Tuberculin Skin Testing in Secondary Schools in Baltimore County, Maryland

Operation Skin Test

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INTRODUCTION

A TUBERCULIN SKIN-TESTING PROGRAM was implemented in Baltimore County, Maryland, in January, 1958, 50 years after Mantoux had devised the intradermal method of administering tuberculin material for testing human beings. This paper presents the results of five years of skin testing tenth grade students in Baltimore County high schools.

At the time this program was introduced, it was felt that not enough was being done in the way of tuberculous case-finding in Baltimore County. True, mass chest x-ray surveys were being conducted throughout the county, but it was felt that these surveys were missing a very important, large segment of the population, the early teen-ager. Up to that time, it was the practice to offer chest x-ray films to the senior classes of the county high schools during alternate years. This amounted to about 3,000 chest roentgenograms every other year. There was too much lacking in this program. In addition, the follow-up program was rather incomplete, what with graduation and students leaving for college, military service and marriage. There was also a great deal of question as to the yield of the x-ray program for the amount of time and money invested.

ORGANIZATION AND METHODS

In the summer and fall of 1957, many conferences were held in conjunction with Dr. Leon H. Hetherington, Chief, Bureau of Tuberculosis, Maryland State Department of Health and with the Directors of the Divisions of School Health Services and Nursing Personnel of the Baltimore County Department of Health. At these conferences, there was also representation from the Board of Education of Baltimore County, the Catholic Board of Education and the Baltimore County Public Health Association. It was evident from the start that the Division of Tuberculosis Control could not carry out this program alone. Cooperation of all the units involved accounts for the success of this project.

The skin-testing program was dubbed "Operation Skin Test" and each test year was denoted by a Roman numeral (as will be seen in the various tables of results). The Catholic high schools were included because they account for about 19 per cent of the high school population in Baltimore County, and because of the close cooperation given by them in various health and education projects.

It was decided to test the tenth grade students of the secondary schools because the Board of Education advised this was the last grade in the educational system with the highest number of students. By the time the 12th grade was reached, there was a "drop-out" rate approaching 50 per cent. This disclosure was rather surprising to all concerned. It was checked against the census tables and was substantiated by the fact that the median average number of completed school years in Baltimore County was 10.9 years.

Discussion arose as to whether an elementary school grade should also be tested. This was deemed desirable, but due to budgetary reasons, could not be implemented at the time.

The average age of students in the tenth grade was somewhere between 15 and 16
years. The test offered was the standard Mantoux method, using a commercially prepared intermediate strength purified protein derivative. The testing procedure was explained in detail to the students and their parents. Tuberculosis and its implications was introduced into the curriculum of the students wherever possible. The testing was offered on a voluntary basis and written parental permission was requested.

The actual testing was performed by specially trained public health nurses, in teams of two, using volunteer personnel for clerical assistance and for preparing the arms of the students to be tested. In the interest of conserving time, platinum needles were used on one ml. tuberculin syringes. The tip of the needle was flamed over an alcohol lamp between each test. The testing was carried out at each high school on a prearranged schedule. The testing days were Monday and Tuesday. The nurses returned for reading the tests in 48 hours, that is, Wednesday and Thursday. Friday was used for preparing their statistics and checking their supplies and equipment.

After due consideration of some of the recent literature, it was decided that a reaction of 5 mm. or more in its greatest transverse diameter would be considered positive. At its annual meeting in May, 1960, the Committee on Diagnostic Skin Testing of the American Trudeau (now Thoracic) Society gave this as its official recommendation.

All students having a reaction were encouraged to have a chest x-ray film. The mobile x-ray units were utilized for this phase of the program. The units were set up at various key school locations, and 70 mm. films were taken. Bus service was available for students from outlying high schools. If, for any reason, a student missed the mobile x-ray unit, he was referred to his local health center where a 14 x 17 inch film was obtained.

To impress all reactors of the importance of their positive state and to further case-finding, they were again approached for chest x-ray films in the 11th and 12th grades in subsequent years at the time of the then current skin-test program.

