Tuberculosis Among College Students

Report on a 4-year case-finding and followup program at Florida State University

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AVAILABLE DATA on the incidence of tuberculosis in the general population as well as in various select groups represent at best only a minimum of the actual number of persons infected. On the basis of 3.5 million small roentgenograms of the chest made during 11 surveys from 1947–49 (*1*), "the overall incidence of pathologic changes suspected of being tuberculous was 2 to 5 percent." As might be anticipated, a greater number of active cases of the disease were found among older age groups.

It is only within recent years that the problem of this disease in college and university students has begun to receive the attention which it merits, and the data available to the present time are still very meager. In an attempt to determine the scope of activity in this field, the tuberculosis committee of the American College Health Association in 1952 submitted questionnaires to 1,068 colleges and universities requesting information as to whether or not some kind of tuberculosis control program was in effect. Replies were received from 672 of the institutions, of which 548 (81.5 percent) indicated that they did have some type of control program.

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Ohio State and Other Studies

In the 13th annual report of the University of Virginia Department of Student Health for 1950–51, it is aptly stated that "the disclosed incidence of active tuberculosis in college groups (with its accompanying infectiousness and public danger) has been shown to be directly proportional to the thoroughness of appropriate diagnostic surveys." Dr. William T. Palchanis has undertaken an extensive 5-year study of this disease at Ohio State University. During this total period of time, he has done tuberculin skin tests on 28,422 students of whom 3,530 (13.8 percent) gave a positive reaction. In conjunction with these tuberculin tests, 29,844 students had chest X-rays, with the result that 16 had radiological evidence of active tuberculosis, 10 had questionable activity, and 112 had inactive lesions. A histoplasmin skin test

was also done on these students, and 10,873 (48.4 percent) gave a positive reaction.

Warren E. Forsythe in the report of the University of Michigan Student Health Service for 1950–51 reported 11 cases of active tuberculosis in the student body for the year 1950–51, from a total enrollment of 24,305.

During the 5-year period beginning in 1945, Shaw (*2*) examined 1,113 medical and dental students at Guy's Hospital in London and found 11 cases of tuberculosis at the time of entry; an additional 10 cases were discovered after entry into the medical or dental school. Of the original 11 cases, only 1 was diagnosed as "apparently inactive," and this individual had a subsequent breakdown of the lesion. All the remaining 10 had some degree of activity when the diagnosis was first made. Epifanio (*3*) in 1952 reported the results of a 10-year study of the problem of tuberculosis in university students in Uruguay. During this period of time, 12,285 students were examined by means of photoroentgenograms and tuberculin tests, and 193 cases of the disease were found. These patients were treated by private physicians of their own choice, and the author reports 72.5 percent as "total cures," and 1.6 percent fatalities.

Kemp (*4*) reported on 28,880 X-rays obtained on students at the University of Texas between November 1946 and October 1947. Five-tenths percent of these students were found to have tuberculosis in some stage. An additional 0.4 percent had some type of nontuberculous pathology. No data are given on the recurrence rates in the cases of tuberculosis that were found. Canuteson (*5*) in 1948 reported the results of a study of 24,468 students admitted to the University of Kansas between the years 1932–46, inclusive: A definite diagnosis of tuberculosis was made for 87. Follow-up studies are not reported.

The tuberculosis committee of the American Student Health Association reports that of 345,158 students examined by X-ray in 1,954 colleges for the academic year 1945–46 (*6*), 139 were found to have tuberculosis. Two hundred and ninety-one cases were discovered by tuberculin-testing programs employed in 105 colleges having a total enrollment of 360,599. The total number of all cases diagnosed for 1946–47 was 630; 590 students were diagnosed as "arrested" and were permitted to resume or continue their college work. Data on the rate of recurrence of activity in these 590 students are not presented in the report.

Cox and Sutherland (*7*) in 1946 reported on the incidence of all forms of tuberculosis in a group of 502 medical students and 630 graduate students in New Zealand. They found the overall incidence of active tuberculosis to be 2.76 percent after the commencement of medical study. No data are presented on followup studies of these patients. Sayago and del Arroyo (*8*) in 1946 published a report of a tuberculosis survey on 328 medical, dental, and pharmacy students, 95.8 percent of whom had a positive Mantoux test, but only 3.3 percent had radiographic evidence of active or suspicious pulmonary lesions.

