invasive Procedures*, 19 LAW, MED. & HEALTH CARE 140 (1991); Chai R. Feldblum, *A Response to Gostin, "The HIV-Infected Health Care Professional: Public Policy, Discrimination, and Patient Safety,"* 19 LAW, MED. & HEALTH CARE 134 (1991).

528. See *Estate of Behringer v. Medical Ctr. at Princeton*, 592 A.2d 1251 (N.J. Super. Ct. Law Div. 1991) (holding restriction of AIDS-infected surgeon's surgical privileges to patients who give informed consent to be proper); Larry Gostin, *The HIV-Infected Health Care Professional: Public Policy, Discrimination, and Patient Safety*, 18 LAW, MED. & HEALTH CARE 303 (1991) (arguing for a middle policy between extreme restrictions and a total absence of controls). Some courts have gone as far as upholding adverse academic or employment decisions against dental students and surgical technicians with HIV infection. *Bradley v. University of Texas M.D. Anderson Cancer Ctr.*, 3 F.3d 922, 924-25 (5th Cir. 1993), *cert. denied*, 114 S. Ct. 1071 (1994); *Doe v. Washington Univ.*, 780 F. Supp. 628, 632-35 (E.D. Mo. 1991).

The risk of tuberculosis adds an intriguing new dimension to the contentious debate about compulsory HIV policies. The risk of HIV-infected health care professionals transmitting *M. TB* is certainly higher than the risk of their transmitting HIV. More important, the risk of *M. TB* transmission is not limited to surgeons or other specialized physicians practicing exposure-prone procedures, but extends to all health care professionals who have contact with a vulnerable patient population.

Unlike tuberculin skin testing, there are no unambiguous public health guidelines that directly answer whether HIV screening would effectively avert the significant risk of tuberculosis transmission. The CDC states that "because of the increased risk of rapid progression from latent TB in HIV-positive or otherwise severely immunocompromised persons, all HCWs [health care workers] should know [whether] they have a medical condition . . . that may lead to severely impaired cell-mediated immunity."<sup>529</sup> The CDC recommends that all health care workers who may be at risk for HIV should be tested. While the CDC recommends voluntary testing, the question arises whether it would violate existing legal or ethical standards to require HIV testing of health care workers to avert the "potential risks, in severely immunocompromised persons, associated with taking care of patients with some infectious diseases, including TB."<sup>530</sup> A careful balancing of the benefits and burdens of compulsory HIV screening in health care settings, however, suggests that such a policy of compulsory testing would not withstand legal or ethical scrutiny.

The use of HIV screening to identify persons at risk of tuberculosis in health care facilities is likely to achieve only marginal public health benefits. Knowledge of a person's HIV status, itself, does not indicate whether the person is, or will become, infected with *M. TB*. Moreover, there are several less invasive public health strategies which are more likely to identify HIV-positive health care workers who are dually infected with tuberculosis or who are at the stage of clinically active tuberculosis. For example, the use of tuberculin skin testing can reliably detect tuberculosis in HIV-infected individuals who are not anergic. These individuals can receive preventive treatment to reduce the risk of progressing to clinically active tuberculosis.<sup>531</sup> The supplementary use of chest X-rays also can identify individuals who

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529. See CDC Draft Guidelines, *supra* note 476, at 52,822.

530. *Id.*

531. See *supra* notes 219-220 and accompanying text.

have tuberculosis.<sup>532</sup> Clinical examination of these individuals would enable health authorities to isolate and treat individuals with active tuberculosis. Some infected individuals may not be identified through a tuberculin skin test or a chest X-ray. However, comprehensive tuberculosis programs, which train and educate workers to identify the symptoms of tuberculosis, would promote the surveillance of tuberculosis throughout the health care setting. If health care facilities implemented comprehensive tuberculosis control strategies, then individuals whose tuberculosis was unidentified and who developed suspicious symptoms, would be quickly isolated and examined for infectious tuberculosis.

A comprehensive tuberculosis prevention program would not eliminate the risk of tuberculosis in health care settings, but would reduce the risk considerably. The alternative policy of compulsory HIV screening substantially burdens the liberty and privacy interests of health care workers, while providing little additional public health protection. Subjecting persons to mandatory HIV screening is an invasion of their privacy. After all, persons who are subject to mandatory testing may unwillingly learn that they are infected with a stigmatic, terminal, and largely untreatable medical condition, which may subject them to discrimination in employment, insurance, and other areas of their lives.<sup>533</sup> Moreover, mandatory HIV screening may violate the ADA because, given the marginal public health utility of HIV screening, health authorities may have difficulty showing that such testing is job-related or consistent with business necessity.<sup>534</sup>

Despite the marginal public health benefits flowing from HIV screening of health care workers, advocates of mandatory HIV screening present one final argument based on the ADA which deserves serious attention. The ADA prohibits employment discrimination against a qualified individual with a disability.<sup>535</sup> However, the ADA also pro-

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532. See CORE CURRICULUM ON TUBERCULOSIS, *supra* note 43, at 24 (discussing chest X-rays as one method of diagnosing clinically active tuberculosis).

533. A more complete assessment of the benefits and burdens of compulsory HIV screening is contained elsewhere. See Allan M. Brandt et al., *Routine Hospital Testing for HIV: Health Policy Considerations*, in AIDS AND THE HEALTH CARE SYSTEM, *supra* note 27, at 125 (arguing for informed consent prior to HIV testing); Steven Eisenstat, *An Analysis of the Rationality of Mandatory Testing for the HIV Antibody: Balancing the Governmental Public Health Interests with the Individual's Privacy Interest*, 52 U. PITT. L. REV. 327 (1991) (stating that neither group nor exposure-based testing plans have been based upon sound public health policy); Lawrence O. Gostin & William J. Curran, *The Case Against Compulsory Casefinding in Controlling AIDS: Testing, Screening and Reporting*, 12 AM. J.L. & MED. 7 (1987) (arguing in favor of voluntary screening).

534. See *supra* note 518 and accompanying text.

535. 42 U.S.C. § 12112(a) (Supp. IV 1992); 29 C.F.R. § 1630.4.

vides that qualification or eligibility standards can include a requirement that a person with a disability "not pose a direct threat to the health or safety of other individuals in the workplace."<sup>536</sup> Therefore, a health care employee who poses a direct threat to others could be excluded from working in health care facilities. Accordingly, assuming that an HIV-infected health care worker satisfies the prerequisites for a medical position, and that he or she can perform the essential functions of the position, the critical inquiry is whether such employee poses a direct threat to others, and, if so, whether the threat can be ameliorated to an acceptable level through reasonable accommodations.<sup>537</sup>

Under the ADA, direct threat is defined as "a significant risk to the health or safety of others that cannot be eliminated by reasonable accommodation."<sup>538</sup> The determination that a person poses a direct threat to the health or safety of others may not be based on generalizations or stereotypes about the effects of a particular disability. Rather, the determination that a person poses a direct threat must be based on an individualized assessment of the risk that the person poses, and on reasonable judgments that rely on current scientific or other objective evidence.<sup>539</sup>

In *School Board of Nassau County v. Arline*,<sup>540</sup> the Supreme Court set out four factors to be considered when determining whether a person poses a direct threat, or a significant risk to others:<sup>541</sup> first, "the nature of the risk (how the disease is transmitted), [second,] the duration of the risk (how long is the carrier infectious), [third,] the severity of the risk (what is the potential harm to third parties) and [fourth] the probabilities the disease will be transmitted and will cause varying degrees of harm."<sup>542</sup> If a health care facility were to determine that HIV-infected individuals posed a direct threat to other employees and patients due to the dangers of HIV and *M. TB* co-infection, then, under the ADA, HIV infected health care workers could be excluded from working in health care facilities.

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536. 42 U.S.C. § 12113(b).

537. See generally Gostin, *Impact of the ADA*, *supra* note 512, at 183-84; Gostin, *The Americans with Disabilities Act*, *supra* note 512, at 111-20.

538. 42 U.S.C. § 12111(3).

539. *Mantoliete v. Bolger*, 767 F.2d 1416, 1422-23 (9th Cir. 1985) (holding that in order to exclude handicapped individuals on the basis of future injury under the Rehabilitation Act there must be an objective showing that the person presents a reasonable probability of substantial harm).

540. 480 U.S. 273 (1987).

541. For a detailed discussion of the "direct threat" standard, see Gostin, *The Americans with Disability Act*, *supra* note 512, at 111-20.

542. *Arline*, 480 U.S. at 288.

The Equal Employment Opportunity Commission (EEOC) takes the view that the ADA's direct threat standard includes not only a significant risk to others, but also a significant risk to the health of workers themselves.<sup>543</sup> Because working in an environment conducive to the spread of tuberculosis may pose a significant risk to the health of an HIV-infected health care professional,<sup>544</sup> some may argue, on the basis of the EEOC's interpretation of the ADA, that the ADA permits health care facilities to discriminate against HIV-infected health care workers to protect the health and safety of those workers. However, the EEOC's interpretation of the ADA is questionable. The language of the ADA refers only to "a significant risk to the health or safety of others that cannot be eliminated by reasonable accommodation."<sup>545</sup> Moreover, disability law is premised on the equal treatment of persons with disabilities. As a general matter, the ADA rejects paternalistic assumptions that employers or others can decide for persons with disabilities what is in their best interests.<sup>546</sup> In other civil rights contexts, the Supreme Court has recognized that the beneficence of an employer's purpose does not undermine the conclusion that an adverse employment decision against a qualified worker is discriminatory.<sup>547</sup> Therefore, as long as the health care worker's disability does not pose a significant risk to patients or other workers, respect for the worker's autonomy suggests that HIV-infected workers legally ought to be permitted to assume the personal risk of tuberculosis infection.

From an ethical perspective, the decision of an HIV-infected health care professional to work in a setting where they might be exposed to tuberculosis should not only be legally permitted but also should be regarded as socially responsible. At a time when health care professionals have refused to work with patients with HIV, tuber-

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543. 29 C.F.R. § 1630.2(r). The EEOC could have relied on limited jurisprudence under federal and state disability legislation to support its position. *See, e.g., Bucyrus-Erie v. State*, 280 N.W.2d 142, 149-50 (Wis. 1979) ("We do not believe that the legislature when proscribing discrimination against those physically handicapped intended to force an employer into the position of aiding a handicapped persons to further injury, aggravating the intensity of the handicap or creating a situation injurious to others.").

544. *See supra* text accompanying notes 466-468, 470.

545. 42 U.S.C. § 12111(3).

546. *See* 42 U.S.C. § 12101(b) (the purpose of the ADA is to "provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities"); *see also* Leonard S. Rubenstein, *Mental Disorder and the ADA*, in *IMPLEMENTING THE AMERICANS WITH DISABILITIES ACT: RIGHTS AND RESPONSIBILITIES OF ALL AMERICANS*, *supra* note 512, at 209, 216.

547. *See* *International Union, United Auto, Aerospace and Agric. Implement Workers of America v. Johnson Controls, Inc.*, 499 U.S. 187 (1992) (holding employer's policy banning all women not documented to be infertile from jobs involving actual or potential lead exposure to be violative of the Civil Rights Act of 1964).

culosis, and other contagious diseases,<sup>548</sup> a decision by an HIV-infected professional to assume a heightened personal risk can provide a positive model for others.<sup>549</sup> This positive model could have a particular effect in poorer inner city neighborhoods where there is a shortage of professionals to care for patients with HIV or *M. TB* infections.

The exclusion of HIV-infected professionals from the health care workplace based on a heightened risk of tuberculosis is not only legally and ethically unjustified, but can also result in unintended harms. Once it is determined that exclusion is necessary for the safety of workers, it is possible to argue that compulsory HIV screening is logically required. If health care facilities implement compulsory HIV screening, then the entire health care professional population will have their autonomy and privacy invaded even though relatively few workers will test HIV-positive. Moreover, a policy of compulsory exclusion may dissuade persons at risk of HIV from coming forward for testing and treatment, or from confiding their serological status to health authorities. Accordingly, a policy like compulsory screening that is benignly intended to protect the health of workers, could result in greater aggregate harm to the workers and their patients.

Health authorities can implement less discriminatory, and more effective, policies to protect the health of HIV-infected professionals from tuberculosis. Education, individualized counseling, and the offer of voluntary testing would alert HIV-infected professionals to the serious risk of tuberculosis. Moreover, pursuant to the ADA, health authorities have a legal requirement to provide reasonable accommodations to eliminate significant risks to workers with disabilities.<sup>550</sup> The elimination of significant risks may entail offering HIV-infected health care workers clinical assignments in areas where there is a lower prevalence of tuberculosis or may entail offering HIV-infected health care workers nonclinical assignments that eliminate the health risk.

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548. See Barbara Gerbert et al., *Primary Care Physicians and AIDS: Attitudinal and Structural Barriers to Care*, 266 JAMA 2837 (1991) (discussing how some primary care physicians have negative attitudes about HIV-infected individuals that prevent some physicians from providing effective treatment to them); Albert R. Jonsen, *The Duty to Treat Patients with AIDS and HIV Infection*, in AIDS AND THE HEALTH CARE SYSTEM, *supra* note 27, at 155 (discussing the reluctance of some health care workers to care for AIDS patients).

549. Bayer et al., *supra* note 522, at 651 ("[T]he decision on the part of HIV-infected workers to work in settings where they may be exposed to tuberculosis should be viewed not as reckless but rather as socially laudable.").

550. 42 U.S.C. §§ 12111(3), 12112(5).

One obvious difficulty with the above analysis is that HIV-infected health care workers could use the ADA both as a sword and a shield. In effect, persons with disabilities can argue that the direct threat standard does not allow employers to discriminate against workers with a disability to protect such workers from significant risks. At the same time, persons with disabilities can argue that the ADA requires health care facilities to provide reasonable accommodations to avert a direct threat to their own health. While some may protest that persons with disabilities cannot have it both ways, there are reasonable grounds for both assertions. The ADA is itself paradoxically designed both to provide equal and special treatment for persons with disabilities.<sup>551</sup> In requiring equal treatment, the Act probably prevents employers from discriminating against qualified workers who do not pose a significant risk to others. In requiring special treatment, the Act requires employers to provide reasonable accommodations to make the workplace safer for persons with disabilities. Accordingly, a legal policy that both prohibits employers from forcibly imposing safety requirements and allows individuals with disabilities to request accommodations for their own safety, is not inconsistent with the equal/special treatment mandate of the ADA.