The medical profession cooperated fully in Operation Skin Test. Before the program was implemented, the Baltimore County Medical Association was fully apprised of it and they gave their approval. In addition, when the testing was first presented to the students, they were given the option to have the studies done by their private physicians. However, not many students accepted this alternative, so that tuberculin skin testing in secondary schools has become almost exclusively a function of the Department of Health.

The program actually started in January, 1958. The winter of that year was a particularly bad one in regard to snow storms and an outbreak of severe respiratory infections. These have remained our biggest problems each year. We have tried to schedule the testing for as early in the school year as possible. In the past few years, we have been successful in completing the program before the Thanksgiving holiday.

Results of Operation Skin Test

For statistical purposes, Baltimore County was divided into five areas which were referred to as school districts. These school districts were established on the basis of census figures and high school population studies as supplied by the Board of Education of Baltimore County. The total number of high schools participating in Operation Skin Test varied from year to year. This was related to the growth of the population, opening of new schools, closing of old schools and desegregation. Figure 1 is a map of Baltimore County showing the five school districts, Catonsville, Pikesville, Towson, Kenwood and Dundalk, with the various high schools in their respective districts. Notice the number of high schools concentrated in the Towson district. Towson is the county seat and of a higher socio-economic level. Many of the schools here are private Catholic schools. The
Catholic high schools in the program were either private, wherein the students paid a substantial tuition, or parochial, wherein the students paid a small or no tuition.

Table 1 shows that the total number of students in the tenth grade during the five years of the study was 29,741, of which 25,875 were skin tested. This represented 87.0 per cent participation. The testing was about equally distributed between the sexes, but less than 4 per cent of those tested were non-white. Almost 90 per cent of the testing took place in public schools.

The total reactors numbered 1,893 or 7.3 per cent of the students tested. Boy reactors outnumbered girl reactors by about two-thirds to one-third. Since most of the students tested were white and in public schools, many more reactors were found in these two categories.

Table 2 compares the number of reactors to the number of students tested and gives a breakdown of the participation and reactors year by year. Notice that the number of students in the tenth grade has, in general, been increasing each year and likewise, the number of students tested has been increasing. The percentage of reactors was 12.1 and 8.9 in the first and second years of skin testing. Since then, the reactors have leveled off at an average of 5.7 per cent. However, for the purpose of this present report, the average for five years is taken at 7.3 per cent. The first and second years were probably high because of over-zealousness in reading the skin tests by the teams of nurses. This over-zealousness in reading is reflected in all the statistical

Table 1—Over-all Summary of Tuberculin Skin-testing Program

| Number of Students in Tenth Grade | 29741 |
| Number of Students Tested | 25875 | 87.0% |
| Boys | 13423 | 51.9% |
| Girls | 12452 | 48.1% |
| Whites | 24872 | 96.1% |
| Non-whites | 1003 | 3.9% |
| Public Schools | 23039 | 89.0% |
| Catholic Schools | 2836 | 11.0% |
| Number of Reactors | 1893 | 7.3% |
| Boys | 1184 | 62.5% |
| Girls | 709 | 37.5% |
| Whites | 1689 | 89.2% |
| Non-whites | 204 | 10.8% |
| Public Schools | 1754 | 92.7% |
| Catholic Schools | 139 | 7.3% |
| Number of Chest X-ray Films Taken | 1772 | 93.6% |
| Number of Significant Chest X-ray Films | 14 |
| Number of Positive Reactors with History of Tuberculosis Contact | 336 | 17.7% |
tables that follow. We have endeavored to use the same teams since that time and they have become proficient in this project.

Figure 2 graphically demonstrates the finding that as more students have been tested there has been a drop in the number of reactors and a leveling out of the percentage of reactors in the last three years.

As mentioned previously, the testing was equally distributed between the two sexes. In Table 3, the positive reactors among boys and girls are compared. Of the boys tested, 8.8 per cent were positive, while 5.7 per cent of the girls tested were positive. The percentage of positive boys was persistently higher than the girls in each year of the program.

