Tuberculin Skin Testing in San Francisco Schools
As An Instrument of Tuberculosis Casefinding

A Five Year Study*

FRANCIS J. CURRY, M.D., F.C.C.P.
San Francisco, California

INTRODUCTION

SINCE 1956, TUBERCULIN SKIN TESTING has been done annually in all public and parochial elementary and secondary schools in San Francisco. Since there are 120,185 pupils in 202 schools, from kindergarten through the twelfth grade, it would be impossible to test every student and do an adequate follow-up examination of all positive reactors and their families. Therefore, it was decided to test the entire first, seventh, tenth and twelfth grades, and all students recently moved to San Francisco.

The first grade was chosen to determine the prevalence of tuberculous infection in children beginning school. Since pupils must attend the elementary school in their neighborhood, the number of positive reactors should compare with the prevalence of tuberculosis in the immediate area.

Public school pupils entering the seventh grade go to district junior high schools, whereas parochial students remain in parish schools through the eighth grade. It was decided to determine the prevalence of tuberculous infection in children entering junior high school, so the seventh grade was chosen.

The senior high schools serve a larger area: students from several districts and many neighborhoods. Public high schools start with the tenth grade, whereas the parochial begin with the ninth. Following the tenth grade the school population falls off rapidly, so that between the tenth and the twelfth grade there is approximately a 25 per cent decrease. The tenth grade was selected to test the maximum number of pupils at this level and to determine the prevalence of reactors beginning senior high school.

The last opportunity to test the group as a whole is in the twelfth grade. The findings indicate not only the prevalence of tuberculous infection in this grade, but may be contrasted with those of other grades tested. Since the end of the 1958-1959 school year every class in junior and senior high schools has been tested. The tuberculin conversion rates from the seventh to the tenth, and from the tenth to the twelfth grades cannot be determined precisely, since reactors moving into San Francisco from other areas will alter the figures. However, the difference in reactor rate will be a good index of the rate of infection.

Since 1942, there has been a large transient population who reside in the city for a few months to as long as two or three years. Many of these people are from the lower socio-economic levels of areas known to have a high prevalence of tuberculosis in Europe, Central and South America, the South Pacific and Hong Kong. The children of these families usually attend school during the interim residence. Past experience has shown a much higher number of reactors and a greater incidence of tuberculosis in this selective group than in the school population generally. Therefore, it is mandatory that these children be tuberculin skin tested and/or receive a chest roentgenogram immediately following admission to school.

FOLLOW-UP PROCEDURE

All tuberculin reactors and their imme-

*From the Tuberculosis Control Division, Department of Public Health, City and County of San Francisco.
J. CURRY

diate family groups shall have further examinations in order to determine the presence or absence of active tuberculosis, and if possible, to find the source of infection. The follow-up examination is mandatory since there is the possibility of an active communicable disease.

A large number of San Francisco school children are under the care of private physicians. In this program the parents are advised that all children should have a tuberculin skin test; that it should be done by their private physician; that the Health Department will test any child with the parents' signed consent; that all reactors and their immediate family groups must have a follow-up examination either by their private physician or by the Health Department. The initial chest x-ray film is taken by the Health Department on all reactors to determine the presence or absence of pulmonary tuberculosis. Children under private medical care are referred to their private physician for follow-up examination and disposition. These physicians send reports to the Health Department at regular intervals.

Any documented recent converter with a normal appearing chest roentgenogram, not under private medical care, is referred to the Chest Clinic at San Francisco General Hospital for ambulant out-patient evaluation and/or treatment. Any student who has converted his tuberculin skin test within the past year is treated. All other reactors are evaluated by history and roentgenographic findings, and may or may not be treated. A long-term follow-up program for this group has been established.

The immediate family group of all reactors are examined: adult members by chest x-ray films; children by tuberculin skin testing and chest roentgenogram of reactors.

It had been the rule of the Health Department since 1932 that a reactor was never retested: "once a positive always a positive." However, during the 1958-1959 school year a change was introduced so that all reactors with 9 mm. or less of induration will be tested annually. In addition, during the 1959-1960 school year all reactors found prior to 1956 who were recorded merely as "positive," 1-plus or 2-plus reactions, were retested. Any student tested prior to 1956 who had a history of tuberculosis, or a 3-plus or 4-plus tuberculin skin test was not retested.