### III. COMPELLING BEHAVIOR CHANGE TO IMPEDE THE TUBERCULOSIS EPIDEMIC: POWERS AND DUTIES OF THE STATE AND INDIVIDUAL RESPONSIBILITY

An analysis of the biological and social foundations of the tuberculosis epidemic reveals three interrelated health concerns of considerable importance. The first concern relates to the threat posed by tuberculosis to the health of persons who become infected with the disease. While tuberculosis is usually curable, the disease can cause serious illness or death of individuals who live with a compromised immune system, who contract a multidrug-resistant strain of bacteria, or who fail to take consistently the full course of their medication. The second concern relates to the threat posed by persons infected with tuberculosis to the health of others who are in close proximity. The risk to public health is greatest in congregate settings where many vulnerable residents and workers share the same airspace. If a person infected with *M. TB* reactivates and develops multidrug-resistant tuberculosis because of incomplete treatment, he or she will transmit a strain of infection that is difficult or impossible to treat. Finally, the

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551. See Chai R. Feldblum, *Employment Protections*, 69 MILBANK Q. 81 (Supp. 1/2 1991) (discussing generally the purposes and impact of the ADA).

third concern relates to the threat that the resurgent multidrug-resistant tuberculosis epidemic poses to society through the risk to the effectiveness of standard antibiotic medication. As the number of cases of drug-resistant tuberculosis increases, the effectiveness of existing pharmaceutical preventions and cures are diminished. While most tuberculosis cases currently are treatable, the long-term cost of government nonintervention could be considerable. For as the percentage of cases of multidrug-resistant tuberculosis rise, society faces the specter of revisiting a preantibiotic era when tuberculosis was a scourge on humankind.

When the resurgent tuberculosis epidemic is seen within this public health context, it becomes apparent that the government has a compelling interest in controlling the spread of tuberculosis infection and in controlling the growth of drug-resistant tuberculosis. Requiring individuals with tuberculosis to engage in conforming behavior is central to the state's interests. From the state's perspective, a sporadic or incomplete course of tuberculosis treatment is worse than no treatment at all because sporadic or incomplete treatment fosters the development of drug-resistant tuberculosis. While states have wide authority to encourage or coerce behavior, they frequently choose compulsory policies, like for example, mandatory screening, physical examinations, treatment, and isolation, over voluntary policies.

While compulsory interventions have been widely employed to control tuberculosis throughout this century, they seldom have been examined in light of the modern legal framework of the constitutional protection of liberty interests and the constitutional guarantee of procedural due process.<sup>552</sup> Similarly, compulsory interventions have not been adequately considered in the context of modern civil rights doctrine, principally civil disability laws which protect persons with infectious disease.

Part III of this Article uses modern disability law and constitutional law as a lens to examine the use of compulsory state interven-

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552. Notable exceptions include the excellent work of the following scholars: Scott Burris, *Rationality Review and the Politics of Public Health*, 34 VILL. L. REV. 933 (1989); Deborah J. Merritt, *Communicable Disease and Constitutional Law: Controlling AIDS*, 61 N.Y.U. L. REV. 739 (1986); Wendy E. Parmet, *AIDS and Quarantine: The Revival of an Archaic Doctrine*, 14 HOFSTRA L. REV. 53 (1985); Wendy E. Parmet, *Health Care and the Constitution: Public Health and the Role of the State in the Framing Era*, 20 HASTINGS CONST. L.Q. 267 (1993). For more recent scholarship focused on the tuberculosis epidemic see Carlos A. Ball & Mark Barnes, *Public Health and Individual Rights: Tuberculosis Control and Detention Procedures in New York City*, 12 YALE L. & POL'Y REV. 38 (1994); Josephine Gittler, *Controlling Resurgent Tuberculosis: Public Health Agencies, Public Health Policy, and Law*, 19 J. HEALTH POL., POL'Y & L. 107 (1994); Rosemary G. Reilly, *Combating the Tuberculosis Epidemic: The Legality of Coercive Measures*, 27 COLUM. J.L. & SOC. PROBS. 101 (1993).

tions to control the resurgent tuberculosis epidemic. The goal of state interventions is to maximize the effectiveness of the fight against tuberculosis because of the disease's ability to affect the morbidity and mortality of the population. At the same time, all state interventions must be measured against accepted disability law and constitutional law. Public health law long has struggled over these potentially conflicting goals of maximizing the effectiveness of state powers designed to impede the threat of disease epidemics while recognizing civil libertarian concerns over the freedom, autonomy, and privacy of individuals.<sup>553</sup>

*A. The Application of Disability Law to Public Health Regulation*

Actions of health departments that directly affect the opportunities of persons with communicable diseases in the areas of employment and public accommodations clearly are covered under Titles I and III, respectively, of the Americans with Disabilities Act (ADA).<sup>554</sup> However, when health departments exercise public health powers, it is questionable whether they must also comply with Title II of the ADA, the public services title.<sup>555</sup>

A persuasive case can be made that the ADA applies to the exercise of public health powers against a person who has communicable disease.<sup>556</sup> The ADA was intended to cover virtually all private and public entities that could discriminate against persons with disabilities on the basis of prejudices, irrational fears, and stereotypical assumptions.<sup>557</sup> The Act was intended to require that decisions regarding persons with disabilities be based on objective and individualized as-

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553. See, e.g., *Jardine v. City of Pasadena*, 248 P. 225, 226 (Cal. 1926) (observing that "it is almost inevitable, since the very foundation of the police power is the control of private interests for the public welfare, that the public rights will come into conflict with private rights" in a private nuisance action brought against the city for the establishment of a isolation hospital).

554. 42 U.S.C. §§ 12112(a), 12182(a) (Supp. IV 1992).

555. Title II provides in pertinent part: "[N]o individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subject to discrimination by any such entity." 42 U.S.C. § 12132 (Supp. IV 1992). The following two sections are based on my previous writing on the Americans with Disabilities Act. See Gostin, *The Americans with Disabilities Act and the Corpus of Anti-Discrimination Law*, *supra* note 512, at 92-99, 103-07, 123-29.

556. See National Lawyers Guild, *Return of a Plague: The Perils of Tuberculosis in the 90s*, 21 EXCHANGE 5 (1993) (supporting the view presented here that the ADA applies to public health regulation).

557. 29 C.F.R. app. § 1630.2(r).

sessments.<sup>558</sup> Given the all-inclusive nature of the ADA, it is unlikely that Congress intended the ADA to permit public health departments to coerce individuals with disabilities absent a showing that the person poses a significant risk to the public.

Title II of the ADA covers public entities, which are defined as "any State or local government; [or] any department, agency . . . or instrumentality of a State . . . or local government."<sup>559</sup> Because they are subdivisions of state or local governments, health departments are clearly public entities under Title II of the ADA.

Qualified individuals with disabilities under Title II include persons who are eligible to "participate in programs or activities provided by public entities."<sup>560</sup> The activities of a health department assuredly include disease control programs. Therefore, Title II of the ADA prohibits governmental agencies from discriminating against qualified individuals with disabilities in any of its activities.<sup>561</sup>

It would be bizarre to read the ADA in a manner that rigidly distinguishes among the various activities of government. When the state provides a service or benefit to a person, such as Medicaid or food stamps, the state undoubtedly has to do so in a nondiscriminatory manner.<sup>562</sup> When the state, based upon disease status, excludes a person from a job, denies a person a professional license, or prohibits a person from entering public accommodations, it must comply with ADA standards.<sup>563</sup> The ADA similarly covers decisions made by entities traditionally regulated by health departments such as schools, hospitals, day care centers, and food service establishments.<sup>564</sup>

Principles of parallel construction suggest that, when a state exercises coercive powers with the potential seriously to affect a person's liberty, autonomy, or privacy, the state ought to be required to comply with the nondiscrimination principles in the ADA. The exercise of

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558. *See School Bd. of Nassau County v. Arline*, 480 U.S. 273, 288 (1987) (stating that under the Rehabilitation Act of 1970 judgments about whether a handicapped individual is disqualified for a job because they represent a risk to others must be based on "reasonable medical judgments of public health officials").

559. 42 U.S.C. § 12131(1)(A) & (B).

560. *Id.* § 12131(2).

561. *Id.* § 12132.

562. *Id.* The most striking example of this requirement was the initial denial of a Medicaid waiver to the State of Oregon when its proposed health plan discriminated against persons with disabilities. Letter from Louis W. Sullivan, Secretary, U.S. Department of Health and Human Services, to Barbara Roberts, Governor of Oregon (Aug. 7, 1992) (on file with the author). The Oregon plan, following revisions to comply with the ADA, received its waiver.

563. 42 U.S.C. §§ 12112(a), 12182(a).

564. *Id.* § 12181(7).

public health powers is a substantial function of health departments. If Congress had intended to carve out, or exclude, public health powers from ADA coverage, then it would have done so expressly and clearly. It would be a tortuous reading of the ADA to posit that Congress required health departments to act in a nondiscriminatory manner when they denied a medical license or withheld a small benefit or service, but not when they deprived a person of liberty.

Admittedly, there are problems with the above construction of the ADA. Title II applies to public services, and it is arguable that it would stretch the meaning of the public service language to include the exercise of regulatory authority over the individual. However, it is possible to conceive of the exercise of public health powers as the exercise of a "service," which involves the expenditure of resources. The service is designed to protect the public and that protection is achieved both by voluntary and involuntary participation in public health programs.<sup>565</sup> Under this construction, discrimination in exercise of public health powers would occur when an individual who did not pose a direct threat was subjected to coercion.

1. *The Food Handlers Controversy and Preemption: A Federalist Approach.*—It might be argued that the limited nonpreemption provisions in the ADA, particularly the provision related to food handlers,<sup>566</sup> demonstrate an intent to treat the exercise of public health powers by health departments differently.<sup>567</sup> However, a careful reading of the Act belies any such intention on the part of Congress. The ADA does not invalidate or limit state laws that provide equal or greater protection for the rights of individuals with disabili-

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565. Admittedly, the concept of compulsory powers as a service runs into difficulties in construction. Persons who are subject to compulsion have to argue that they were included in the service unjustifiably—i.e., they are eligible not to be included in the service because they do not pose a direct threat.

566. 42 U.S.C. § 12113(d)(2) & (3). The food handlers provision provides: "In any case in which an individual has an infectious or communicable disease that is transmitted to others through the handling of food . . . and which cannot be eliminated by reasonable accommodation, an entity may refuse to assign or continue to assign such individual to a job involving food handling." *Id.* § 12113(d)(2).

567. See Ball & Barnes, *supra* note 552, at 58-59 ("[I]t is not clear that the use of detention as a public health intervention falls under the definition of public services as set forth in Title II of the ADA."). The authors argue that the ADA is not applicable because the use of coercion "does not center on the fact that an individual has tuberculosis, but instead, on the fact that she has failed to complete treatment." *Id.* at 58. This argument is circular because the very question the ADA asks is whether the person poses a significant risk to others because of a failure to complete treatment. If the health department can demonstrate a significant risk, it can surely act because standards of the Act are met.

ties than the protection provided by the ADA.<sup>568</sup> State public health laws are consistent with the dictates of the ADA only if state public health laws protect the rights of persons with communicable disease as well or better than the ADA. Accordingly, state public health laws would be preempted by the ADA only to the extent that state public health laws adopt a standard less rigorous than the ADA's direct threat test.

Congress engaged in considerable debate over applying the ADA to persons with communicable disease largely because the ADA was enacted at a time when there was a real controversy over the rights and responsibilities of persons with HIV infection and AIDS.<sup>569</sup> The issue was resolved by including persons with HIV and other infectious conditions under the coverage of the ADA, but excluding food handlers who posed a significant risk of transmitting food-borne disease.<sup>570</sup> Accordingly, the ADA expressly does not preempt local, county, or state law governing food handling "[that] is designed to protect the public health from individuals who pose a significant risk to the health or safety of others, which cannot be eliminated by reasonable accommodation."

Even if the food handling example was construed to include public health regulation beyond food establishments,<sup>571</sup> such a construction, which is unlikely, does not suggest that Congress intended to treat public health regulation differently from other governmental regulation. It is clear from the language of the nonpreemption provision<sup>572</sup> that Congress intended to require health departments to comply with the same direct threat standard as other private and public entities. Indeed, Congress's express discussion of one form of health regulation, the regulation of food handling, as if it were already covered, suggests that the ADA covers all other forms of public health regulation. The purpose of the food handlers compromise was to ensure that "valid scientific and medical analysis, using accepted public health methodologies and statistical practices regarding risk of trans-

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568. 42 U.S.C. § 12201(b).

569. See William Dannemeyer, Joseph Barton, & Donald Ritter, House Report (Energy and Commerce Committee) No. 101-485 (IV), May 15, 1990 (to accompany H.R. 2273), at 126 (Congressmen asking whether employers could be required to employ persons with AIDS if they risked "exposing others to tuberculosis, cytomegalovirus, and other AIDS-associated illness.").

570. 42 U.S.C. § 12113(d)(3).

571. This is indeed highly unlikely since the provision is triggered only if the Secretary of Health and Human Services includes the disease on a specially prepared list of food-borne diseases. 42 U.S.C. § 12113(d)(1)(B).

572. 42 U.S.C. § 12113(d)(3).

mission" would be brought to bear in analyzing food-borne transmission of disease.<sup>573</sup> All public health regulations should be based on the same type of analysis.

The House Conference Report emphasizes that the food handlers amendment "clearly defines certain types of existing and prospective state and local public health laws that are not pre-empted by the ADA."<sup>574</sup> The ADA does not preempt laws relating to food handling if they are designed to protect the community from significant public health risks that cannot be eliminated by reasonable accommodation.<sup>575</sup> This nonpreemption strategy supports legitimate state and local laws and regulations intended to protect the public from communicable disease, and thus, is consistent with the "letter and the spirit" of the ADA.<sup>576</sup>

2. *The Direct Threat Standard.*—The ADA's most focused standard of review of public health powers is the "direct threat" test.<sup>577</sup> The ADA clearly provides a right to take action against persons who pose a direct threat to the health and safety of others in the realm of employment and public accommodations.<sup>578</sup> The concept of direct threat, however, is not expressly extended to public services in Title II.<sup>579</sup> While strong arguments on the applicability of the ADA's direct threat test to the exercise of public health powers can be made, it is by no means certain that the judiciary ultimately will accept these arguments. However, if the judiciary refuses to apply the direct threat test or some equally rigorous standard to public health regulations, then the legal analysis of public health powers will suffer. Use of an exacting standard in public health law is essential as the exercise of compulsory powers becomes increasingly more complex. Whether the standards under which public health regulations are judged are found in disability law, constitutional law, or communicable disease law is not important. What is important is that legislatures and courts establish rigorous and objective criteria for review of the exercise of public health powers.

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573. H.R. CONF. REP. NO. 596, 101st Cong., 2d Sess. 14 (1990), *reprinted in* 1990 U.S.C.A.N. 565, 570-71.

574. *Id.* at 17-18.

575. 42 U.S.C. § 12113(d)(3).

576. H.R. CONG. REP. NO. 596, at 17-18.

577. 42 U.S.C. §§ 12113(b), 12182(b)(3). For a thorough discussion of the "direct threat" test, see *supra* notes 535-547 and accompanying text.

578. 42 U.S.C. §§ 12113(b), 12182(b)(3).

579. *See id.* §§ 12132-12134.

*B. Constitutional Review of Public Health Powers: A Decidedly Deferential Approach*

Constitutional review of the exercise of public health powers is plagued by a continuing sense of doctrinal uncertainty. The early courts were highly deferential when reviewing state public health regulation under the police powers.<sup>580</sup> From the seminal case of *Jacobson v. Massachusetts*<sup>581</sup> onward, the Supreme Court provided a set of minimalist principles guiding the constitutional review of health regulation.<sup>582</sup> In *Jacobson*, the Court held that the state intervention must have a "real or substantial relation" to public health objectives and cannot be a "plain, palpable invasion of rights."<sup>583</sup> The Court further held that the state must refrain from "acting in an arbitrary, unreasonable manner," or from going "so far beyond what [is] reasonably required for the safety of the public."<sup>584</sup>

The "arbitrary, oppressive and unreasonable" standard established in *Jacobson* is highly deferential. States need only show a good faith intention to promote the public health and some medical evidence demonstrating that the restriction on individual rights may be beneficial to the health of the community.