Table 4 shows a similar comparison by race. The number of non-white students tested was actually quite small, 1,003, or less than 4 per cent of the total tested. Of the white students, 6.8 per cent were positive reactors. However, 20.3 per cent of the non-white students tested had positive reactions. Each year of the program, the non-whites had two to three times as many reactors, percentage-wise, as the white students.

It is pertinent at this time to mention again the fact that the greatest concentration of the non-white population in Balti-

<table>
<thead>
<tr>
<th>Year of Program</th>
<th>Total Students Tested</th>
<th>Boys Positive</th>
<th>Girls Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total for Five Years</td>
<td>13423</td>
<td>12452</td>
<td>1184</td>
</tr>
</tbody>
</table>

| No. I | 2124 | 2148 | 313 | 14.7 | 202 | 9.4 |
| No. II | 2318 | 2187 | 249 | 10.7 | 154 | 8.7 |
| No. III | 2500 | 2281 | 182 | 7.3 | 88 | 3.9 |
| No. IV | 2949 | 2621 | 191 | 6.5 | 116 | 4.4 |
| No. V | 3532 | 3215 | 249 | 7.0 | 149 | 4.6 |

Table 2—Summary of Students Tested and Positive Reactors

<table>
<thead>
<tr>
<th>Year of Program</th>
<th>Number of Students Tested</th>
<th>Number of Positives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total for Five Years</td>
<td>29741</td>
<td>25875</td>
</tr>
<tr>
<td>No. I</td>
<td>5066</td>
<td>4272</td>
</tr>
<tr>
<td>No. II</td>
<td>5535</td>
<td>4505</td>
</tr>
<tr>
<td>No. III</td>
<td>5430</td>
<td>4781</td>
</tr>
<tr>
<td>No. IV</td>
<td>6227</td>
<td>5570</td>
</tr>
<tr>
<td>No. V</td>
<td>7483</td>
<td>6747</td>
</tr>
</tbody>
</table>

Table 3—Sex Distribution of Reactors

**Figure 2:** Graphic comparison of percentage of students tested to percentage of reactors.
Table 4—Racial Distribution of Reactors

<table>
<thead>
<tr>
<th>Year of Program</th>
<th>Total Students Tested</th>
<th>White Positives</th>
<th>Non-white Positives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Non-white</td>
<td>Number</td>
</tr>
<tr>
<td>Total for Five Years</td>
<td>24872</td>
<td>1003</td>
<td>1689</td>
</tr>
<tr>
<td>No. I</td>
<td>4043</td>
<td>229</td>
<td>439</td>
</tr>
<tr>
<td>No. II</td>
<td>4252</td>
<td>253</td>
<td>359</td>
</tr>
<tr>
<td>No. III</td>
<td>4614</td>
<td>167</td>
<td>240</td>
</tr>
<tr>
<td>No. IV</td>
<td>5429</td>
<td>141</td>
<td>287</td>
</tr>
<tr>
<td>No. V</td>
<td>6534</td>
<td>213</td>
<td>364</td>
</tr>
</tbody>
</table>

more County is in the Dundalk and Kenwood Districts, especially in Election District 12 (shaded area on Figure 1). Election District 12 is the smallest election district in Baltimore County, and yet is the third most populous. A large percentage of the population here is non-white. This non-white group may be economically classified as middle-class. The older members of this group were attracted to this area because of the well-paying jobs in the steel mills and other heavy industry. Overcrowding and poverty apparently are no great problem here at present. We feel that this population is well seeded with tuberculosis and that the large numbers of reactors bear this out.

The preponderance of non-white positive reactors has been demonstrated repeatedly in the literature. It is apparent that this finding reflects the higher morbidity and mortality from tuberculosis that is found among non-whites throughout various parts of the country. Baltimore County seems to conform to this pattern because the non-white population of Election District 12 is considered a “hot-bed” of tuberculosis.