When tuberculosis is found in a student, the entire class and the teachers are given a special examination. The teachers must have a chest roentgenogram or a tuberculin skin test. The students are examined immediately following discovery of the case, and again in more than three months but less than four months in order to detect any recent converters among the negative reactors, or incipient tuberculosis by chest x-ray films in the reactors. All students and teachers must participate in the contact examinations. However, at the junior and senior high school levels only the "home class" is tested for contacts to an open case, since usually the closest contacts are within this group. In our experience this approach has been equally as productive as more widespread examinations.

When tuberculosis is found among the family group, the contact and epidemiologic investigations are done in the routine manner.

Material and Method

An injection of 0.1 ml. of Old Tuberculin, containing 0.1 mg. of tuberculin, is given intradermally on the volar surface of the forearm. The test is read in 72 hours. The reading is recorded in mm. of induration, which is measured. The presence or absence of erythema is not recorded. An area of induration measuring 6 mm. or more in diameter is considered a reactor; less than 6 mm. of induration is read as negative. There are no doubtful readings; if there is any question the test is repeated.

Results

Of the 120,185 students in 202 elementary and secondary schools, 7,199, or 6 per cent, are known tuberculin reactors. During the past five years, 134,458 students
were tested in the school program, of whom 8,300, or 6.2 per cent reacted (See Table 1). Since 1958, a total of 1,192 students with tuberculin reactions of 6-9 mm. of induration were retested: 607, or 50.9 per cent, were reactors, and 585, or 49.1 per cent, were negative. Ninety-six per cent of the students who failed to react to tuberculin reactions of 6-9 mm. of induration were negative. Ninety-six per cent of the students who failed to react to tuberculin upon retesting were found to be in the 6-8 mm. of induration group. Furthermore, no student with less than 9 mm. of induration was found to have clinical tuberculosis.

The 585 students found to be negative reactors upon retesting should be deducted from the total number of positive reactors reported for the program. Therefore, the corrected statement should read: of the 134,458 students tested during the past five years, 7,715, (5.74 per cent) reacted (See Table 1). Included are the number of tests, the number and percentage of positive reactors, and the number of cases of tuberculosis found in students and family contacts by school year and totals.

The tuberculosis casefinding rates per thousand tests by school year are found in Table 3. This table shows the casefinding rates for school children alone, family contacts alone, and for the total program. The 134,458 tests yielded 212 cases in students with a casefinding rate of 1.6 per thousand. When the number of cases discovered in immediate family contacts are included, the casefinding rate is increased to 2.4 per thousand.

DISCUSSION

I. Percentage of Reactors

Tuberculin skin testing was done for the first time in San Francisco schools in 1932. At that time, children in a few selected schools were tested, and 48 per cent were found to be reactors. This stands out in sharp contrast to the findings in 1961 when 6 per cent of the total school population of 120,185 were reactors. Whereas, 6 per cent of the total school population were reactors, the percentage by grade level reveals a spread from 2.7 per cent at the first grade to 12.7 per cent at the twelfth grade. This is a conversion of 0.85 per cent per year

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Students Tested</td>
<td>25,286</td>
<td>16,904</td>
<td>29,431</td>
<td>34,028</td>
<td>28,699</td>
<td>134,458</td>
</tr>
<tr>
<td>No. Reactors</td>
<td>1,492</td>
<td>1,125</td>
<td>1,765</td>
<td>2,267</td>
<td>1,651</td>
<td>8,300*</td>
</tr>
<tr>
<td>Per Cent Reactors</td>
<td>5.9</td>
<td>6.7</td>
<td>6.0</td>
<td>6.7</td>
<td>5.7</td>
<td>6.2</td>
</tr>
<tr>
<td>No. Cases in Students</td>
<td>59</td>
<td>32</td>
<td>44</td>
<td>54</td>
<td>38</td>
<td>212</td>
</tr>
<tr>
<td>No. Cases in Family Contacts</td>
<td>42</td>
<td>10</td>
<td>18</td>
<td>39</td>
<td>20</td>
<td>105</td>
</tr>
<tr>
<td>Total No. of Cases</td>
<td>62</td>
<td>42</td>
<td>62</td>
<td>93</td>
<td>58</td>
<td>317</td>
</tr>
</tbody>
</table>

*The 585 students with 6-9 mm. of induration found to be negative upon retesting should be subtracted from this total. Therefore, the number of positive reactors was 7,715, (5.7 per cent).
and serves as an index of the infection rate within the community. However, this is not strictly true, since a large number of reactors are found among students newly moved to San Francisco, many of whom come from areas of known high prevalence of tuberculosis.

