

# Incidence Of Tuberculin Test Conversion Among Employees Of A Metropolitan Hospital

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*There is a dread disease which . . . is so gradual, quiet and solemn, and the result so sure, that day by day and grain by grain the mortal part wastes and withers away, so that the spirit grows light and sanguine with its lightening load . . . a disease in which death and life are so strangely blended, that death takes the glow and hue of life, and life the gaunt and grisly form of death; a disease which medicine never cured, wealth never warded off or poverty could boast exemption from; which sometimes moves in giant strides and sometimes at a tardy, sluggish pace, but slow or quick, is ever sure and certain.*

— Charles Dickens

*The Lives and Adventures of Nicholas Nickelby*

Hospital employees are a group at high risk for contracting tuberculosis.<sup>1</sup> The incidence of tuberculosis, after falling about 5 percent yearly since 1953,<sup>2</sup> has increased 20 percent in the United States since 1985.<sup>3</sup> This increase is due to many factors, but several authors have cited the increasing numbers of persons with human immunodeficiency virus (HIV) infection as the most important cause of this increase.<sup>4-7</sup> Few studies have examined whether there has been a concomitant rise in tuberculin test conversion among hospital employees.

Although known in antiquity,<sup>8</sup> tuberculosis was rare before the Industrial Revolution.<sup>9</sup> Since the Industrial Revolution tuberculosis has become the most prevalent infectious disease, infecting one-third of the world's population.<sup>10</sup> Ten million Americans are now infected with tuberculosis.<sup>11</sup> Besides health care workers and those infected with HIV, others at higher risk for tuberculosis include those born in countries where tuberculosis is endemic; those who are poor, institutionalized, homeless, or intravenous drug users; and those who have chronic diseases.<sup>12</sup>

Adler<sup>13</sup> reported a 1970s study of nonurban hospital employees who had a conversion rate of 2 percent. Raad, et al.<sup>14</sup> reported conversion rates of employees in university hospitals to be between 0.5 and 2.3 percent during the years 1984 through 1987; Price, et al.<sup>15</sup> reported studies showing conversion rates of hospital employees in the 1970s at between 0.11 and 2.9 percent; and Chan and Tabak<sup>16</sup> cited hospital employee conversion rates between 1.3 and 3.96 percent in studies done during 1979 to 1981.

Our study addressed two questions: (1) What is the incidence of tuberculin skin testing conversion in Saint Paul Medical Center? (2) Is the rate of conversion similar to that found in previous studies done with hospital employees before 1985?

## Methods

Saint Paul Medical Center is a 600-bed nonprofit private hospital affiliated with the University of Texas Southwestern Medical Center in Dallas. Saint Paul had 15,297 admissions in 1992. In addition to a large private medical staff, Saint Paul Medical Center has residencies in family practice, internal medicine, obstetrics and gynecology, and general surgery.

In 1993 Saint Paul employees cared for 8 patients with pulmonary tuberculosis (none were HIV antibody positive), and there were 149 admissions for patients who had acquired immunodeficiency syndrome (AIDS). Additionally, about 8 patients were cared for daily in a day program for patients with AIDS.

This study was conducted from 1 January 1993 to 31 December 1993. All hospital employees and volunteers are required to have annual tuberculin testing. Testing for a boosted response to purified protein derivative (PPD) was not done. The test used was the Mantoux test (5 tuberculin units of PPD), and all tests were administered and read by the employee health nurse at 48 to 72 hours after administration. Questionable results were confirmed by the second author. A conversion was an annual test with a skin reaction of 10 mm of induration or a postexposure test of 5 mm of indura-

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tion. All subjects completed a 1-page questionnaire about previous tuberculin testing and tuberculosis exposure. Newly hired employees later discovered to have had a previous positive tuberculin test were excluded from the study, so that each person had two Mantoux tests about 1 year apart administered and interpreted by the same person. The incidence was then computed.

## Results

Of the 1776 persons who received tuberculin skin tests between 1 January 1993 and 31 December 1993, 9 participants were excluded because of a history of a previously positive tuberculin test and 69 participants were excluded because they were newly hired.

Of the remaining 1698 participants 1651 had negative tuberculin tests and 47 had positive tuberculin tests, for an incidence of 2.8 percent.

The median age of those with positive tuberculin skin tests was 47 years. Thirty-four percent worked in patient care, 23 percent in housekeeping, 17 percent in administration, 8 percent each in the laboratory and home health, 4 percent in dietary, and 2 percent each in the emergency department and respiratory care.

## Discussion

The tuberculin test conversion rate of Saint Paul Medical Center employees in 1993 is similar to rates reported in earlier studies.<sup>13-16</sup> There might have been selection bias, because about 300 (15 percent) of the hospital employees did not receive tuberculin tests in 1993. The incidence could have been overreported, because no employee underwent booster testing. Because the incidence of conversion of Saint Paul employees before 1993 is not known, it is possible that there was an unnoticed increase.

Price, et al.<sup>15</sup> suggested in their report of a large North Carolina study that hospital employee tuberculin conversion rates are similar to the community in which the hospital is located. The incidence of tuberculin test conversion in Dallas County is not known, but it is interesting to note that when Saint Paul Medical Center tested 75 mostly middle-class teenage hospital volunteers (who were not part of the study) for tuberculosis infection in June 1993, 6 (8 percent) who gave a history of negative PPD testing were positive. Nationwide, the incidence of tuberculosis infec-

tion in selected urban areas in 1977 varied from between 3 percent in young children to a range of 14 to 40 percent in adults older than 65 years.<sup>17</sup>

These data support the notion that our hospital has a tuberculin test conversion rate similar to that found in previous studies of hospital employees before the increase in tuberculosis in 1985.

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