Table 5 gives a summary of positive skin tests by race and sex. The largest group involved in the program was the white boys, and the smallest group was the non-white boys. The largest percentage of reactors, 26.8 per cent was found among non-white boys, while the smallest percentage, 5.3 per cent was among white girls. In former days, the young white girl was the one considered to have the greatest susceptibility to tuberculosis. Our concept of this fact in Baltimore County has changed. It has been accepted that positive skin tests indicate a reservoir of potential cases and the location of these reactors delineates the area where tuberculosis control must be emphasized.

Table 6 compares the skin test results of the public high schools to the Catholic high schools. The Catholic high schools accounted for 11.0 per cent of the students tested, as was seen in Table 1. The percentage of students in the Catholic high schools participating in the skin test program was slightly higher than in the public high schools, 92.1 per cent as compared to 86.4 per cent. This may reflect a tighter control of student programs by the Catholic school administration than by public school authorities. However, the percentage of reactors in the Catholic high schools was slightly more than half that found in the public high schools. This lower number of reactors probably reflects a higher socio-economic level among students in the Catholic high schools, as was mentioned previously.

Table 5—Summary of Positive Skin Tests by Race — Sex

<table>
<thead>
<tr>
<th></th>
<th>Number of Skin Tests</th>
<th>Positive Reactors</th>
<th>Per Cent Positives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>White</td>
<td>Non-white</td>
</tr>
<tr>
<td>Boys</td>
<td>13423</td>
<td>12967</td>
<td>456</td>
</tr>
<tr>
<td>Girls</td>
<td>12452</td>
<td>11905</td>
<td>547</td>
</tr>
<tr>
<td>Both Sexes</td>
<td>25875</td>
<td>24872</td>
<td>1003</td>
</tr>
</tbody>
</table>
TABLE 6—COMPARISON OF TUBERCULIN SKIN-TESTING IN PUBLIC AND CATHOLIC HIGH SCHOOLS

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of 10th Graders</th>
<th>Number of Reactors</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Schools</td>
<td>26663</td>
<td>23039</td>
<td>93.6</td>
</tr>
<tr>
<td>Catholic Schools</td>
<td>3078</td>
<td>2836</td>
<td>92.1</td>
</tr>
<tr>
<td>Total</td>
<td>29741</td>
<td>25875</td>
<td>87.0</td>
</tr>
</tbody>
</table>

All reactors were approached for a chest x-ray film after their first tuberculin skin test. Table 7 shows that the cooperation for these chest films was fairly good, averaging out at 93.6 per cent for the five years. After the first post-tuberculin chest x-ray, cooperation fell off slightly, but still remained in the neighborhood of 90 per cent.

TABLE 7—POSITIVE REACTORS CONSENTING TO CHEST X-RAY FILMS*

<table>
<thead>
<tr>
<th>Year of Program</th>
<th>Positive Reactors Number</th>
<th>X-ray Films Taken Number</th>
<th>Per Cent</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total for Five Years</td>
<td>1893</td>
<td>1772</td>
<td>93.6</td>
<td></td>
</tr>
<tr>
<td>No. I</td>
<td>515</td>
<td>470</td>
<td>91.3</td>
<td></td>
</tr>
<tr>
<td>No. II</td>
<td>403</td>
<td>383</td>
<td>95.0</td>
<td></td>
</tr>
<tr>
<td>No. III</td>
<td>270</td>
<td>261</td>
<td>96.7</td>
<td></td>
</tr>
<tr>
<td>No. IV</td>
<td>307</td>
<td>276</td>
<td>89.9</td>
<td></td>
</tr>
<tr>
<td>No. V</td>
<td>398</td>
<td>382</td>
<td>96.0</td>
<td></td>
</tr>
</tbody>
</table>

If the 70 mm. films taken by the mobile chest x-ray units showed evidence of pathology, the student was referred to his private physician or to the local health center where further studies were performed. Table 8 gives a summary of the number of significant chest x-ray changes found that could explain a positive tuberculin reaction. These numbered only 14 for the five-year period. These chest x-ray findings were all compatible with inactive primary acid-fast infection. Again, the findings in Table 8 refer to x-ray findings on the first post-tuberculin chest films.