The gross results of tuberculin skin testing in San Francisco schools from 1956-1961 are found in Table 1. There were 134,458 students tested during this period, of whom 7,715, or 5.7 per cent, were found to be reactors. The percentage of reactors by grade and school year are shown in Table 2. It is interesting to note that whereas the difference between the first and twelfth grades in 1961 was 10 per cent, in 1957 the difference was 16 per cent. Furthermore, there was a decrease from 19.9 per cent reactors at the twelfth grade level in 1956-1957 to 12.7 per cent in 1960-1961. However, the most important decrease is at first grade level: from 3.9 per cent in 1957 to 2.7 per cent in 1961.

Whereas 12.7 per cent of the students in the twelfth grade were reactors in 1960-1961, there were four senior high schools with 20 per cent or more reactors in this grade, the highest being 26 per cent. There are large numbers of non-white and Latin-American students, and students newly moved to San Francisco in these schools.

Whereas, 9.8 per cent of the students at the seventh grade level were found to be reactors during 1960-1961, there were three junior high schools in which 12 per cent or more of the students at this grade level reacted. Again, there are large numbers of non-whites and Latin-Americans and students newly moved to San Francisco in these schools.

There is a 25 per cent decrease in school enrollment between the tenth and twelfth grades. Students leaving school at this level are from poorer families living in the older and poorer neighborhoods where tuberculosis is found more frequently. The prevalence of reactors in these children is greater as a group than their former classmates who remain in school. This, undoubtedly, explains in part the decrease in reactors in the twelfth grade. It is estimated that the percentage of reactors to be found in the twelfth grade during the 1961-1962 school year will be less than 11 per cent, despite the fact that the seventh grade level of 1956-1957 had 13.3 per cent. However, there are other factors which may alter the figure upwards: recently there have been a large number of reactors admitted to school from Hong Kong, the South Pacific Islands, Central and South America. One junior high school had 105 reactors admitted from these areas during the past two years. The latter have been responsible for the rise in reactors at the seventh grade level during 1959-1961.

The decrease in reactors in the first grade reflects the results of intensified casefinding programs among high risk groups and in high prevalence areas. Furthermore, it is interesting that with intensified casefinding programs, and in spite of an increased number of newly diagnosed cases of active tuberculosis in the community, the percentage of reactors at the first grade level has continued to decline.

II. Casefinding Rates and Productivity of the Program

The annual and five-year casefinding rates for the program are found in Table 3. The five-year casefinding average for students is 1.6 per thousand tests given, with an annual range of 1.3 to 1.9; for family contacts 0.8, with an annual range of 0.7 to 1.2; and a total casefinding rate of 2.4, with an annual range from 2.0 to 2.8. The productivity of this program has been due primarily to the follow-up of reactors and their immediate family contacts.
The importance of the follow-up part of the program can be shown best by establishing a casefinding rate based upon reactors. The rate per thousand reactors for 1956-1961 is 27.6 cases in the schools; 13.6 cases in the home; and 41.2 cases for the total program. This means that more than four active cases of tuberculosis have been found in the follow-up of every 100 newly discovered tuberculin reactors and their immediate family contacts.

There has been 100 per cent follow-up of the reactors and their immediate family contacts due to enthusiastic support and cooperation from the Public and Parochial School Departments, private physicians, the San Francisco Medical Society, Public Health Nurses and District Medical Health Officers. Without this support, individually and collectively, the program would not have been successful. The work of the Public Health Nurses in the schools and in the districts deserves special mention, since many students at the junior and senior high school levels attend school in one health district and reside in another. To complete the follow-up examinations requires the coordinated efforts of the nursing and medical personnel in the districts involved.

There are other factors contributing to the productivity of the program which are secondary and characteristic of San Francisco. Areas of high prevalence of tuberculosis and tuberculin reactors are identical and have not changed over the past 30 years. Furthermore, they are identical with the areas of highest incidence of newly diagnosed active cases. If the city is divided into an eastern and western half, 85 per cent of all known cases of tuberculosis will be found in the eastern or older portion, and 15 per cent in the western or newer part. The city may be further subdivided into a northeastern quarter in which 48 per cent of all known cases of tuberculosis will be found. If, in addition, the nine square blocks of adjacent Skid Row are included, the area will contain 58 per cent of all known cases.