While we would like to believe that modern constitutional doctrine goes much further than *Jacobson* in establishing rational boundaries around the exercise of public health powers, in fact, since *Jacobson*, no uniform and coherent set of criteria for reviewing public health powers have emerged from the courts. In particular, the courts have failed to establish clear criteria for balancing the restrictions on individual rights, with the level of risk to the public, and the efficacy of the control measure. Overly burdensome restrictions have been placed on some public health measures while virtually no restrictions have been placed on others. Because of the lack of uniform criteria for reviewing the constitutionality of public health regulations, it is

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580. See *Arizona ex rel. Conway v. Southern Pac. Co.*, 145 P.2d 530, 532 (Ariz. 1943) ("Where the police power is set in motion in its proper sphere, the courts have no jurisdiction to stay the arm of the legislative branch."); *Ex parte Caselli*, 204 P. 364, 364 (Mont. 1922) (finding that the Constitution had "no application to this class of case.").

581. 197 U.S. 11 (1905).

582. *Id.* at 28-31.

583. *Id.* at 30-31.

584. *Id.* at 28. See *Stull v. Reber*, 64 A. 419 (Pa. 1906) (holding that an act which provides that children who have not been vaccinated shall be excluded from public schools is a valid exercise of police power); *Kirk v. Wyman*, 65 S.E. 387, 390 (S.C. 1909) (holding that the criteria for constitutional review of an isolation statute are: "first, whether interference with personal liberty or property was reasonably necessary to the public health, and, second, if the means used and the extent of the interference were reasonably necessary for the accomplishment of the purpose to be attained.").

difficult to predict the outcome of cases, and therefore the case law provides little guidance to legislators and public health officials.

While public health jurisprudence exists in cases involving constitutional provisions such as the Fourth Amendment,<sup>585</sup> questions of mandatory treatment and detention are likely to arise under the Fourteenth Amendment. During the last several decades a highly mechanistic approach to judicial decision making under the Fourteenth Amendment has emerged.<sup>586</sup> Under the lowest level of scrutiny, which is known as the rational basis test, courts will uphold state conduct which does not impinge upon a fundamental right or discriminate against a suspect class so long as the state's conduct is rationally related to a valid governmental purpose.<sup>587</sup> Since protecting public health is a valid governmental purpose, courts under the rational basis test will deferentially review public health regulations that do not infringe upon fundamental rights or discriminate against suspect classes.<sup>588</sup> Under the rational basis test, courts often uphold a state's public health decisions without carefully examining the benefits and risks of such decisions. For example, in cases involving public health decisions to classify<sup>589</sup> and report<sup>590</sup> infectious disease, to require mandatory examination or treatment,<sup>591</sup> and to control sexually transmitted infections in bathhouses,<sup>592</sup> courts have readily yielded to the discretion of health officials. Moreover, issues critical to meaningful public health analysis barely surface when courts are engaged in reviewing public health decisions. Whether a public health decision overly burdens individual rights, whether it comports with the clear

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585. Public health cases involving testing or screening are often grounded in the Fourth Amendment. See *Skinner v. Railway Labor Executives' Ass'n*, 489 U.S. 602, 633 (1989) (upholding drug test on railway employees involved in safety incidents); *Glover v. Eastern Neb. Community Office of Retardation*, 867 F.2d 461, 463 (8th Cir.), cert. denied, 493 U.S. 932 (1989) (holding that human service agency's employee HIV testing program violated the Fourth Amendment).

586. See LAURENCE TRIBE, *AMERICAN CONSTITUTIONAL LAW* § 16 (2d ed. 1988).

587. See, e.g., *Kadrmas v. Dickinson Pub. Sch.*, 487 U.S. 450, 461-62 (1988).

588. James A. Kushner, *Substantive Equal Protection: The Rehnquist Court and the Fourth Tier of Judicial Review*, 53 Mo. L. Rev. 423, 449-50 (1988).

589. See *New York State Soc'y of Surgeons v. Axelrod*, 157 A.D.2d 54, 58 (N.Y. App. Div. 1990) (holding that State Commissioner of Health had the discretion not to designate AIDS as a communicable or sexually transmissible disease).

590. See *Whalen v. Roe*, 429 U.S. 589, 598 (1977) (holding that state law requiring doctors to report patients receiving prescriptions for certain drugs was a valid exercise of police powers).

591. Cf. *Irwin v. Arrendale*, 159 S.E.2d 719, 724 (Ga. Ct. App. 1967) (holding that wholly capricious taking of x-ray of a prisoner constituted assault and battery).

592. See *City of New York v. New Saint Mark's Baths*, 130 Misc. 2d 911, 915 (N.Y. Sup. Ct.), *aff'd*, 122 A.D.2d 747 (1986) (injunction issued closing bath house as a nuisance because of "high risk sexual activity" therein).

weight of scientific opinion, or whether the public health objective could be accomplished in less restrictive ways, all are issues that are never addressed by courts reviewing a public health decision under the Fourteenth Amendment's rational basis test.

The highest level of judicial scrutiny, strict scrutiny, is brought to bear on state action that impinges on fundamental rights, such as the right to travel,<sup>593</sup> and marry,<sup>594</sup> and the right to privacy when making decisions associated with reproduction.<sup>595</sup> Strict scrutiny is also triggered when state action burdens certain suspect classes, such as race<sup>596</sup> or national alienage.<sup>597</sup>

These two traditional tiers of constitutional review are outcome determinative. Thus, public health measures that burden personal freedom—for example, measures mandating isolation—or measures which burden marriage—for example, banning marriage for persons with sexually transmitted infections—or measures which define a class based upon race—for example, measures strictly limiting persons with sickle cell disease—theoretically ought to be subject to strict scrutiny.<sup>598</sup> In cases where strict scrutiny is applied, the public health justification would have to be compelling<sup>599</sup> and the measure would have to be suitably tailored to serve that compelling interest.<sup>600</sup> If, however, the public health measure does not directly burden a fundamental right or a suspect class, then the courts probably will perform a perfunctory review of the measure, in which case the courts readily will yield to public health judgments. Under both standards of review, there is little room for clear and cogent analysis of issues such as the

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593. *Shapiro v. Thompson*, 394 U.S. 618, 629-31 (1969).

594. *Zablocki v. Redhail*, 434 U.S. 374, 383-84 (1978); *Loving v. Virginia*, 388 U.S. 1, 12 (1967).

595. See *Griswold v. Connecticut*, 381 U.S. 479, 485-86 (1965) (noting that intrusion into matters of contraception is "repulsive in the notions of privacy surrounding the marital relationship").

596. See, e.g., *Regents of the Univ. of Cal. v. Bakke*, 438 U.S. 265 (1978) (holding that racial classifications are inherently suspect).

597. See, e.g., *Graham v. Richardson*, 403 U.S. 365, 372 (1971) (treating national alienage as a suspect class).

598. As late as the 1960s, however, courts were treating public health decisions affecting liberty as if they did not require serious scrutiny at all. See *In re Halko*, 54 Cal. Rptr. 661, 664 (Cal. Dist. Ct. App. 1966) (upholding isolation of persons with pulmonary tuberculosis without any inquiry as to whether it was essential to the public health; only question asked by the court was whether the health officer had probable cause to believe the person had an infectious disease). "The legislature is vested with broad discretion in determining what are contagious and infectious diseases and in adopting means for preventing the spread thereof." *Id.* at 663; see also *Moore v. Armstrong*, 149 So. 2d 36 (Fla. 1963) (upholding detention of person in a tuberculosis hospital).

599. See *Griswold*, 381 U.S. at 496 (Goldberg, J., concurring).

600. *City of Cleburne v. Cleburne Living Center*, 473 U.S. 432, 440 (1985).

public health risk, the efficacy of the public health measure, the efficacy of alternative measures, and the burden on individual rights.

Although the Supreme Court appears to be moving away from the rigid tiered approach to constitutional review, the Court's new method of review is largely uninformative and unpredictable. In *City of Cleburne v. Cleburne Living Center*, the Supreme Court engaged in what appears to be a new method of review.<sup>601</sup> In *Cleburne*, the Supreme Court invalidated a zoning ordinance excluding group homes for persons with mental retardation.<sup>602</sup> The Court did not explicitly state the standard of review it was applying. Rather, the Court searched the record to conclude that no rational basis existed to warrant a legislative finding that persons with mental retardation posed a threat to the community, and could, therefore, be excluded.<sup>603</sup> In striking down the ordinance, the Court held that the legislature may not base its decision on "vague, undifferentiated fears" or "irrational prejudice."<sup>604</sup>

While the *Cleburne* doctrine often has been referred to as a third tier of constitutional review, the doctrine does not take the inquiry much further than the post-*Jacobson* "true purpose" test. In a very early expression of a "true purpose" test, one lower federal court in *Jew Ho v. Williamson*<sup>605</sup> held that the state may not, under the guise of protecting the public, arbitrarily interfere with the liberty and business interests of the community.<sup>606</sup> The *Jew Ho* court found that a quarantine that affected only the Chinese community, while fair on its face and impartial in appearance, was administered "with an evil eye and an unequal hand."<sup>607</sup>

Recently, the Supreme Court has refrained from finding new "fundamental" rights, particularly in medically related fields. Rather, the Court has referred to a series of "liberty interests" in cases involving individual decisions to refuse psychotropic medication,<sup>608</sup> to reject admission to mental hospitals,<sup>609</sup> or to withdraw life-sustaining treatment.<sup>610</sup> An individual's right to have doctors and public health offi-

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601. *Id.*

602. *Id.* at 450.

603. *Id.*

604. *Id.*; see also *Brennan v. Stewart*, 834 F.2d 1248, 1258 (5th Cir. 1988) (holding that decisions based on physical and mental disabilities should be reviewed "somewhat closer than usual").

605. 103 F. 10 (C.C.N.D. Cal. 1900).

606. *Id.* at 24.

607. *Id.* (quoting *Yick Wo v. Hopkins*, 118 U.S. 356, 373-74 (1886)).

608. *Washington v. Harper*, 494 U.S. 210, 221 (1990).

609. *Parham v. J.R.*, 442 U.S. 584, 600 (1979).

610. *Cruzan v. Director, Mo. Dep't of Health*, 497 U.S. 261, 278 (1990).

cials leave them alone is, however, only one interest to be balanced against a series of competing state interests. While the Supreme Court mentioned liberty interests in each of the above cases, in each case the state interests prevailed over the liberty interest of the individual. The Court's notion of a "liberty interest" is so weak that the counterbalancing of this interest against a legitimate state public health measure will result in a highly deferential review resembling the rational basis test. Therefore, the medical activity is upheld as long as the state can point to some legitimate justification.

*C. Theoretical Problems in the Exercise of Compulsory Powers in Modern Public Health Practice*

For much of its history, public health law presented few challenging legal problems. In general, courts have deferred to medical authorities in decisions about the exercise of compulsory powers.<sup>611</sup> The paradigmatic use of compulsion was, at its core, rather simple. If an individual was currently contagious, then the government had the undeniable authority to separate that person from others and to provide necessary treatment.<sup>612</sup> The legal challenges posed in modern public health practice, however, are far more complex. This section examines several theoretical problems concerning the contemporary exercise of compulsory public health powers. The initial inquiry concerns the authority of the state to exercise compulsion against individuals who are infected with *M. TB*, but are not currently contagious and therefore pose no immediate threat to the public health. The second inquiry concerns the authority of the state to exercise compulsion against an entire class of individuals where some, but not all, members of the class pose a future risk to the public health. The final inquiry concerns the extent to which the state must exhaust less intrusive interventions before resorting to compulsion. While these theoretical problems are discussed in the abstract, their resolution clearly may vary depending on the intrusiveness of the state intervention.<sup>613</sup> Accordingly, after examining these theoretical issues in the abstract, this Article will examine the classical forms of compulsory powers used in tuberculosis control. In particular, this Article will examine com-

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611. See Gostin, *The Americans with Disabilities Act*, *supra* note 512, at 91-92 (discussing judicial deference to medical activities).

612. See generally Lawrence O. Gostin, *The Future of Public Health Law*, 12 AM. J.L. & MED. 461 (1986) (noting relevant government policies).

613. For example, in upholding a New York City regulation requiring teachers and other school employees to be tested for tuberculosis, the New York Court of Appeals emphasized the noninvasive nature of the procedure. *Conlon v. Marshall*, 59 N.Y.2d 51, 56 (1945).

pulsory detention, including isolation and civil commitment, compulsory administration of therapy under direct observation, and compulsory treatment.

1. *Compulsory State Intervention Against Persons Infected with M. TB who Pose no Immediate Risk to the Public.*—Tuberculosis is defined under many state statutes as a clinically active disease.<sup>614</sup> A facial reading of the applicable law in these states suggests that health officials are authorized to exercise compulsory powers against persons with clinically infectious tuberculosis, but are not necessarily authorized to exercise compulsory powers against those with asymptomatic *M. TB* infections.<sup>615</sup> The statutory language also calls into question whether state statutes authorizing the exercise of compulsory powers apply to previously symptomatic individuals whose medication has rendered them currently noninfectious.

Since the *raison d'être* of public health statutes is to protect the welfare of the community, it may not be surprising that public health law applies only to conditions that pose immediate risks to others. Paradoxically, however, from a public health perspective, interventions against individuals who are currently noninfectious may be far more important than interventions against the infectious. Persons with active tuberculosis are gravely ill, and therefore will seldom refuse isolation treatment. If persons with active clinical disease do not cooperate with medical advice, then health officials undeniably have the power to force their compliance. Persons with *M. TB* who are nonsymptomatic, however, are less likely to comply with medical advice, not only because they feel well but also because of the length of time it takes to complete a course of preventive or curative treatment. The failure of a person infected with *M. TB* to complete treatment increases the risk of reactivation at a time when the person is living unsupervised in the community, perhaps in a crowded prison, shelter, or tenement. The failure to complete treatment also substantially increases the probability that the reactivated disease will be drug-resistant. The risks associated with the failure to complete tuberculosis treatment raise the dilemma concerning whether the state can compulsorily intervene in cases based upon an undifferentiated assessment of future risk.

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614. See Gostin, *supra* note 24, at 256-57 (surveying state statutes).

615. See, e.g., *State v. Snow*, 324 S.W.2d 532, 534 (Ark. 1959) (refusing to order the confinement of a defendant because the state failed to show that the defendant had tuberculosis in a communicable or infectious stage).