Only one case of active tuberculosis was found in a tenth grader as a direct result of the skin-testing program. A 15-year-old white girl had a 14 mm. reaction during Operation Skin Test No. III. The first chest x-ray film was negative. The second chest x-ray film, when she was in the 11th grade, showed minimal changes. She was hospitalized and found to have active disease.

TABLE 8—SIGNIFICANT CHEST X-RAY FINDINGS AMONG POSITIVE REACTORS

<table>
<thead>
<tr>
<th>Year of Program</th>
<th>No. of Chest X-Ray Films</th>
<th>No. of Chest X-Ray Films Showing Abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total for Five Years</td>
<td>1772</td>
<td>14</td>
</tr>
<tr>
<td>No. I</td>
<td>470</td>
<td>5</td>
</tr>
<tr>
<td>No. II</td>
<td>383</td>
<td>1</td>
</tr>
<tr>
<td>No. III</td>
<td>261</td>
<td>4</td>
</tr>
<tr>
<td>No. IV</td>
<td>276</td>
<td>0</td>
</tr>
<tr>
<td>No. V</td>
<td>382</td>
<td>4</td>
</tr>
</tbody>
</table>

In Table 9, the reactors have been summarized by the size of reaction, using 9 mm. as a dividing line. The group of 5 to 9 mm. reactions represented 54.3 per cent of the reactors, while the reactions measuring 10 mm. or more accounted for 45.7 per cent of the reactors.

The 5 to 9 mm. group may be a significant group because of possible cross-immunization reactions produced by the Battey strain of acid-fast bacteria.4,5 Sartwell and Dyke,4,6 in a Maryland study, demonstrated a fairly good correlation between skin reactions resulting from sensitivity to standard tuberculin material and an antigen prepared from the Battey bacillus.

All reactors were interviewed by a public health nurse or the school nurse in the attempt to obtain a history of tuberculosis contact. They were also strongly urged to have their household contacts x-rayed by their private physicians or at their local health centers.

This clinical case-finding effort gave rather poor results because the students gave unreliable histories. During the course of Operation Skin Test No. III, some reports4,5 were reviewed that showed there may be some correlation between large-sized reactions and clinical disease. With
TABLE 9—SUMMARY OF POSITIVE SKIN TESTS BASED ON 10 MM. REACTION

<table>
<thead>
<tr>
<th>Year of Program</th>
<th>Students Tested</th>
<th>Total Number Positives</th>
<th>Size of Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>5-9 mm. 10 mm. or More</td>
</tr>
<tr>
<td>Total for Five Years</td>
<td>25875</td>
<td>1893</td>
<td>1027</td>
</tr>
<tr>
<td>No. I</td>
<td>4272</td>
<td>515</td>
<td>306</td>
</tr>
<tr>
<td>No. II</td>
<td>4505</td>
<td>403</td>
<td>217</td>
</tr>
<tr>
<td>No. III</td>
<td>4781</td>
<td>270</td>
<td>116</td>
</tr>
<tr>
<td>No. IV</td>
<td>5570</td>
<td>307</td>
<td>162</td>
</tr>
<tr>
<td>No. V</td>
<td>6747</td>
<td>398</td>
<td>226</td>
</tr>
</tbody>
</table>

This in mind, the 10 mm. or more group was further subdivided and it was found that about half of these reactions actually measured 15 mm. or more. At this time, it was decided to interview the parents of this latter group and to urge them strongly to have chest x-ray films. Operation Skin Test No. I and No. II were included and these parents were also interviewed by the nurses.