Palchanis (*9*) has arrived at the very important conclusion that the incidence of tuberculosis in individuals who do not participate in voluntary survey programs is approximately 10 times as great as among those who do. If his data can be applied generally, it would have to be assumed that in order to be representative of the total number of cases, an X-ray would have to be mandatory for all individuals in a group or population. Undoubtedly, this factor is frequently overlooked in routine college surveys, for in many of our institutions the chest X-ray is obtained on a purely voluntary basis.

Florida State University Study

Over a 4-year academic period beginning in September 1948 and ending in July 1952 a study was conducted at the Florida State University, Tallahassee, Fla. It was based largely on radiographic studies made by mobile units of the Florida State Board of Health at the time of each fall registration. X-rays were also made at the beginning of the 1951 summer session. Late registrants and others who for various reasons were missed at the time of the mass surveys were called to the university hospital where films were made in the department of radiology. Radiographic interpretations were made by Dr. C. M. Sharp, director, bureau of tuberculosis control, Florida State Board of Health.

From the outset, every effort was made to make this procedure mandatory for the entire student body. During the first 2 years of the study, however, certain small religious groups vigorously opposed the X-ray as a requirement for admission to Florida State University, and for them it was waived. In later years, this opposition was largely overcome, and no known exceptions were permitted. The faculty and staff of the university were also X-rayed, on a compulsory basis, during the 4-year period, but the results obtained on these groups will not be reported at this time.

On the basis of these procedures, 21,855 radiographs were made, a figure roughly 4 times the total enrollment for any one year, since all students were X-rayed at the beginning of each academic year. For those students, therefore, who were beginning their freshman year in 1948, 4 X-rays were made, while correspondingly fewer films were obtained for the other classes.

On the basis of these survey films plus the application of additional diagnostic measures wherever indicated, 19 cases of tuberculosis were discovered for the entire 4-year period. Of these, 7 had been previously undiagnosed, and the remaining 12 were old cases. Each of the 7 new cases was promptly withdrawn from the university and was admitted to a sanatorium. Of the remaining 12, 1 received a disciplinary dismissal from the university for causes not related to his tuberculosis; 1 was enrolled as a "special student" and took only 1 or 2 courses at a time; 1 failed to return to the university after the first year, and 7 of the remaining 9 were compelled to interrupt their education at least once as a result of the development of activity of the lesion.

It may be said, therefore, that of the 12 apparently arrested cases who were permitted to enroll in the university during this 4-year period, only 2 continued their education without interruption. One of these has now graduated. The other has remained continuously in school but has not yet graduated.

World War II Veterans

Most of the published data on tuberculosis in university students have dealt largely if not solely with statistics on the numbers of active and inactive lesions, and the results of various studies in institutions of higher learning in the United States are being tabulated from year to year by the Committee on Tuberculosis Control of the American College Health Association. Only a few of the studies reported, however, deal with the problem of the reactivation of old lesions. It has been this factor of the rate of recurrence of activity which has been given primary attention in the present study at Florida State University.

The problem of whether or not to permit an individual with an "inactive" or "apparently arrested" case of tuberculosis to enter a university deserves a great deal of consideration by the medical personnel responsible for making such decisions. Most of the patients in this classification in the present study were World War II veterans in whom the disease was classified as "service-connected." All of them arrived at the university with a statement from the Veterans Administration or some other responsible medical authority to the effect that appropriate studies had indicated that their disease process "had reached a state of arrest."

In most instances, the applicant brought a medical opinion to the effect that he was physically able to attend a university. An opinion such as this is exceedingly difficult to evaluate. In the first place, a wide variety of medical advice is sought by individuals with tuberculosis, and the criteria upon which recommendations for future conduct are based are at best not uniform. In the second place, a student who becomes an integral part of the life of a university almost always finds that demands are made upon his time and resources which he had not anticipated and which would not be brought to bear in a life outside an institution of higher learning.

Specifically, during times of increased emotional tension, as in examination periods, the student feels called upon to put forth an added amount of energy in order to make a superior showing. At times such as these he usually convinces himself that it will be safe to forego the prescribed rest periods and other measures designed to facilitate his full recovery.

The likelihood of recurrence of activity in in-

active lesions in patients involved in the study at Florida State University does not appear to have been significantly affected by the amount of work they were allowed to take at any given time, or by the length of time the disease process had been arrested. For example, one patient had qualified under the criteria set forth in Diagnostic Standards (*10*) as an inactive case for more than 5 years. In October 1951, a routine chest film disclosed no change in the status of the lesion, but 3 months later the patient had developed marked extension of the process with evidence of cavitation. So far as could be determined, he had not deviated from his prescribed routine of conduct during this 3-month period. This, then, represents an example of a case of tuberculosis which had been arrested for 5 years, but which developed into a very explosive lesion while the patient was a student. It further serves to emphasize the necessity of frequent, adequate followups even for those persons presenting evidence of long periods of inactivity.