Assuming that public health statutes are reformed to make clear the authority of the state to compel asymptomatic individuals, the next question is whether constitutional or civil rights doctrine place any limits on state powers and, if they do, then what is the nature of those limits? On the assumption that the courts would require public health regulation to conform with the dictates of the ADA, the central question is whether intervention against persons who are noninfectious meets the direct threat standard.<sup>616</sup>

Several of the criteria for direct threat, originally established by the Supreme Court in *Arline*,<sup>617</sup> contemplate circumstances where the individual is contagious: The first factor, which focuses on the "mode of transmission," suggests a current capability of transmitting infection; the second factor, which focuses on the "probability of risk," suggests an imminent likelihood of transmitting infection; and the third factor, which focuses on the "duration of risk," suggests that interventions are unlawful once the person is no longer contagious.<sup>618</sup> Indeed, the Supreme Court in *Arline* factually inquired whether the school teacher was "contagious at the time she was discharged."<sup>619</sup>

While traditional public health law inquiries focus principally on present infectiousness, there is no reason to limit the direct threat doctrine in this way. The ADA attempts to balance legitimate safety concerns with its goal of protecting persons with disabilities from unwarranted discrimination.<sup>620</sup> Direct threats, therefore, ought to include significant risks that are reasonably foreseeable.<sup>621</sup> After all, a health department's duty to protect citizens from the risk of foreseeable harm is as strong as its duty to protect citizens from the more imminent risk of infection transmission.

Given the highly deferential approach that courts take when constitutionally reviewing the exercise of public health powers, courts would likely uphold compulsory interventions that are based upon a reasonable assessment of future harm.<sup>622</sup> Moreover, where the state

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616. See *supra* notes 535-547 and accompanying text.

617. See *supra* text accompanying note 542.

618. See *School Bd. of Nassau County v. Arline*, 480 U.S. 273, 288 (1987).

619. *Id.*

620. 28 C.F.R. Part 35 app. A at 31 (1991).

621. See *Peoples v. City of Salina*, No. 88-4280-S, 1990 U.S. Dist. LEXIS 4070, at \*11 (Mar. 20, 1990) (upholding termination of employment to avoid a future sickle cell crisis affecting the health of the worker and others).

622. See *Ex parte Martin*, 188 P.2d 287, 291 (1948) ("[T]he right of personal liberty must of necessity carry with it the obligation to exercise such usual powers only when, under the facts as brought within the knowledge of the health authorities, reasonable ground exists to support the belief that, the person so held is infectious. However, that is not to say that in order to warrant the exercise of such process, it is necessary for a health officer to first

demonstrates a rational nexus between a relatively unintrusive intervention, such as directly observed therapy, and a likely reduction in future harm to the public, there appears to be no judicial propensity to interfere with reasonable medical judgments about the necessity of such interventions.

The constitutional or disability-based rule authorizing compulsion to avert foreseeable harm requires reasonably accurate predictions of future dangerousness. If the state can demonstrate through objective data that the person is likely to develop or reactivate clinically infectious tuberculosis, then there is no reason why the state cannot intervene to prevent the future risk to the public. For example, the development of clinically infectious tuberculosis in a person dually infected with HIV and *M. TB* presents a significant risk to fellow residents in a congregate setting. The risk justifies requiring the completion of a course of isoniazid preventive treatment. Similarly, the health department may base its prediction of foreseeable harm on past failures to complete therapy. In cases in which a past failure to complete therapy is demonstrated, a requirement of directly observed therapy is warranted.

2. *Separating the Dangerous from the Nondangerous: Directing Compulsion Against a Class of Persons with Tuberculosis.*—While science often possesses a veneer of credibility, careful inquiry shows that scientific predictions of future harm are fraught with uncertainty and inaccuracy. There may be instances where past behavior provides a coherent justification for the exercise of compulsory intervention, but, in most cases, health officials simply are unable to determine accurately whether an individual will comply with medical advice. Because of the difficulty of predicting compliance, many will claim that protecting the public health requires acting against an entire class of persons. To some, this class includes groups of persons who many believe are less likely to cooperate with health providers—for example, persons with mental illness, or drug dependency, or persons without stable housing, or access to private health care.<sup>623</sup> Using such classifications as a proxy for recalcitrant behavior is highly problematic. First, status classifications are unreliable predictors of future complex behavior.<sup>624</sup>

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determine that one is afflicted with such a disease before subjecting such person to quarantine, all that is required is that there be probable cause to believe the person so held has an infectious disease . . .") (citations omitted).

623. See Etkind et al., *supra* note 177, at 275; Esther Sumartojo, *When Tuberculosis Treatment Fails: A Social Behavioral Account of Patient Adherence*, 147 AM. REV. RESPIRATORY DISEASE 1311, 1312-14 (1993).

624. See *infra* notes 689-691 and accompanying text.

Second, status classifications are likely to be overbroad.<sup>625</sup> Finally, status classifications are likely to affect disproportionately members of racial minorities and impoverished classes.<sup>626</sup>

Because of the problems inherent in the use of narrow classifications, public health experts have concluded that appropriate compulsory interventions ought to be directed against an even broader class of persons, namely all persons diagnosed with active tuberculosis who have not completed a full course of treatment.<sup>627</sup> While it may be possible to demonstrate objectively that the class as a whole presents a foreseeable risk to the public, exercising compulsion against all persons with active tuberculosis poses legal problems because many members of this class pose no danger to the public. The question, therefore, arises whether compulsion can legally be visited upon an individual simply by virtue of his or her membership in a class and absent an individualized assessment of significant risk.

Perhaps the most revered principle of antidiscrimination law is the principle requiring individualized determinations about the risk that a person poses to others.<sup>628</sup> To free individuals from the biases frequently associated with their membership in a class, civil rights doctrine requires risk assessments to be based on a person's own individual characteristics. The Supreme Court in *Arline* provided the reasoning behind the requirement of individual assessments of risk:

Few aspects of a handicap give rise to the same level of public fear and misapprehension as contagiousness. . . . [Section 504 of the Rehabilitation Act of 1973] is carefully structured to replace such reflexive reactions to actual or perceived handicaps with actions based on reasoned and medically sound judgments . . . . The fact that *some* persons who have contagious diseases may pose a serious health threat to others under certain circumstances does not justify excluding from the coverage of the Act *all* persons with actual or perceived contagious diseases. . . . [This would render them] vulnerable to discrimination on the basis of mythol-

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625. See THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 25.

626. A New York Department of Health study of the use of detention orders from 1988 to 1991 found that 92% of persons confined were African American or Hispanic, 52% were homeless, and 79% percent were substance abusers. Mireya Navarro, *New York City to Detain Patients Who Fail to Finish TB Treatment*, N.Y. TIMES, Mar. 10, 1993, at A1, B3.

627. See DUBLER ET AL., *supra* note 235, at 24-25.

628. See 28 C.F.R. Part 35 app. A at 31 (1991) ("The determination that a person poses a direct threat to the health or safety of others may not be based on generalizations or stereotypes about the effects of a particular disability. It must be based on an individualized assessment, based on reasonable judgment that relies on current medical evidence or on the best available objective evidence.").

ogy—precisely the type of injury Congress sought to prevent.<sup>629</sup>

Given the ADA's unequivocal requirement for individualized assessments of risk, one might ask what recourse the state has when, despite its best efforts, it is not able reliably to separate those persons who are perceived to be dangerous from those who are truly dangerous. This dilemma is formidable when the state demonstrates that a class, as a whole, poses a significant health threat and when the state demonstrates that the proposed intervention is both effective and nondraconian.<sup>630</sup>

The Supreme Court rejected an inflexible approach requiring individualized assessments in *Traynor v. Turnage*,<sup>631</sup> a case in which the Court concluded that the Veterans' Administration did not violate the Rehabilitation Act by characterizing primary alcoholism as "willful misconduct."<sup>632</sup> Even though all persons within the class of alcoholics had not engaged in willful misconduct, the Supreme Court held that the Veterans' Administration could rely on a reasonable agency rule.<sup>633</sup> Associate Justice Breyer, while Chief Judge of the First Circuit Court of Appeals, interpreted *Traynor* in *Ward v. Skinner*.<sup>634</sup> Former Judge and now Justice Breyer wrote:

[A]n agency, in treating handicapped persons, may sometimes proceed by way of general rule or principle, at least where 1) the agency behaves reasonably in doing so, 2) a more individualized inquiry would impose significant additional burdens upon the agency, and 3) Congress, as well as the agency, has expressed some kind of approval of the general rules or principles concerned.<sup>635</sup>

In *Ward*, the First Circuit held that the Department of Transportation reasonably relied upon general task force recommendations in denying a license to a truck driver with a history of epilepsy without making further individualized inquiries.<sup>636</sup> Reliance on a generalized rule was upheld despite evidence that the driver took anticonvulsant drugs,

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629. 480 U.S. 273, 284-85 (1987) (footnotes omitted).

630. Clearly, the state could not impose severe limitations on the freedoms of an entire class, for example by isolation for extended periods, in the absence of an individual determination of dangerousness for each subject of the power. See *infra* notes 684-685 and accompanying text.

631. 485 U.S. 535 (1989).

632. *Id.* at 551.

633. *Id.* at 550-51.

634. 943 F.2d 157 (1st Cir. 1991).

635. *Id.* at 162.

636. *Id.* at 164.

had no seizures for seven years, and had an exceedingly low risk of a seizure.<sup>637</sup>

Health departments arguably could justify status-based determinations under the standard set in *Traynor* and *Ward*. In relying on *Traynor* and *Ward*, a health department first would have to show that it acted reasonably by reference to objective scientific standards. For example, in demonstrating the reasonableness of requiring directly observed therapy, the department could rely on CDC guidelines, evidence showing significant noncompliance with treatment, and data demonstrating the efficacy of directly observed therapy in reducing rates of reactivation and drug resistance.<sup>638</sup>

Second, the health department would have to show that individual assessments of risk would be significantly burdensome. For example, a health department could argue that providing individual administrative or due process hearings for all persons subject to directly observed therapy would be expensive and time consuming. Additionally, such individualized determinations might defeat the very purpose behind the state intervention. After all, if members of the class stopped taking their medication during the hearings, then harm that the state sought to avert already would have occurred. Indeed, the health department could demonstrate not only that a requirement of individualized hearings is burdensome, but also that the task of making such individualized determinations is virtually impossible because of the insufficiency of scientific and behavioral foundations for predicting which individuals will take their medication.<sup>639</sup>

It is not necessary to agree with the judicial decisions in *Traynor* and *Ward*,<sup>640</sup> or even to agree generally with the principle of status-based determinations,<sup>641</sup> to conclude that requiring directly observed

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637. *Id.* at 161-64.

638. *See infra* notes 724-729 and accompanying text.

639. *See* Margaret A. Hamburg & Thomas R. Frieden, *Tuberculosis Transmission in the 1990s*, 330 NEW ENG. J. MED. 1750 (1994) (reviewing studies on patient self-medication).

640. A strong case can be made that both *Traynor* and *Ward* were wrongly decided. In *Traynor*, plaintiffs produced credible scientific evidence that some 30% of all cases of alcohol dependency were due to mental illness. 485 U.S. at 550. Individualized inquiries in which psychiatric evidence was examined would have been both possible and not unduly burdensome. In *Ward*, the plaintiff produced credible evidence that the risk of a seizure for him was lower than for persons not diagnosed as having epilepsy. 943 F.2d at 163.

641. In most other contexts, status-based determinations are highly inequitable, such as when persons in the class may be subject to harsh consequences such as detention on civil or criminal grounds. *See* Lawrence O. Gostin, *The Politics of AIDS: Compulsory State Powers, Public Health and Civil Liberties*, 49 OHIO ST. L.J. 1017, 1020 (1989) (arguing that "a compulsory power needs rigorous justification and should not be imposed merely because it is dressed in the guise of public health").

therapy for all persons with infectious tuberculosis is warranted. Directly observed therapy as a method of tuberculosis control is distinguishable from most other compulsory programs in that the intervention is not an extreme invasion of individual autonomy. The intervention benefits the person receiving treatment, and the intervention demonstrably benefits the public health.

The requirement of individualized determinations is inherent not only in antidiscrimination law but also in the doctrine of overbreadth found in Fourteenth Amendment and other constitutional jurisprudence.<sup>642</sup> Yet, the analysis of compulsory interventions under the Constitution likely would be consistent with the analysis under disability law suggested above. Courts generally require state action to be narrowly tailored in cases in which courts apply strict scrutiny.<sup>643</sup> In cases in which a state program deprives individuals of liberty, for example by isolating all members of a class, courts likely will examine the program to determine if it is impermissibly overbroad.<sup>644</sup> Yet, where state programs less severely affect liberty interests, for example by programs requiring directly observed therapy, the courts probably would engage in an interest-balancing approach.<sup>645</sup> Given the government's considerable interest in controlling tuberculosis, the courts' natural inclination to defer to medical judgments, and the relatively unintrusive nature of directly observed therapy, claims challenging public health programs requiring directly observed therapy under the Fourteenth Amendment probably would not succeed.

3. *Exhaustion of Less Intrusive Means as a Condition Precedent to the Use of Compulsion.*—Even if the exercise of compulsory powers to control the tuberculosis epidemic is likely to be effective and not overly invasive, many advocacy groups argue that it is legally and ethically necessary to exhaust means less intrusive protecting the public health before resorting to coercion.<sup>646</sup> The central message of advocacy

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642. See *TRIBE*, *supra* note 586, at 1022-39.

643. See *id.* at 1446-57. But cf. *City of Cleburne v. Cleburne Living Center*, 473 U.S. 432 (1985) (ostensibly applying a rational basis scrutiny); see *supra* text accompanying note 603.

644. See *Shapiro v. Thompson*, 394 U.S. 618, 637 (1969) (holding that possibility of welfare fraud by a few new state residents was an improper justification for a state denying benefits to all new residents).

645. See *Washington v. Harper*, 494 U.S. 210, 222-23 (1990) (holding that states must balance a prisoner's "liberty interest in avoiding the unwarranted administration of antipsychotic drugs under the Due Process Clause" against "the legitimate needs of his institutional confinement").

646. See *Dubler et al.*, *supra* note 235, at 30-32; David A. Hansell, Comment, *The TB and HIV Epidemics: History Learned and Unlearned*, 21 J.L. MED. & ETHICS 376, 380 (1993) (arguing that coercion should be a last resort measure); Susan L. Jacobs, Comment, *Legal Advo-*

groups is compelling. It is not necessary to excuse economically disadvantaged and socially marginalized people from taking responsibility for protecting their own health and the public health to understand that those who are economically disadvantaged and socially marginalized face formidable barriers outside of their control. In addition to the sheer difficulty of completing a course of antituberculosis therapy,<sup>647</sup> there are many social, cultural, economic, and psychological factors that significantly impede a person's ability to complete a course of medication.<sup>648</sup> Persons who are homeless or transient may find it difficult to attend treatment regularly; persons who are mentally ill or drug or alcohol dependent may not be capable of following treatment regimens; persons who are without adequate health care and social support, or who are hungry or abused may not make routine treatment a priority; and persons who are from different cultural backgrounds may be unfamiliar with or distrust Western medical care.<sup>649</sup>

Because of the difficulty that many underserved populations have in complying with medical advice, many advocates reject the imposition of coercion in the absence of services. The exact contours of the argument for the least restrictive alternative are not always clear; but it is clear that the precise form of the argument could determine its chances of legal success. Advocates opposing coercion argue that the government must utilize less restrictive means before resorting to dep-

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*cacy in a Time of Plague*, 21 J.L. MED. & ETHICS 382 (1993); see also AIDS IN PRISON PROJECT, CORRECTIONAL ASSOCIATION OF NEW YORK, ET AL., DEVELOPING A SYSTEM FOR TB PREVENTION AND CARE IN NEW YORK CITY (September 1992) (presenting the work of eight advocacy organizations in New York City addressing systemic issues in approaching the threat of tuberculosis).