Table 10 presents the positive reactors with a history of tuberculosis contact found by interviews of students with reactions measuring 5 to 14 mm. and interviews of parents of students with reactions measuring 15 mm. or more. Only 17.7 per cent of these interviews revealed a reliable history of contact. All but one of these contacts were known to the Baltimore County Department of Health, the Baltimore City Health Department or to some other official agency. In this one instance, a new case of tuberculosis was discovered. The father of a 15-year-old white girl was found to have tuberculosis by x-ray study.

The disease was diagnosed as clinically active and he was admitted to a sanatorium for treatment.

VALUE OF TUBERCULIN SKIN TESTING

Many reasons have been given for conducting tuberculin skin-testing programs13,14,50 and foremost among these is case-finding. However, this has not been a proved fact in Baltimore County. Only two new cases of tuberculosis were turned up, one in a student and one in a household contact. These have been described above.

In another case, a 16-year-old white boy had a negative skin test in Operation Skin Test No. III. Subsequent to this, he became a contact of an uncle with active tuberculosis. The uncle was hospitalized and the boy was placed on prophylactic chemotherapy. A chest x-ray film on April 3, 1961 was essentially normal, but a repeat film on September 30, 1961 showed minimal active disease. This boy was hospitalized for further treatment. When it was learned that he had active tuberculosis, all of his school contacts were skin tested. It was found that four contacts had converted their skin tests from negative to positive within a one-year period. These four students were put on prophylactic chemotherapy. Another five contacts were found to have converted, but in a period of two years or more. It was decided to x-ray this group every three months for one year, and then annually for another two years. Thus, it may be seen that this case of tuberculosis would have been diagnosed in spite of the skin test, but the skin testing helped us pick up the converters.

The question of large reactions and their relationship to clinical disease has been mentioned previously. On occasion, a private physician in Baltimore County has placed a student on prophylactic chemotherapy when the skin reaction has been very positive and there has been a strong past family history of tuberculosis.

In Baltimore County, we have felt that the tuberculin skin-test program has served two main purposes: (1) epidemiology, and (2) health education. It has told us where
our greatest number of reactors are located and, therefore, where we should concentrate our greatest tuberculosis control efforts. It has brought the message of tuberculosis and its implications to the attention of the people, especially the young people. There apparently is still some stigma attached to having a history of tuberculosis in the family because we felt that our contact studies did not tell us enough. However, we now feel that the program has helped to dispel some of the fears surrounding tuberculosis.

**Tuberculin Skin Testing in Baltimore City**

From a perusal of the map in Fig. 1, one may appreciate how Baltimore County sprawls over 610 square miles and embraces Baltimore City like a horseshoe. Many of our public health problems in Baltimore County are shared by Baltimore City.

The greatest non-white population is concentrated in the center of Baltimore City. In recent years, the flow of this population has been to the northwest section of the city. This has followed increased incomes by non-whites and their subsequent search for better homes. There is not too much migration of non-whites from the city to the county, but when it does occur, they usually move to established non-white neighborhoods.

There is no tuberculin skin-testing program, as such, in Baltimore City. The Baltimore City Health Department conducts skin-testing programs at schools whenever tuberculosis is discovered in a student. The entire school is then skin tested on a voluntary basis. Most of the schools tested so far have been predominantly non-white schools in the central area of the city. The statistics show that about 12 per cent of the non-white students and about 6 per cent of the white students were reactors. Most of the non-white reactors were boys. The 5 to 9 mm. group of reactions accounted for 50 per cent of the positive reactors. Special note was made of this group because of the question of atypical disease. Tuberculin sensitivity has followed the non-white migration to northwest Baltimore.

Contact studies and case-finding have not been much more successful in the city than in the county. For this reason, the Baltimore City Health Department has used tuberculin skin testing as an epidemiologic tool and for health education. They do not plan any large skin testing program in the future.