Advantage in Review Boards

In passing upon the advisability of allowing an individual with a known tuberculosis lesion to become or remain a student in a university, the physician must be forever mindful of the danger to other members of the student body and faculty, should this lesion break down. It is exceedingly difficult to deny an application for admission on this basis alone, but the danger of the spread of the infection to well students is so important as to dictate this decision in many instances.

In order to make the best possible judgment in doubtful cases, or possibly in all cases, some universities have found it to be advantageous to appoint a special medical board to review applications from prospective students who are known to have had tuberculosis. Such a board was appointed by the president of Florida State University in 1951. Its membership includes the State health officer, the director of the bureau of tuberculosis control of the State board of health, the director of the State tuberculosis hospital program, the director of the regional tuberculosis hospital, the county health officer, the medical director of the university hospital, and a representative from the medical society of the county in which the university is located. A committee such as this could not function satisfactorily in the absence of complete cooperation of all those concerned. At the Florida State University it appears to be an ideal way of handling these very difficult cases.

Summary

In summary, during the period of the study at Florida State University, 7 active, previously undiagnosed tuberculosis cases were identified, and 12 previously diagnosed cases were studied at the university. All 7 of the new cases were withdrawn from school at the time of diagnosis and referred to sanatoriums for treatment. Of the 12 students with arrested lesions, 3 did not return to the university for reasons not related to their pulmonary disease. One of these is known to have developed active tuberculosis in the armed forces. Only 1 of the 9 remaining in this category has been able to graduate without having to withdraw at least once because of recurrent activity. One student has remained continuously in school but has not yet graduated. Thus, all 7 patients with previously undiagnosed tuberculosis and 7 of 12 patients with old tuberculous infections evidenced activity at the time of diagnosis or before completing their college education.

The inference that all persons with arrested tuberculosis should be denied admission to a university is not justified and should not be drawn from the small number of cases reported here. The indication is, rather, that an energetic case-finding and followup program is essential.

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From the SOCIAL SECURITY BULLETIN . . . . .

Workmen's Compensation: Measures of Accomplishment

Various measurements of the scope and adequacy of workmen's compensation programs, developed over a period of years by the Social Security Administration's Division of Research and Statistics, are summarized in the March 1954 Social Security Bulletin. The authors, Dorothy McCamman and Alfred M. Skolnik, also present detailed analyses of newly available data.

Coverage of the State and Federal programs now extends to almost 4 out of every 5 civilian wage and salary workers and to a slightly higher proportion of civilian wages and salaries. Covered payrolls in 1952 amounted to $135–140 billion, a 287-percent increase over 1940. The number of workers actually protected by the program, 38½ to 39½ million in the average month of 1952, is measured against the number who might be covered if the laws did not exclude such groups as agricultural and domestic workers and employees of small firms.

Summary data on benefits for the 1939–52 period show a 1952 total of $787 million—$527 million in compensation payments and $260 million in medical benefits. This total represents a 235-percent increase over 1939. To account for a slower rate of growth in benefit payments than in covered payrolls, the authors draw on Bureau of Labor Statistics data on work accident rates but find only partial explanation therein.

Six-tenths of all covered workers were in State where the maximum benefit payable for temporary total disability, in 1952 and after the liberalizations of 1953, was 40–50 percent of the average wage earned the preceding year. The article also includes a rough calculation of the effect of the waiting period in further reducing the proportion of wage loss which would be compensated in the average case of temporary total disability.

The cost to employers of protecting their workers under compensation laws was $1⅓ billion in 1952—just under 1.0 percent of covered payroll. For ratios of incurred losses to earned premiums and for expense ratios use is made of published data on the countrywide business of private carriers operating in New York State, representing about 80 percent of the total business underwritten for United States employers by insurance companies.

Reported are the results of a project designed to produce an estimate of the number of injured workmen and survivor families currently drawing cash compensation payments. Only a broad range—rather than definitive figure—could be developed, despite generous assistance from the major underwriters of workmen's compensation business.

Social Security Bulletin is issued monthly by the Division of Research and Statistics, Social Security Administration. $2 a year ($2.75 foreign mailing). 20 cents a copy. Superintendent of Documents, Washington 25, D. C. (Reprints will be available.)