647. See *supra* notes 182-188 and accompanying text.

648. See Etkind et al., *supra* note 177, at 275; Paul Farmer et al., *supra* note 247; Arthur J. Rubel & Linda C. Garro, *Social and Cultural Factors in the Successful Control of Tuberculosis*, 107 PUB. HEALTH REP. 626 (1992); John A. Sbarbaro, *Public Health Aspects of Tuberculosis: Supervision of Therapy*, 1 CLINICS IN CHEST MED. 253 (1980); Sumartojo, *supra* note 623, at 1311.

649. Discussing the social factors affecting one's ability to complete treatment, one scholar states:

Homelessness, by definition, means lack of permanent shelter. Whether a person lives on the streets, wanders from one SRO to another, or moves in and out of a congregate facility, medical care is rarely his or her first priority. The daily search for food and shelter belie the possibility of an organized schedule, appointment keeping or routine medical ingestion as is necessary with tuberculosis treatment. Alcoholism, drug dependence and psychiatric disturbances affect anywhere from 50 to 90 percent of the homeless, and the notion that persons so affected can remember and comply with clinic appointments and medication regimens is laughable.

Karen Brudney, *Homelessness and TB: A Study in Failure*, 21 J.L. MED. & ETHICS 360, 361 (1994).

privation of liberty—for example, requiring directly observed therapy before issuing a detention order. Advocates of the least restrictive means might also argue that the government must offer economic incentives such as food, child care, transportation allowances, or small cash payments, before compelling cooperation with treatment regimens. Finally, advocates might argue that the state must provide health, housing, and social services as a condition precedent to coercion.

Despite the unclear contours of the argument for the least restrictive alternative, advocates raise several important points. Advocates astutely observe that “passage of coercive laws is cost-free, while resource constraints will limit the ability to offer the services ostensibly mandated by a ‘treatment to cure’ imperative.”<sup>650</sup> Therefore, targeting vulnerable patients with compulsion is certainly politically easier than requiring government to provide a comprehensive network of social services and incentives to complete treatment. Tolerating the use of compulsion in the absence of services, moreover, implicitly accepts the flawed argument that the responsibility for noncompliance lies wholly with the individual and not the state. While these observations are compelling, it is possible to accept the contention that states ought to provide a range of services and incentives for tuberculosis patients, without agreeing that the provision of those services must be a condition precedent to the use of compulsion in any individual case.

The principle of the least restrictive alternative can be found in disability law and constitutional law, as well as in reasoned ethical assessments in public health. While a modest claim that the state utilize less restrictive means, such as directly observed therapy, prior to depriving a person of liberty may succeed, claims for the affirmative provision of services will be difficult to sustain. Public or private agencies covered by the ADA may have some responsibility to provide reasonable accommodations or modifications in lieu of discriminating against a person with a disability.<sup>651</sup> However, the responsibility to provide reasonable accommodations does not require agencies to fundamentally restructure programs and incur undue hardships.<sup>652</sup> Health departments may not have the resources to provide comprehensive services, nor may they have the authority; the provision of welfare benefits or housing may be outside the jurisdiction of health

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650. DUBLER ET AL., *supra* note 235, at 31.

651. 42 U.S.C. § 12113(a) (Supp. IV 1992).

652. See *Southeastern Community College v. Davis*, 442 U.S. 397, 410-11 (1979) (refusing to require fundamental alteration of a nursing program to accommodate a hearing-impaired applicant).

departments. Further, courts have been highly reluctant to use disability law to require the expenditure of resources, on the ground that such judgments are more political than judicial.<sup>653</sup>

Least drastic alternatives analysis can also be found in constitutional jurisprudence.<sup>654</sup> Like the doctrine of overinclusion, least drastic means analysis is usually reserved for cases in which courts apply more focused scrutiny. Courts rarely engage in careful explorations of alternatives in the absence of a finding that state action targets a suspect class or implicates a fundamental right.

The most developed expression of the constitutional right to less drastic alternatives is found in mental health cases in which some courts have placed the burden on states to demonstrate why community-based settings are not a suitable alternative to civil commitment.<sup>655</sup> Under theories analogous to these mental health cases, a persuasive claim could be made that health departments seeking compulsion would have to demonstrate why a less restrictive alternative, such as directly observed therapy, was not a suitable alternative to detention.

While the less drastic means doctrine has been used to limit the power of government, it has rarely been used to constitutionally require the state affirmatively to provide economic services, benefits, or incentives. Even in the mental health context, the Supreme Court has never expressly found an affirmative duty to provide treatment.<sup>656</sup>

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653. *See id.* (stating that the Rehabilitation Act does not require substantial adjustments in existing programs beyond those necessary to eliminate discrimination); *Williams v. Secretary of the Exec. Office of Human Servs.*, 609 N.E.2d 447, 452 (Mass. 1993) (rejecting ADA claim by homeless persons with mental illness seeking to require Department of Mental Health to provide specific housing services). *But see Martin v. Voinovich*, 840 F. Supp. 1175, 1202 (S.D. Ohio 1993) (declining to dismiss complaint of persons with mental retardation contending that they could not live in the community because the state failed to create sufficient housing options to meet the needs of the class).

654. *See Shelton v. Tucker*, 364 U.S. 479, 489-90 (1960) (holding unconstitutional a requirement that teachers file an affidavit listing organizations to which they belong on the ground that the requirement went far beyond what might be justified as the state's legitimate inquiry into the competency of its teachers).

655. *See Covington v. Harris*, 419 F.2d 617, 623 (D.C. Cir. 1969); *Lessard v. Schmidt*, 349 F. Supp. 1078, 1084 (E.D. Wis. 1972) (noting that state power to deprive a person of liberty must rest upon a compelling state interest).

656. The Supreme Court perhaps came closest to finding a contingent right to treatment in the Constitution in *O'Connor v. Donaldson*, 422 U.S. 563 (1975). Yet, the Court merely concluded that the state cannot detain a non-dangerous mentally ill person "without more." *Id.* at 576. The case could be taken to establish the proposition that were the state to continue to confine a non-dangerous individual, it would have to provide some form of treatment. The state may also have the obligation to provide rehabilitation services to a civilly committed person to prevent a deterioration in his or her condition.

Moreover, in contexts ranging from the funding for abortions<sup>657</sup> to the provision of child welfare services,<sup>658</sup> the Supreme Court has steadfastly refused to interfere with legislative and executive decisions about the allocation of scarce resources. For most courts, the choice of which social program warrants government spending remains a preserve of the politically accountable branches of government.

From an ethical perspective, the government should not be asked to forego practical measures necessary to avert a significant health risk while waiting for the resources to provide services and incentives. As the New York City Health Department aptly argued, it could not be required "to exhaust a pre-set, rigid hierarchy of alternatives that would ostensibly encourage voluntary compliance, but then be compelled to wait for the patient to fail each of them, regardless of the patient's individual circumstances and regardless of the potentially adverse consequences to the public health."<sup>659</sup>

The duty of government to protect the public may require the provision of services and incentives, the creation of voluntary programs which promote counseling and education, and the exercise of compulsory powers when necessary. Conditioning the use of coercion on the prior use of less drastic alternatives ultimately could result in greater, not lesser, danger to the public.

*D. The Role of Personal Control Measures in the Tuberculosis Epidemic: Compulsory Detention, Directly Observed Therapy, and Forced Treatment*

At least since the early part of this century, health officials have utilized an array of compulsory measures to control the spread of tuberculosis, including the use of criminal sanctions against those who

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657. See *Harris v. McRae*, 448 U.S. 297, 316 (1980) ("[I]t simply does not follow that a woman's freedom of choice carries with it a constitutional entitlement to the financial resources to avail herself of the full range of protected choices.").

658. See *DeShaney v. Winnebago County Dep't of Social Servs.*, 489 U.S. 189, 203 (1989) (holding that a state has no constitutional duty to protect a child from his father after receiving reports of possible violence).

659. Memorandum from Kelly Henning, Acting Deputy Commissioner, Response to Public Comments Concerning Proposed Amendments to Section 11.47 of the Health Code 7 (March 2, 1993). Accordingly, Section 11.47(f)(1)(iii) of the New York Health Code requires the Health Department to set forth in its detention order only "the less restrictive treatment alternatives that were attempted and were unsuccessful and/or less restrictive treatment alternatives that were considered and rejected, and the reasons such alternatives were rejected." This language, while not mandating a hierarchy of alternatives, requires the Department to detail its attempts to promote completion of treatment through voluntary or less restrictive means. *Id.* at 8.

disobeyed a health department order.<sup>660</sup> Frequently used measures such as compulsory *M. TB* screening<sup>661</sup> and reporting<sup>662</sup> have seldom been contested. Vociferous objections to the use of coercive measures to combat the HIV epidemic, however, have re-awakened interest in the use of compulsory measures to control tuberculosis.<sup>663</sup> This section applies the theoretical and legal analysis of compulsory measures discussed above to the three most analytically difficult tuberculosis control measures—detention, treatment, and directly observed therapy.

1. *Compulsory Detention.*—Modern constitutional review, as suggested above,<sup>664</sup> applies strict scrutiny when reviewing state action that deprives a person of liberty. Accordingly, when the state isolates<sup>665</sup> a person with clinically infectious tuberculosis, issues a detention order,

660. *In re Stoner*, 73 S.E.2d 566, 568 (N.C. 1952) (holding that conviction of person with infectious tuberculosis for willful refusal to comply with tuberculosis statute did not violate defendant's constitutional rights).

661. The courts have had little difficulty in upholding compulsory tuberculosis screening and physical examinations in a variety of contexts. *United States v. Baray*, 445 F.2d 949 (9th Cir. 1971) (upholding the physical examination of Jehovah's Witness pursuant to armed forces regulation); *Ritterband v. Axelrod*, 562 N.Y.S.2d 605 (N.Y. 1990) (upholding the testing of health care professionals); *Conlon v. Marshall*, 59 N.Y.S.2d 52 (N.Y. 1945) (upholding the testing of teachers and school employees); *State ex rel. Holcomb v. Armstrong*, 239 P.2d 545 (Wash. 1952) (holding that there is no First Amendment violation for compelling person who believes in the Christian Science faith to submit to chest X-ray for tuberculosis).

662. For a historical discussion of the use of tuberculosis reporting requirements, see Daniel M. Fox, *Social Policy and City Politics: Tuberculosis Reporting in New York, 1889-1900*, 49 BULL. HIST. MED. 169 (1975) (reviewing the historical trend toward more inclusive reporting). Today, all states require designated health care professionals to report cases of tuberculosis to local or state health departments. *Tuberculosis Control Laws*, *supra* note 24, at 3.

663. Ball & Barnes, *supra* note 552, at 38; Gittler, *supra* note 552, at 107; Reilly, *supra* note 552, at 101.

664. See *supra* notes 593-595 and accompanying text.

665. In the medical context, the term "isolation" means the separation of a person known to have a currently contagious condition (usually transmitted through the airborne route) from others during the period of contagion. This isolation is to be distinguished from quarantine, which involves the separation of a person who has been exposed to disease, but who is not known to be infected or contagious, for a period of time necessary to determine if that person has been infected and is contagious. Many early cases supported the use of quarantine. See, e.g., *Ex parte Culver*, 202 P. 661 (Cal. 1921) ("There can be no doubt but that . . . the state board of health has power to order the quarantine of persons who have come in contact with cases and carriers of contagious diseases 'whenever in the judgment of the said board such action shall be deemed necessary to protect and preserve the public health.'") (citation omitted); *Compagnie Francaise De Navigation v. State Bd. of Health*, 25 S. 591 (La. 1899) (upholding state statute that authorized the regulation of contagious and infectious diseases, under which the health board has authority to prohibit the introduction into an infected locality of persons coming from any place, whether or not such persons or place are infected); *Crayton v. Larabee*, 220 N.Y. 493 (1917) (upholding power of the health department to quarantine woman in her home which adjoined a

or institutes civil commitment proceedings against persons with *M. TB*, the state will have to demonstrate that it has a compelling interest which justifies the action. The state also will have to provide fair procedures for determining dangerousness; avoid interventions which are arbitrary or overbroad; demonstrate that the governmental interest cannot be achieved by less intrusive means; and show that the effectuation of the governmental interest is health related and nonpunitive.<sup>666</sup>

*a. Governmental Interest in Detention.*—To withstand the constitutional review of state action requiring the confinement of a person with tuberculosis, the state must demonstrate that it has a compelling governmental interest which is substantially furthered by the action.<sup>667</sup> The confinement of persons with mental illness under civil commitment provides an apt analogy to tuberculosis detention because, in both situations, the intervention is noncriminal and is based on the health and safety of the individual and the commu-

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house where a person was ill with smallpox even though there was no finding that the woman actually was exposed to the disease).

666. A recently amended New York City Health regulation illustrates how each of the foregoing elements of constitutional review can be incorporated into a tuberculosis statute. The regulation requires the Commissioner to "prove the particularized circumstances [including recent behavior] constituting the necessity for detention by clear and convincing evidence"; to provide a statement of "the less restrictive treatment alternatives that were attempted and were unsuccessful and/or . . . were considered and rejected, and the reasons such alternatives were rejected"; to appoint counsel and provide a due process hearing; and to detain in a secure setting designed for the treatment of tuberculosis. The Regulation was amended expressly to articulate the standards for compulsory powers and to ensure sound principles of procedural due process and respect for civil liberties. Memorandum from Kenneth R. Ong, Deputy Commissioner, Disease Prevention for the Attention of the Board of Health, Request to Amend Section 11.47 Health Code 1 (Oct. 6, 1992). See generally Ball & Barnes, *supra* note 552, at 66 (discussing the controls and requirements for long term detention); Navarro, *supra* note 626, at A1 (stating that New York City adopted strict regulations for detaining tuberculosis patients who fail to complete treatment on their own).