**Tuberculosis in Metropolitan Baltimore**

There is no doubt that tuberculosis is a significant disease in Maryland, particularly in metropolitan Baltimore. The 1960 census revealed that the population of Maryland numbered about 3,120,000.* Death from tuberculosis in the United States was at a rate of 6 per 100,000, and in Maryland the rate was 8 per 100,000. Of these deaths, 25 per cent represented tuberculosis that was being reported for the first time. This is a highly significant figure for it shows how a population group may be silently seeded with infection.

New active cases of tuberculosis occurred at a rate of 31 per 100,000 in the United States. The rate for Maryland was 50, which is considerably higher. However, most of this tuberculosis, no doubt, was centered in Baltimore City where the rate was 88. This rate was the highest for any city in the nation. The Baltimore County rate was 31, which coincided with the national rate. The statistics for Baltimore City show that most of the tuberculosis here is concentrated in the 45 to 64-year-old age group, especially the non-white population.

The tuberculin skin-testing program in Baltimore County has certainly helped in pin-pointing areas and groups where the tuberculosis morbidity rate may be high.

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*The author is indebted to Dr. Robert E. Farber, Commissioner of Health, Baltimore City Health Department for this unpublished data on tuberculin skin testing in Baltimore City. At the time of this testing, Dr. Farber was Chief of the Bureau of Communicable Diseases of the Baltimore City Health Department.
and where tuberculosis control efforts should be more concentrated.

**Summary**

1. A five-year summary of tuberculin skin testing among tenth graders in Baltimore County public and Catholic high schools is presented.

2. All students having a skin reaction measuring 5 mm. or more were considered positive, and all reactors were followed by periodic chest x-ray films.

3. There was 87.0 per cent participation by the students, and 7.3 per cent positive reactors were found.

4. The largest number of reactors was found in the non-white boys, and the lowest in the white girls with the total non-white reactors outnumbering the total white reactors by 3 to 1.

5. Catholic high schools had a higher rate of participation and a lower incidence of reactivity than public high schools.

6. Of the students tested, 93.6 per cent cooperated for the first post-tuberculin chest x-ray film with only 14 of these films showing any significant changes.

7. Although 45.7 per cent of the reactions measured 10 mm. or more and about half of these were 15 mm. or more, only 17.7 per cent of all reactors could give a reliable tuberculosis contact history.

8. Because only two new cases of tuberculosis were discovered by this program, it is felt, in Baltimore County, that tuberculin skin testing has served its purpose for epidemiology and health education rather than for case-finding.

**Addendum:** The Bureau of Communicable Diseases, Baltimore City Health Department, under the direction of Dr. James E. Peterman, implemented a tuberculin skin testing program among first graders in selected public schools in Baltimore City, starting February, 1964.

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**Resumen**

1. Se presenta el resultado de las pruebas tuberculinicas llevadas a cabo durante cinco años entre los alumnos de quinto año de las escuelas públicas del condado de Baltimore, así como en las escuelas católicas.

2. Todos los estudiantes con 5 mm. o más de reacción tuberculinica se consideraron positivos y todos los reactores se observaron por exámenes periódicos a los rayos X.

3. Hubo participación por parte de los estudiantes en 87 por ciento, y se encontró 7.3 por ciento de reactivos positivos.

4. Se encontró el mayor número de reactivos en los muchachos negros y el menor en las niñas blancas en proporción de 3 a 1.

5. Las escuelas católicas participaron mayormente y en ellas la frecuencia de reactividad fue más baja que en las escuelas públicas.

6. De los estudiantes blancos, 93.6 por ciento cooperaron para primera revisión, después de la tuberculina por los rayos X. Sólo 14 de las películas mostraron cambios de alguna significación.

7. Aunque 45.7 por ciento de las reacciones mostraron 10 mm. o más, y como la mitad eran de 15 mm. o más, sólo 17.7 por ciento de todos los reactivos pudieron dar un indicio confiable de contacto con la tuberculosis.

8. Como sólo dos casos nuevos se descubrieron en este plan, se cree que en el condado de Baltimore la prueba tuberculinica ha llenado su objeto para la salubridad y la educación sanitaria más que el procedimiento de búsqueda de casos.