667. While most courts and commentators invoke the state's police powers, at least one court has alluded to the *parens patriae* doctrine as a justification for detention of persons with tuberculosis since the individual benefits from treatment. See *State v. Snow*, 324 S.W.2d 532, 534 (Ark. 1959) (basing the rationale for commitment hearing on "the theory that the public has an interest to be protected"). However, in the absence of some showing that the individual is incompetent and unable to make decisions necessary for his or her own best interests because of young age, mental illness or mental retardation, the *parens patriae* doctrine may not provide a viable constitutional rationale for confinement. See *Rivers v. Katz*, 495 N.E.2d 337, 343-44 (N.Y. 1986) (*sine qua non* for the State's use of *parens patriae* power as justification for forceful administration of drugs is determination that individual lacks capacity to decide for himself).

nity.<sup>668</sup> In mental health cases, the Supreme Court has provided indirect support for requiring a finding of dangerousness as a prerequisite of commitment.<sup>669</sup> In *O'Connor v. Donaldson*, the Supreme Court held that, without providing treatment or some other sufficient service, the state could not confine a nondangerous individual who is capable of surviving in the community.<sup>670</sup> Several lower courts have gone further than the Supreme Court and have required a finding of recent overt behavior that demonstrates that the person subject to confinement is a significant risk to themselves or others.<sup>671</sup>

It is relatively easy to find sufficient evidence of a person's dangerousness in cases where a person, who has active tuberculosis, is confined during a brief period until treatment renders the person noncontagious.<sup>672</sup> After all, a single individual with infectious tuberculosis can cause dozens of active cases, and can infect hundreds of people with *M. TB*.<sup>673</sup>

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668. This analogy is directly made by the court in *Greene v. Edwards*, 263 S.E.2d 661, 663 (W. Va. 1980) (stating that "involuntary commitment for having communicable tuberculosis impinges on the right to liberty, full and complete liberty, no less than involuntary commitment for being mentally ill").

669. See generally *O'Connor v. Donaldson*, 422 U.S. 563, 575 (1975) (stating that "a finding of 'mental illness' alone" is not sufficient to justify confinement); *Humphrey v. Cady*, 405 U.S. 504, 509 (1972) (noting without further comment that Wisconsin conditions such confinement not solely on the patient's mental condition, but also on his potential for doing harm to himself and others).

670. *O'Connor*, 422 U.S. at 575. At least one post-*O'Connor* court has held that the civil commitment of the mentally ill without treatment is not necessarily an impermissible exercise of governmental power. See *Morales v. Turman*, 562 F.2d 993, 998 (5th Cir. 1977) (commenting that the Supreme Court in *O'Connor* "did not, however, decide whether a nondangerous person could be confined with treatment or if a dangerous person could be confined without treatment").

671. See *Suzuki v. Yen*, 617 F.2d 173, 178 (9th Cir. 1980) (agreeing with the district court that "danger must be imminent to justify involuntary commitment"); *Colyar v. Third Judicial Dist. Court for Salt Lake County*, 469 F. Supp. 424, 432 (Utah 1979) (requiring that the State show, among other things, "that the person poses an immediate danger to himself").

672. Despite effectuation of the goal of isolating the patient during the period of contagiousness, short-term detention may not assure the completion of a treatment regimen. Small scale studies suggest that most patients fail to take the full course of their medication after discharge from short-term detention, rendering them susceptible to reactivation tuberculosis. Catherine Woodard, *Detentions Don't Work: Holding TB Patients Can't Assure Cure*, *Newsday*, Jan. 23, 1992, at 6 (citing New York City study that found that only one of 33 patients detained since 1988 took medication long enough to be cured).

673. Hamburg & Frieden, *supra* note 639, at 1750; see also Peter M. Small et al., *The Epidemiology of Tuberculosis in San Francisco—A Population-Based Study Using Conventional and Molecular Methods*, 330 *NEW ENG. J. MED.* 1703, 1708 (1994) (stating that "a single tuberculosis patient may have devastating effects on tuberculosis control . . ."); Dand Alland et al., *Transmission of Tuberculosis in New York City—An Analysis by DNA Fingerprinting and Conventional Epidemiologic Methods*, 330 *NEW ENG. J. MED.* 1710, 1715 (1994) (suggesting that almost 40% of the tuberculosis cases in an inner-city community recur from recent transmissions of the disease).

A substantial number of cases in the early to middle part of this century upheld isolation orders for persons with contagious tuberculosis<sup>674</sup> and other communicable<sup>675</sup> or sexually transmitted<sup>676</sup> diseases.<sup>677</sup> While in many of the early cases public health officers merely had "reasonable suspicions" that the person was contagious, under modern constitutional doctrine, short term detention would only be justified if there was credible scientific evidence that the person was infectious. In *State v. Snow*, for example, the court refused to

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674. See, e.g., *State v. Snow*, 324 S.W.2d 532, 534 (Ark. 1959) (suggesting that if the state can demonstrate that a person has infectious tuberculosis and refuses treatment, the state can lawfully confine the individual); *In re Halko*, 54 Cal. Rptr. 661, 664 (Cal. Ct. App. 1966) (holding that consecutive orders for quarantine of an individual with *M. TB* does not deprive the person of due process of law as long as health officer has reasonable grounds to believe that the person is dangerous to public health); *Moore v. Armstrong*, 149 So. 2d 36, 37 (Fla. 1963) (finding no deprivation of an individual's civil rights during periods of his isolation for misconduct while confined in state hospital for treatment of infectious tuberculosis); *Moore v. Draper*, 57 So. 2d 648, 650 (Fla. 1952) (upholding the constitutionality of a state statute authorizing the detention of person with infectious tuberculosis, but stating that when the person feels he is cured or that the disease is arrested to the point where he is no longer a danger to society, he may seek release).

675. See, e.g., *State v. Rackowski*, 86 A. 606, 607 (Conn. 1913) (holding that "[b]efore a lawful order [for confinement] can be made . . . the health officer must have a reasonable belief that the person or persons ordered into confinement are infected with [scarletina or scarlet fever]"); *People ex rel. Barmore v. Robertson*, 134 N.E. 815, 820-21 (Ill. 1922) (upholding the authority of the department of health to quarantine a woman with typhoid); *Kirk v. Wyman*, 65 S.E. 387, 390-91 (S.C. 1909) (upholding the board of health's quarantine, but not confinement in a "pesthouse," of a woman with anesthetic leprosy even though the person posed "hardly any danger of contagion").

676. See, e.g., *Ex parte Martin*, 188 P.2d 287, 289-90 (Cal. Dist. Ct. App. 1948) (stating that because state statutes impose a "mandatory duty . . . upon health officers to prevent the transmission of venereal disease," a health officer need only show reasonable cause to justify quarantining a woman accused of prostitution); *In re Clemente*, 215 P. 698, 698 (Cal. Dist. Ct. App. 1923) (holding that the health department was justified in detaining a woman accused of conducting a "house of ill fame" until she submitted to an examination to determine "whether she was infected with a contagious or infectious disease"); *Ex parte Johnston*, 180 P. 644, 645 (Cal. Dist. Ct. App. 1919) (upholding the confinement of a woman suffering from gonococcus infection despite the fact that she was unlawfully arrested and examined); *Varholy v. Sweat*, 15 So. 2d 267 (Fla. 1943) (upholding the quarantine of a prisoner with gonorrhea); *Ex parte Company*, 139 N.E. 204 (Ohio 1922) (upholding the quarantine of a woman accused of prostitution).

677. The level of discretion afforded to state health department officials is so extensive that tort actions have not succeeded even where the state quarantined an individual's home and later determined that the quarantine was unwarranted. See *Jones v. Czapkay*, 6 Cal. Rptr. 182 (Dist. Ct. App. 1960) (finding no cause of action against city and health officials for alleged failure to promptly initiate and enforce the quarantine of a person with tuberculosis); *Haverty v. Bass*, 66 Me. 71 (1876) (finding no action in trespass against city officials for physically removing a child believed to be sick with small pox from the arms of her mother); *Valentine v. City of Englewood*, 71 A. 344, 345 (N.J. 1908) (holding that the state need only show "reasonable and probable cause" to believe a quarantine was necessary).

uphold a detention order where no x-ray, sputum test, or diagnostic procedure was conducted on the patient.<sup>678</sup>

Short-term detention of persons, consistent with extant constitutional standards of dangerousness, merely requires a determination that the person has clinically infectious tuberculosis.<sup>679</sup> The burden of the state, however, is greater in cases of longer-term detention of currently uninfected persons.<sup>680</sup> In such cases, the state must demonstrate more than current health status; the state must show that the individual poses a future danger to others by virtue of his or her predicted failure to complete the full course of treatment. As recently as 1966, a California court in *In re Halko*<sup>681</sup> found no deprivation of due process when a detention order for tuberculosis treatment was renewed four times. In *In re Halko*, the court required the health officer only to have reasonable grounds for the belief that the individual was "dangerous to the public health."<sup>682</sup> However, the more recent case of *In re New York City v. Doe*<sup>683</sup> demonstrates the modern standard. The modern standard requires the presentation of clear and convincing evidence of the person's "inability to comply with the projected 18 to 24 month prescribed course of medication,"<sup>684</sup> based upon the person's "refusal to cooperate with . . . repeated efforts to have her participate in voluntary forms of directly observed therapy."<sup>685</sup>

As the court in *In re New York City* indicated, the best predictors of future behavior are recent patterns of similar behavior.<sup>686</sup> Accordingly, demonstrating that a person left a hospital against medical advice, refused or failed to follow a treatment regime, or failed to attend

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678. *Snow*, 324 S.W.2d at 534.

679. See *infra* text accompanying notes 693-695.

680. Persons with sputum positive pulmonary tuberculosis which is so drug resistant as to be refractory to treatment are potentially infectious to the general community for an extended period of time. In such cases, status-based determinations of infectiousness may provide a justification for longer-term confinement. See CENTERS FOR DISEASE CONTROL, U.S. DEP'T OF HEALTH AND HUMAN SERVICES, IMPROVING PATIENT COMPLIANCE IN TUBERCULOSIS TREATMENT PROGRAMS 14 (1989) [hereinafter IMPROVING PATIENT COMPLIANCE IN TUBERCULOSIS TREATMENT PROGRAMS].

681. 54 Cal. Rptr. 661 (Ct. App. 1966).

682. *Id.* at 664.

683. 614 N.Y.S.2d 8 (App. Div. 1994); see *Medical Ctr. E. v. Jefferson Tuberculosis Sanatorium*, 607 So. 2d 390 (Ala. 1991) (per curiam) (dismissing an appeal of a detention order for a tuberculosis patient).

684. *In re New York City*, 614 N.Y.S.2d at 9.

685. *Id.*

686. *Id.* See generally *Project Release v. Provost*, 722 F.2d 960, 973-94 (2d Cir. 1983), and cases cited therein.

scheduled sessions for supervised treatment provides the best evidence for assessing the necessity of compulsion.<sup>687</sup>

Yet, even in *In re New York City*, the court was prepared to accept, at least in part, membership in traditionally disfavored groups as evidence of dangerousness.<sup>688</sup> However, the use of status characteristics to predict noncompliance with medical advice has never been demonstrated to be reliable. Predictions of complex behavior are exceedingly difficult, and the efforts of psychiatrists have exhibited low levels of reliability and validity.<sup>689</sup> In particular, researchers have been unable to identify a set of patient characteristics that accurately predict who will, and who will not, complete treatment.<sup>690</sup> Investigators have observed that "socioeconomic status, occupation, race, and other personal indicators are not characteristics that predict non-compliance."<sup>691</sup> Use of personal status as a proxy for dangerous behavior is not only problematic because status-based determinations are unreliable, but is also problematic because such determinations disproportionately impact people who are poor or who are members of racial or ethnic minorities.

b. *Procedural Due Process*.—Persons with tuberculosis who are subject to detention are entitled to procedural due process. As the Supreme Court recognized, "[t]here can be no doubt that involuntary commitment to a mental hospital, like involuntary confinement of an individual for any reason, is a deprivation of liberty which the State cannot accomplish without due process of law."<sup>692</sup> The nature and

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687. Ball & Barnes, *supra* note 552, at 54.

688. *In re New York City*, 614 N.Y.S.2d at 9. In particular, the court focused on whether there was a history of drug abuse and unstable or uncertain housing accommodations.

689. See Bruce J. Ennis & Thomas R. Litwack, *Psychiatry and the Presumption of Expertise: Flipping Coins in the Courtroom*, 62 CAL. L. REV. 693, 752 (1974) ("Human behavior is difficult to understand, and, at present impossible to predict."); Henry J. Steadman & Joseph Cocozza, *Psychiatry, Dangerousness and the Repetitively Violent Offenders*, 69 J. CRIM. L. & CRIMINOLOGY 226, 231 (1978) ("Psychiatrists can demonstrate no special expertise in making predictions of future violent behavior."). In the context of tuberculosis, the CDC similarly observed that "[s]tudies have shown . . . that physicians and other health care providers are very unreliable in assessing patient compliance." IMPROVING PATIENT COMPLIANCE IN TUBERCULOSIS TREATMENT PROGRAMS, *supra* note 680, at 5.

690. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 87 (citing Sumartojo, *supra* note 623).

691. John A. Sbarbaro, *The Patient-Physician Relationship: Compliance Revisited*, 64 ANNALS OF ALLERGY 327 (1990); see Stephen E. Weiss et al., *The Effect of Directly Observed Therapy on the Rates of Drug Resistance and Relapse in Tuberculosis*, 330 NEW ENG. J. MED. 1179, 1182 (1994) ("Age, sex, religion, education, race, and socioeconomic status do not predict compliance.").

692. *O'Connor v. Donaldson*, 422 U.S. 563, 580 (1975) (Burger, C.J., concurring); see also *Vitek v. Jones*, 445 U.S. 480, 492 (1980) ("[W]ere an ordinary citizen to be subjected to

extent of the process required depends on the nature of the interests affected, the risk of an erroneous deprivation, the value of additional safeguards, and the administrative burdens that additional procedures would entail.<sup>693</sup>

In cases of short-term isolation during the brief period of contagion, the Constitution would not necessarily require a hearing prior to determination because of the importance of immediately separating the infectious individual from close contacts. However, despite judicial deference to health officials' concerns about contracting *M. TB* infection,<sup>694</sup> some showing of current infectiousness, perhaps at the site of isolation, would be required after detention. In cases of short term detention, reduced expectations of due process are justified by the relatively short period of confinement, the urgent need to protect the public, and the difficulty of providing a full panoply of procedural protections.

The Due Process Clause, however, requires considerably more extensive procedures in cases of longer-term detention. In cases involving civil commitment of persons with mental illness, the Supreme Court has required a "clear and convincing" showing of proof of dangerousness,<sup>695</sup> and many lower courts have required an array of procedural protections, including the right to legal counsel.<sup>696</sup> In *Greene v. Edwards*,<sup>697</sup> the West Virginia Supreme Court reasoned that there is little difference between loss of liberty for mental health reasons and the loss of liberty for public health reasons.<sup>698</sup> A person with tuberculosis facing detention, therefore, is likely to be entitled to the same

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[compelled psychiatric confinement and treatment], it is undeniable that protected liberty interests would be unconstitutionally infringed absent compliance with . . . the Due Process Clause."); *Project Release v. Prevost*, 722 F.2d 960, 971 (2d Cir. 1983) ("Civil commitment for any purpose requires due process protection.") (citations omitted).

693. See *Washington v. Harper*, 494 U.S. 210, 229-30 (1990) ("The procedural protections required by the Due Process Clause must be determined with reference to the rights and interests at stake in the particular case."); *Mathews v. Eldridge*, 424 U.S. 319, 335 (1976) ("[D]ue process is flexible and calls for such procedural protections as the particular situation demands."); *Morales v. Turman*, 562 F.2d 993, 998 (5th Cir. 1977) ("The interests of the individual and of society in the particular situation determine the standards for due process.")