**Résumé**

1. L'auteur présente un résumé d'une étude portant sur cinq ans de tests cutanés tuberculiques chez les écoliers du 10 ème degré dans les lycées publics et catholiques du Comté de Baltimore.

2. Tous les étudiants ayant une réaction cutanée mesurant 5 mm. ou plus furent considérés comme porteurs de réactions positives et tous ceux qui réagirent de cette façon furent suivis par des examens radiologiques périodiques du thorax.

3. Il y eut une participation de 87% d'étudiants, et on trouva 7,3% de porteurs de réactions positives.

4. Le plus grand nombre de porteurs de réactions positives fut trouvé chez les garçons de race noire, et la plus faible chez les filles de race blanche, avec un total de porteurs de réactions positives chez les étudiants noirs surpassant le nombre total des porteurs de réactions positives de race blanche dans la proportion de 3 à 1.

5. Les lycées catholiques eurent un taux de participation plus élevé, et une fréquence plus
basse de réactivité que dans les lycées publics.
6. Parmi les étudiants soumis au test, 93,6% se souviennent au premier examen thoracique post-
tuberculine avec seulement 14 films montrant
quelque altération nette.
7. Bien que 43,7% des réactions mesuraient 10
mm. ou plus, et environ la moitié de celles-ci avaient 15 mm. ou plus, il y eut seulement 17,7%
parmi tous les porteurs de réactions positives qui purent faire état d’un contact tuberculeux cer-
tain.
8. Parce qu’il y seulement deux nouveaux cas de
 ECBERCEIN découverts par ce programme, l’auteur croit que, dans le Comité de Baltimore,
 ce programme de tests cutanés tuberculine a
 atteint son but épidémiologique et d’éducation
 sanitaire, plutôt qu’il n’a réalisé un programme
 de dépistage.

ZUSAMMENFASSUNG
1. Bericht über eine Zusammenfassung von 5
Jahren lang durchgeführten Tuberkulin-Schulkin-
dertesten bei Schulabgängern des 10. Schuljahres
in den Kreis- und katholischen Schulen von Balti-
more.
2. Alle Schüler, die eine Hautreaktion von 5
mm oder mehr im Durchmesser hatten, wurden
als positiv erfasst, und alle positiv reagierenden
Fälle wurden wurth periodische Thoraxröntgen-
untersuchungen überwacht.
3. Die Teilnahme der Schüler lag bei 87%,
und die Zahl der positiven Reaktoren betrug
7,3%.
4. Die größte Zahl von Reaktoren fand sich
bei den farbigen Knaben und die niedrigste bei
den weiß Kinder, wobei die Gesamtzahl der
farbigen Reaktoren die Gesamtzahl der weiß
Reaktoren im Verhältnis von 3:1 übertraf.
5. Die katholischen Mittelschulen hatten eine
höhere Teilnahmehäufigkeit und ein niedrigeres
Vorkommen von positiven Reaktionen als die
öffentlichen Schulen.
6. Von den getesteten Schülern nahmen 93,6
an der ersten Thoraxröntgenuntersuchung nach
der Tuberkulin-Testung teil, und nur 14 von
diesen Aufnahmen zeigten irgendwelche wesent-
lchen Veränderungen.
7. Obwohl 45,7% der Reaktionen 10 mm und
mehr im Durchmesser betrug und ungefähr die
Hälfte von diesen 15 mm oder mehr, gab nur
17,7% aller Reaktoren eine glaubwürdige Anam-
nese hinsichtlich eines Kontaktes mit einem Fall
von Tuberkulose an.
8. Weil nur 2 neue Fälle von Tuberkulose bei
diesem Programm ans Licht gefördert wurden,
wird die Auffassung vertreten, daß zu mindestens
im Kreis von Baltimore die Tuberkulinahptprü-
fung ihren Zweck eher für die epidemiologischen
Bemühungen und die Gesundheitserziehung hat
als dafür, neue Fälle zu ermitteln.

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