694. See Richard T. Andrias, *The Criminal Justice System and the Resurgent TB Epidemic*, 9 CRIM. JUSTICE 2, 52 (1994).

695. *Addington v. Texas*, 441 U.S. 418, 425 (1979) ("This Court repeatedly has recognized that civil commitment for any purpose constitutes a significant deprivation of liberty that requires due process protection."); see also *In re New York City*, 614 N.Y.S.2d at 8.

696. See, e.g., *In re Ballay*, 482 F.2d 648, 563-66 (D.C. Cir. 1973) (discussing the applicable standard of proof); *Lessard v. Schmidt*, 413 F. Supp. 1318 (E.D. Wis. 1976).

697. 263 S.E.2d 661 (W. Va. 1980).

698. *Id.* at 663.

procedural safeguards as a person with mental illness facing civil commitment. These procedural protections include the right to counsel, the right to a hearing, and the right to an appeal. Such rigorous procedural protections are justified by the fundamental invasion of liberty occasioned by long-term detention;<sup>699</sup> the serious implications of erroneously finding a person dangerous; the value of such procedures in accurately determining complex facts which are important to predicting future dangerous behavior;<sup>700</sup> and the absence of significant administrative or practical problems in providing a hearing.

c. *Less Drastic Means Analysis*.—Given the deservedly strict standard of review in cases involving a deprivation of liberty, the government would not be permitted to resort to confinement if it could achieve its objectives through less drastic means. For the reasons explored earlier, the government would not have to provide an elaborate array of services, such as housing, health care, and economic incentives, to meet the less restrictive means test.<sup>701</sup> However, if the government could achieve its objective by getting a person with tuberculosis to take his or her medication with supervision in the community, the governmental interest in confinement would be obviated.<sup>702</sup>

d. *Effectuation of the Governmental Interest Must be Health-Related and Nonpunitive*.—Confinement for the purpose of tuberculosis treatment is ostensibly nonpunitive, because the government's interest is in protecting the public health and, in most cases, the person confined has not been convicted of a criminal offense.<sup>703</sup> Accordingly, the place and conditions of confinement are a relevant concern in examining the lawfulness of detention. Even in early public health cases that adopted a deferential approach to the review of compulsory public health measures,<sup>704</sup> courts would not tolerate the use of jails or

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699. By analogy, involuntary civil commitment to a mental institution has been recognized as a "massive curtailment of liberty." *Vitek v. Jones*, 445 U.S. 480, 491 (1980).

700. See *supra* notes 686-687, 689 and accompanying text.

701. See *supra* notes 656-658 and accompanying text.

702. See *In re New York City*, 614 N.Y.S.2d at 8 (agreeing with the proposition that less restrictive alternative analysis applies to the involuntary confinement of a tuberculosis patient, but failing to find it in the facts of the case).

703. See *Benton v. Reid*, 231 F.2d 780, 782 (D.C. Cir. 1956) ("In the absence of specific language, we cannot lightly infer that Congress intended that a person like appellant, neither indicted for nor convicted of any crime, is to be confined in a penal institution to suffer the social stigma and bad associations resulting therefrom."); *State v. Snow*, 324 S.W.2d 532, 534 (Ark. 1959) (stating that the Arkansas statute addressing the isolation of recalcitrant tuberculosis patients "is not a penal statute, but it is to be strictly construed to protect the rights of the citizen").

704. See *supra* notes 580-584 and accompanying text.

other punitive or unhealthy settings for isolation.<sup>705</sup> These courts reasoned that persons who were civilly confined for treatment should neither suffer the stigma associated with the criminal justice system, nor face additional health risks.<sup>706</sup>

2. *Compulsory Treatment.*—All persons have an interest in making decisions about the medical treatment that they will receive. Whether framed as an interest in autonomy, liberty, or privacy, the right to refuse treatment has been found to exist both under state<sup>707</sup> and federal constitutional law.<sup>708</sup> As one state supreme court noted: “[I]f the law recognizes the right of an individual to make decisions about . . . life out of respect for the dignity and autonomy of the individual, that interest is no less significant when the individual is mentally or physically ill.”<sup>709</sup>

While it is clear that administering medical treatment without a person’s consent can constitute a violation of a patient’s right to liberty,<sup>710</sup> courts have struggled over determinations about when an individual’s liberty interest may be overridden in mental health cases.<sup>711</sup> With painstaking emphasis on the deference shown to prison regulations that effectuate penological interests in prison safety, the

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705. See, e.g., *Benton*, 231 F.2d at 782 (refusing to allow the use of a jail for isolation detention); *State v. Hutchinson*, 18 So. 2d 723, 726 (Ala. 1944) (stating that “persons affected with [a contagious] disease are not for that reason criminals, and jails and penitentiaries are not made or designated for their detention”); *Kirk v. Wyman*, 65 S.E. 387, 391 (S.C. 1909) (finding that isolation in a “pesthouse” located within a hundred yards of the city dump would pose “a serious affliction and peril” to the patient, an elderly woman).

706. See *supra* note 705.

707. See, e.g., *Rivers v. Katz*, 495 N.E.2d 337, 343 (N.Y. 1986) (stating that persons of “adult years and sound mind” have the right to “control the course of [their] medical treatment”) (citations omitted). Similar conclusions have also been reached under state statute and common law. See, e.g., *Rogers v. Commissioner, Dep’t of Mental Health*, 458 N.E.2d 308 (Mass. 1983) (holding that an institutionalized mental patient is competent to make treatment decisions unless and until the patient is adjudicated incompetent by a judge).

708. See, e.g., *Cruzan v. Director, Mo. Dep’t of Health*, 497 U.S. 261, 278 (1990) (generally supporting a qualified right to refuse treatment); *Washington v. Harper*, 494 U.S. 210, 229 (1990) (“The forcible injection of medication into a nonconsenting person’s body represents a substantial interference with that person’s liberty.”); *Riggins v. Nevada*, 112 S. Ct. 1810, 1814 (1992) (commenting favorably on *Washington v. Harper*).

709. *In re K.K.B.*, 609 P.2d 747, 752 (Okla. 1980).

710. See *Washington*, 494 U.S. at 229.

711. “[T]he substantive issue involves a definition of th[e] protected constitutional [liberty] interest, as well as identification of the conditions under which competing state interests might outweigh it. The procedural issue concerns the minimum procedures required by the Constitution for determining that the individual’s liberty interest actually is outweighed in a particular instance.” *Mills v. Rogers*, 457 U.S. 291, 299 (1982) (citations omitted).

Supreme Court, in *Washington v. Harper*, held that the state's interests outweigh the interests of an inmate when the inmate is dangerous to himself or others and when the treatment is in the inmate's medical interest.<sup>712</sup> Were the courts faced with the issue of compulsory tuberculosis treatment to adopt the standard used in *Washington* to review cases of civilly committed patients, due process would allow medically appropriate tuberculosis treatment to be administered to avert a danger to the public.<sup>713</sup> Under *Washington*, due process would not, on the other hand, permit compelled treatment absent a finding of medical appropriateness and of overriding justification, such as a finding that an individual posed a danger to others.<sup>714</sup>

Persons in the community, and even persons civilly committed, might reasonably expect that their liberty interests in refusing tuberculosis treatment would weigh more heavily than the liberty interests of corrections inmates refusing treatment.<sup>715</sup> Yet, the Supreme Court has not defined the boundaries of the deference accorded the determinations of health officials that impact on the liberty interests of tuberculosis patients.<sup>716</sup> Even those lower courts that are highly sympathetic to patients' rights to refuse treatment concede that the state's exercise of the police power overrides individuals' interests

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712. *Washington*, 494 U.S. at 227.

713. The Supreme Court in *Riggins v. Nevada*, 112 S. Ct. 1810 (1992) observed that due process would be satisfied in connection with the administration of antipsychotic medication for a defendant sentenced to death if it had been demonstrated that treatment was "medically appropriate and, *considering less restrictive alternatives*, essential for the sake of Riggins's own safety or the safety of others." *Id.* at 1815 (emphasis added). In the context of tuberculosis, the state's interest in ensuring the completion of a regimen of treatment may not always require compulsory treatment or detention. Many individuals would complete their treatment in the community through directly observed therapy with consent or through other less intrusive measures. See *infra* note 728 and accompanying text.

714. See *Riggins*, 112 S. Ct. at 1814-15.

715. See *Youngberg v. Romeo*, 457 U.S. 307, 321-22 (1982) ("Persons who have been involuntarily committed are entitled to more considerate treatment and conditions of confinement than criminals whose conditions of confinement are designed to punish."). Some courts have gone quite far in recognizing the interests of mental patients who are involuntarily committed by holding that the state must demonstrate an overriding interest that is compelling. See *Woodland v. Angus*, 820 F. Supp. 1497, 1509-10 (D. Utah 1993). The *Woodland* court used *Riggins* as authority for this conclusion, despite the *Riggins* Court's explicit denial that it was adopting a strict scrutiny standard of review. *Riggins*, 112 S. Ct. at 1815 (requiring an "overriding justification and a determination of medical appropriateness").

716. See *Mills v. Rogers*, 457 U.S. 291, 301 (1982) (resting its decision on Massachusetts state law, the Court wrote that an individual's liberty interest in refusing treatment can be overcome by an overwhelming state interest).

when there has been a determination of dangerousness and medical appropriateness.<sup>717</sup>

In mental health law and scholarship, a charged debate has ensued over whether a person who is civilly committed may be given treatment without consent in the absence of a procedural due process finding of incompetence or dangerousness. Many courts and commentators have aptly suggested that the civil commitment process itself is insufficient for determining whether a committed person is competent to refuse treatment, and that therefore, some separate process is required to make treatment determinations.<sup>718</sup> While the merger of civil commitment and treatment determinations may not be warranted in mental health cases, merger may be warranted in tuberculosis cases. The primary question in tuberculosis cases is whether medically appropriate tuberculosis treatment is necessary to protect the health of the patient and the public; it is the person's inability or unwillingness to follow a course of treatment, and not the person's competency, that is at issue.<sup>719</sup> Since the criterion used to determine the necessity of compulsory treatment should be reviewed at the time of detention, a separate due process hearing on treatment may not be warranted. Moreover, determinations about the necessity of treatment are primarily medical in nature. Allowing physicians to make postcommitment determinations concerning treatment, therefore, will probably satisfy the requirements of procedural due process.<sup>720</sup>

Manifestly, when a patient no longer poses a danger to himself or to others, confinement and treatment are no longer justified. Accord-

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717. *Rivers v. Katz*, 495 N.E.2d 337, 343 (N.Y. 1986) ("Where the patient presents a danger to himself or other members of society or engages in dangerous or potentially destructive conduct within the institution, the State may be warranted, in the exercise of its police power, in administering antipsychotic medication over the patient's objections.").

718. Much of the case law and scholarly analysis in this area is surveyed in *Rivers*, 495 N.E.2d at 343. See also Larry O. Gostin, *The Merger of Incompetency and Certification: The Illustration of Unauthorized Medical Contact in the Psychiatric Context*, 2 INT'L J.L. & PSYCHIATRY 127, 132 (1979) ("In certain cases the determination of incompetency simply merges with the compulsory admission decision. . . . [The determination of incompetency by reference to the admission decision] is an empirically unfounded assumption . . .").

719. In a concurring opinion in *Riggins*, Justice Kennedy, *in dicta*, observed that where the purpose of involuntary medication is to insure that the person ceases to be a physical danger to himself or others, the inquiry is both "objective and manageable." 112 S. Ct. at 1818 (Kennedy, J., concurring).

720. See *Youngberg v. Romeo*, 457 U.S. 307, 323 (1982) (finding such decisions to be "presumptively valid" when made by "professionals"); *Parham v. J.R.*, 442 U.S. 584, 609 (1979) ("What is best . . . is an individual medical decision . . ."); *Project Release v. Prevost*, 722 F.2d 960, 979 (2d Cir. 1983) ("deference must be accorded medical judgment in such matters").

ingly, due process requires some postcommitment access to the courts whether through habeas corpus or through the periodic judicial renewal of the detention order.

3. *Directly Observed Therapy*.—The state's interest in ensuring the completion of treatment may not always require compulsory detention. Treatment in the community can often be assured through directly observed therapy. Directly observed therapy is a compliance enhancing strategy in which each dose of medication is observed by a family member, a peer advocate, a community worker, a health care or public health professional, or by any other responsible person.<sup>721</sup> The supervision of medication can take place in a variety of locations, ranging from the individual's residence, or place of employment, to a clinic, a health care office, or even a street corner. The administration of directly observed therapy can be either voluntary, which would require health care professionals to obtain informed consent, or mandatory, which would require health care professionals to mandate patient compliance.

An exploration of the legal justification for compulsory directly observed therapy requires a careful balancing of the state's interests and the individual's interests. Directly observed therapy is frequently thought to be relatively unintrusive because it does not require confinement.<sup>722</sup> However, its imposition does affect an individual's interests in autonomy, dignity, and privacy.<sup>723</sup> For example, an individual subject to compulsory directly observed therapy may have to attend treatment at specific places and times which may interfere with the individual's freedom of movement. Moreover, treatment may take place in public places known for the treatment of tuberculosis, resulting in stigma or discrimination; or treatment may occur at the individual's home, imposing on the individual's privacy.

The interests of the state in mandating directly observed therapy against individuals must be substantial enough to override the person's interests in avoiding compulsion. As a general matter, however, it is easy to construct a formidable case favoring the state's imposition of directly observed therapy. Evidence suggests that significant numbers of persons with tuberculosis do not complete the full course of treatment.<sup>724</sup> Studies have shown that treatment "noncompliance"

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721. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 89.

722. *Id.*

723. *Id.*

724. The scientific and lay literature is replete with gripping illustrations of the health hazard occasioned by treatment failure. See IMPROVING PATIENT COMPLIANCE IN TUBERCULO-

rates range from twenty-two to fifty-five percent.<sup>725</sup> From a strict public health perspective, it does not matter whether the principal cause of treatment failure is the willful noncompliance of patients, the inadequacy of health department services,<sup>726</sup> the sheer difficulty of completing a complicated and extended treatment regime,<sup>727</sup> or social, psychological, and cultural factors beyond the control of patients. What does matter to the legal and ethical assessment of compulsory directly observed therapy is the state's ability to demonstrate that, absent an effective intervention, a significant number of individuals with tuberculosis will fail to complete treatment, and that, therefore, a significant number of these individuals will reactivate with a drug-resistant form of clinically infectious tuberculosis.

In general, the government can demonstrate not only that many persons diagnosed with active tuberculosis will fail to complete treatment, but also that the systematic application of supervised therapy will be highly effective in securing completion of treatment. For example, directly observed therapy programs in geographically diverse tuberculosis programs have achieved patient treatment completion rates of over ninety percent.<sup>728</sup> Moreover, the universal administra-

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SIS TREATMENT PROGRAMS, *supra* note 680, at 3 (In Mississippi, an alcoholic man with pulmonary tuberculosis takes treatment irregularly and subsequently infects his wife and son. This sets off an outbreak of drug resistant disease involving at least 12 additional cases, including 3 deaths, and hundreds of new infections); Mireya Navarro, *Gauging Threat of Recalcitrant TB Patients*, N.Y. TIMES, Apr. 14, 1992, at A1 (discussing a 34 year old homeless man who repeatedly failed to take medication and was forcibly taken by health department officials to a hospital in shackles and chained to the bed); Mireya Navarro, *Pill Monitors Make Sure TB Patients Swallow*, N.Y. TIMES, Sept. 5, 1992, at A1 (reporting on a program in which a public health official watched patients with known failure to comply with treatment takes tablets and capsules daily); Specter, *supra* note 187, at A1 (reporting that New York health department officials ordered the confinement of a Manhattan woman who has been in and out of city hospitals at least five times with active tuberculosis, has been in jail, surfaced in Georgia, gave birth to a daughter, and returned to New York, still refusing to take her medication and complete her treatment); Woodard, *supra* note 438 (discussing a 28 year old man who had infectious tuberculosis 9 times in 4 years and was released back to the streets because his detention order was valid only while he was infectious).

725. IMPROVING PATIENT COMPLIANCE IN TUBERCULOSIS TREATMENT PROGRAMS, *supra* note 680, at 4; see Whitney W. Addington, *Patient Compliance: The Most Serious Remaining Problem in the Control of Tuberculosis in the United States*, 76 CHEST 741, 741 (1979) (finding compliance rates ranging from 69% to 79% for the years 1970 through 1975); Bloom & Murray, *supra* note 28, at 1059; Brudney & Dopkin, *supra* note 209, at 746.

726. See *supra* notes 279-310 and accompanying text.

727. See *supra* notes 183-188 and accompanying text.

728. Centers for Disease Control & Prevention, U.S. Dep't of Health and Human Services, *Approaches to Improving Adherence to Antituberculosis Therapy—South Carolina and New York, 1986-1991*, 42 MORBIDITY & MORTALITY WKLY. REP. 74 (1993) (citing a 93.9% completion rate by South Carolina during 1980 through 1985 when directly observed therapy was used); THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 90 (citing a treatment completion rate of more than 90% in Denver when directly observed therapy was

tion of treatment under direct observation dramatically reduces the rates of primary drug resistance, acquired drug resistance, and relapse.<sup>729</sup>

The overriding justifications for compulsory directly observed therapy, then, are both the significant rate of treatment failure leading to drug resistance and reactivation of disease, and the demonstrably beneficial effects of the intervention. If the government can demonstrate in any individual case that with less intrusive treatment programs, the person is not likely to complete medication, then compulsory directly observed therapy would be allowable. The more difficult question, already explored, is whether the government can rely on statistical predictions of risk to universally apply mandatory directly observed therapy to a large population of persons diagnosed with active tuberculosis, absent an individualized assessment and exploration of less restrictive alternatives.<sup>730</sup>

Universal directly observed therapy is becoming the standard method in tuberculosis control. The CDC,<sup>731</sup> clinicians,<sup>732</sup> and expert committees<sup>733</sup> all support the concept that all persons diagnosed with active tuberculosis ought to take medication under supervision at least for a period of time to ensure compliance. Universal directly observed therapy is justified by the repeated empirical observation that clinicians cannot accurately separate the compliant from the noncompliant, by the desire to avoid status-based decisions that would disproportionately burden minority races and the poor, and by the evidence of directly observed therapy's efficacy, as measured against the uncertain efficacy of other voluntary programs.

Critiques of universal directly observed therapy have focused not only on the invasiveness of monitoring therapy, but on the substantial economic costs of directly supervising the treatment of large numbers of people.<sup>734</sup> In particular, critics argue that directly observed therapy is unnecessary for patients who are motivated to comply with treat-

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used). See also Hamburg & Frieden, *supra* note 639, at 1751 ("Recent reports demonstrate that the use of directly observed therapy can turn back the tide of drug-resistant tuberculosis.").

729. Weiss et al., *supra* note 691, at 1183.

730. See *supra* notes 623-644 and accompanying text.

731. *Initial Therapy for Tuberculosis*, *supra* note 98 ("DOT should be considered for all patients because of the difficulty in predicting which patients will adhere to a prescribed treatment regimen.").

732. Iseman, *supra* note 83, at 790 (recommending "treatment programs that entail directly observed therapy supported by effective inducements or enforcements").

733. DUBLER ET AL., *supra* note 235.

734. THE CONTINUING CHALLENGE OF TUBERCULOSIS, *supra* note 57, at 89.

ment.<sup>735</sup> This argument however, begs the question. Directly observed therapy is unnecessary and wasteful for persons who would have completed treatment without supervision. The problem is that science cannot determine who will complete treatment, and therefore, universal directly observed therapy is the only effective and non-discriminatory course available. The cost-effectiveness critique also fails to take into account the substantial economic savings that will result from reductions in the rates of relapse, the rates of multidrug-resistant relapse, and the rates of acquired resistance under a program of universal directly observed therapy.<sup>736</sup>

The cost effectiveness of universal directly observed therapy in combatting the tuberculosis epidemic does not necessarily suggest that compulsion should be visited upon all persons diagnosed with active tuberculosis. Nor does the likelihood of judicial approval of population-based compulsory directly observed therapy render such a policy wise. While the CDC recommends universal directly observed therapy, the CDC does not recommend the universal application of compulsion.<sup>737</sup> The vast majority of individuals with tuberculosis accept directly observed therapy when offered.<sup>738</sup> Consequently, while securing an individual's informed consent may not be legally required, the state's interests are not materially compromised by seeking consent in all cases. Compulsory directly observed therapy, therefore, should be considered only when an individual has refused voluntary supervision. Conceptually, compulsory directly observed therapy would be a less restrictive alternative to isolation or commitment. In the absence of consent, directly observed therapy would be justified by an individualized determination that the person is unable or unwilling to complete treatment and that the person poses a significant risk of transmission. Generalizations or stereotypes about the person's class or status, as a homeless person or a drug user, for example would not provide a sufficient basis for imposing directly observed therapy without consent. Objective evidence of noncompliance, such as evi-

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735. See *id.* Some also charge that directly observed therapy is merely fashionable and politically correct. Kenneth Prager, *A PC Approach to TB Control*, WALL ST. J., Dec. 30, 1992, at A6.

736. The economic and human burdens of treating multidrug-resistant tuberculosis is high, with median hospital stays of over seven months at costs ranging from \$100,000-\$180,000 per case. Weiss et al., *supra* note 691, at 1183.

737. *Tuberculosis Control Laws*, *supra* note 24, at 6 (recommending that directly observed therapy be used only for "[p]atients who do not adhere to self-administered therapy").

738. See Weiss et al., *supra* note 691, at 1183 (reporting that patients "accepted [DOT] after the benefits to them and to society were explained to them" and "new patients frequently asked about [DOT] at the initial visit").

dence of a recent failure to comply, would be required under the significant risk standard.

4. *Duties on the State to Provide a Range of Compliance-Enhancing Services.*—"Recalcitrance" is an oversimplified explanation of a person's failure to complete a treatment regimen because an individual's behavior is often influenced by complex social and personal factors. Considerable evidence suggests that compliance is influenced as much, or more, by the health system as it is by patient characteristics.<sup>739</sup> Factors influencing compliance include: features of the health care system—including clinic settings, waiting times, access to health care and health insurance, and access to knowledgeable and sympathetic providers; features of the treatment regimen—including the cost, duration, side effects, and painfulness of treatment; and features of the health care professional/patient/relationship—including the effectiveness of communication, and personal and cultural sensitivity. Accordingly, placing statutory duties on the state may benefit the community more than focusing on the behavior of individuals who are perceived to be noncompliant.<sup>740</sup>

Because preventive and curative treatment may be the single most important aspects of tuberculosis control, health departments should have a duty to devise an individualized plan of treatment for all persons diagnosed with active disease. The patient should be involved in the development of the plan and health departments should require the patient's informed consent. Treatment plans also should be tailored to the individual's medical and personal needs and should include all of the following elements: an evaluation of drug susceptibility with a strategy for effective treatment and prevention of transmission; a provision for directly observed therapy in a convenient place such as a hospital, community clinic, homeless shelter, private physician's office, or residential care setting;<sup>741</sup> and a creative array of incentives and support structures to help ensure the person completes the full course of treatment. An imaginative range of incentives to encourage voluntary completion of treatment could include hot

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739. See IMPROVING PATIENT COMPLIANCE IN TUBERCULOSIS TREATMENT PROGRAMS, *supra* note 680, at 6-9; John A. Sbarbaro, *Compliance: Inducements and Enforcements*, 76 CHEST 750 (1979).

740. See generally *Strategic Plan for the Elimination of Tuberculosis in the United States*, *supra* note 45; *National Action Plan to Combat Multidrug-Resistant Tuberculosis*, *supra* note 297.

741. In order to encourage hospitals, clinics, drug treatment centers, and community-based treatment programs to provide supervision for treatment, in 1992, New York State began a \$5.8 million program of Medicaid payments for directly observed therapy. Mireya Navarro, *Medicaid Program to Pay to Monitor TB Patients*, N.Y. TIMES, Apr. 28, 1992, at B3.

meals, child care, street and neighborhood outreach, service referrals and placement, tokens and transportation expenses, modest cash payments or vouchers, and free treatment for substance abuse or mental health.

States could also assign an advocate or a public health case worker to the patient to help ensure that the patient receives the support and services necessary to assure their completion of treatment. Advocates could be recruited and trained from the patient's peer group such as a homeless peer advocate. Advocates and case workers also could assist patients in obtaining housing, government services and financial benefits, and substance abuse or mental health treatment. The core strategy for tuberculosis control, then, would move from a model of patient management to a model involving a therapeutic partnership that is more humane and arguably more effective.<sup>742</sup>

#### CONCLUSION: THE RESPONSIBILITIES OF THE STATE FOR THE CONTROL OF ANCIENT AND EMERGING DISEASE THREATS

Humanity, not very long ago, had the hubris to believe that it could control and even conquer infectious diseases, even tuberculosis, the most ancient and durable microbial infection in history. Ironically, not only has there been a resurgence of tuberculosis, but there has been a remarkable emergence of other old and new viruses, drug-resistant bacteria, and protozoans, ranging from streptococcus-A, E. coli bacteria, cryptosporidium, and hantavirus, to Legionnaires' disease, Lyme disease, and AIDS.<sup>743</sup> Moreover, "[t]he danger is greatest . . . in the undeveloped world where epidemics of cholera, dysentery and malaria are spawned by war, poverty, overcrowding and poor sanitation."<sup>744</sup>

There is no simple explanation for the resurgence of tuberculosis and the emergence of new infectious disease threats. Nor is the often sterile scholarly debate about the preeminence of biological, social, or behavioral determinants of tuberculosis and other diseases particularly instructive. There is no single approach to disease control that is sufficient. Only a broad range of biological, social, and behavioral approaches to infectious diseases will demonstrably reduce the burden of such diseases.

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742. See Letter from Mark Barnes, Associate Commissioner for Health of New York City, to Paul Schwartz, Division of Tuberculosis Elimination, Centers for Disease Control, U.S. Dep't of Health and Human Services, Nov. 16, 1992.

743. See *Addressing Emerging Infectious Disease Threats*, *supra* note 32.

744. Lemonick, *supra* note 32, at 62.

With respect to biological approaches to the control of tuberculosis, virtually no biological innovation has taken place in tuberculosis control since the middle part of this century. Despite dozens of clinical trials, and a place as the world's most widely used vaccine, the efficacy of the BCG vaccine still has not been demonstrated and its form still is not consistent. In addition, the diagnosis of tuberculosis continues to rely on two of the oldest and most uncertain methods of detection, the tuberculin skin test and the chest X-ray. Reliance on these two methods of detection has left many of the most vulnerable persons, such as persons with HIV infection and other immune deficiencies, underprotected. Moreover, despite the rapid increase in multidrug-resistant strains, it commonly takes many weeks to perform standard drug susceptibility tests. Once treatment begins, it is painstakingly long, and often produces marked adverse effects, making it exceedingly difficult to complete a course of prescribed therapy. Finally, no new medications which treat tuberculosis have been developed within the last several decades. While the deficiencies in recent biological innovation are inexplicable, they did not occur because of an apparent reduction in the burden of the disease, for tuberculosis has never been abated in poorer areas of America and in developing countries.

With respect to the social approaches to the control of tuberculosis, the association of tuberculosis and many other health conditions with race, poverty, homelessness, and institutionalization are so deep and persistent over time, that it is impossible to escape the conclusion that impoverished social conditions are a powerful causal factor in the spread of disease. Comprehensive programs in housing, poverty, sanitation, nutrition, health care, and public health would substantially reduce the morbidity and mortality due to tuberculosis. However, improvement in underlying social conditions is costly and, ultimately involves allocative decisions that remain under the control of the political branches of government. Thus far, the political process has failed to give sufficient weight to the normative values behind disease reduction.

Despite the overriding importance of biological and social determinants of tuberculosis, most of the academic discourse on the tuberculosis epidemic has centered on behavior change. Behavior change is, by no means, irrelevant to the effective reduction of tuberculosis and other diseases such as HIV infection. However, the exercise of state police powers is not the only—and certainly not the most cost effective—method of obtaining behavior change. Changing human

behavior is highly complex and difficult to understand, and requires a multidimensional strategy.<sup>745</sup>

One dimension of behavior change focuses on the much discussed dichotomy between voluntary and compulsory interventions. However, despite over a century of constitutional jurisprudence on the exercise of public health powers, today little clear guidance exists concerning the most basic aspects of compulsory intervention: the need for individualized determinations; the level of risk necessary to justify compulsion; the duty to explore less intrusive alternatives, the kinds of alternatives that are required to be explored; the nature and extent of procedural due process required; and the extent to which judicial, rather than merely clinical, determinations are required.

Another dimension of behavior change focuses on the dichotomy between the duties of the state and the responsibilities of the individual. Many legal commentators understandably emphasize the responsibility of individuals to conform their behavior to legal requirements—for example, through compulsory testing, treatment, and detention. However, more effective and less burdensome approaches focus on statutes requiring the state to provide services designed to change behavior. Public health interventions such as counseling, voluntary screening, incentives for treatment, and broad-based education can be highly effective agents for behavioral change.

The theoretical problem behind using compulsory powers directed against the "recalcitrant" to control tuberculosis is that the use of compulsory interventions focuses efforts on changing the behavior of one individual, while virtually ignoring the aggregate effect of compulsory interventions on the health of the population.<sup>746</sup> After all, compulsory interventions against a single individual may actually increase overall health risks by deterring many others from seeking health care or entering public health programs. Effectuating state objectives for population based behavioral change requires an innovation in thinking about public health law. Ultimately, the achievement of valid health goals may require an examination, not so much of individual behavior, but of the actions of the state itself.

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745. See Ronald Bayer et al., *Trades, AIDS, and the Public's Health*, 83 GEORGETOWN L.J. (forthcoming 1994) (book review); William Estrich, 61 U. CHI. L. REV. 733 (1994) (book review).

746. See generally Scott Burris, *Thoughts on the Law and the Public's Health*, 22 J.L. MED. & ETHICS 141 (1994); Lawrence O. Gostin, *The Future of Communicable Disease Control: Toward a New Concept in Public Health Law*, 64 (Suppl.) MILBANK Q.: HEALTH AND SOC'Y 79 (1986).