The northeastern quarter has the highest population density in the city, with 64,719 residents per square mile, and contains a high concentration of non-whites and Latin-Americans. Whereas the downtown financial and business districts, and the wealthy residences of Nob Hill are in this section, the majority of the residences are of the older and poorer multiple dwelling homes, apartments, rooming houses, and lower priced hotels. The majority of residents are from the lower socio-economic groups of whites, Latin-Americans, Negroes, Chinese, and Filipinos. Furthermore, the area has the highest concentration of single or unattached men and elderly people in the Bay Area.

Non-white and Latin-American groups living in areas of high population density, with overcrowding in run-down or substandard housing, are high risks for tuberculosis, and casefinding programs directed toward these special groups are highly productive. A comparative study of these minority groups in the newer and older sections of the city revealed that families motivated to improve themselves by moving to better districts had less active tuberculosis and fewer tuberculin reactors among the younger children than those content to remain in the older and overcrowded areas.
The type of tuberculosis most frequently found in the latter group is soft and exudative, with a tendency to spread rapidly, and may involve large areas of lung, or may produce widespread hematogenous dissemination. Not infrequently these people are quite ill when first discovered, and small epidemics are not uncommon among close familial or neighborhood contacts. There have been seven small epidemics detected through the tuberculin skin testing program during the past five years. There were 11, 10, 10, 7, 6, 6, and 5 cases traceable to a single open case in each epidemic. Of the seven families with 55 cases of active tuberculosis, three were Negro, three were Mexican and one was Samoan. All were characterized by living in an older neighborhood of high population density with poor housing, poor nutrition, and poor education; of the lowest economic group, with no insight into their problems and no motivation to improve their situation.

III. Tuberculosis in Students

A review of the entire group of 212 students with tuberculosis revealed that there were 122 males and 90 females. The ratio of male to female with newly diagnosed active tuberculosis is 2.3 to 1 for the community as a whole, so the incidence in girls of school age is greater than that found at 20 years of age or older.

A study of the distribution of the disease by race revealed that there were 96 whites, of whom 46 were Latin-American, 62 Negroes, 34 Chinese, ten Samoans, nine Filipinos, and one Japanese. All of the Samoan, Filipino, and Japanese, and many of the Negroes, Chinese and Latin-Americans had recently moved to San Francisco. The distribution by race and school level may be found in Table 4.

The relationship of newly discovered tuberculosis in school children to the incidence of newly diagnosed tuberculosis in the community by race is illustrated in Table 5. The disproportionately high incidence in non-white students is merely a reflection of the same finding in the general population. Whereas non-whites comprise 18.4 per cent of the San Francisco population, they account for 116 cases, (54.7 per cent), of the tuberculosis discovered in students. On the other hand, the whites, representing 81.6 per cent of the population, were found to have only 45.3 per cent, or 96 of the school cases. Further, the combination of non-white and Latin-American populations accounted for 79.4 per cent, or 164 cases of tuberculosis in school children. In addition, 56, (26.4 per cent) of the students with tuberculosis were among the group recently moved into the city; and 70 per cent of the tuberculosis in students was found in the elementary grades and in the newly moved to San Francisco. However, of the 94 cases found at the junior and senior high school levels, 64, (68.1 per cent) were of the high risk communicable pulmonary type.

The type of tuberculosis and the school level at which it was found are given in Table 5.
Table 6. The disease in students may be divided into three major categories:

1. Active primary: 114 cases (53.8 per cent).

2. Pulmonary (re-infection or communicable): 75 cases (35.4 per cent).

3. Extrapulmonary: 23 cases (10.8 per cent).

Whereas active primary tuberculosis was the most frequently diagnosed form of the disease in school children, occurring in 114 of 212 cases, its highest incidence was in students in the elementary grades: 94 (82.5 per cent) of the 114 cases were at this level. This finding is in accord with expectations. Since active primary tuberculosis was the most common finding, the criteria for establishing this diagnosis is presented. The presence of a positive tuberculin skin test, or a documented recent positive converter, without other clinical or roentgenographic evidence of tuberculosis was not considered sufficient for the diagnosis of active primary tuberculosis.

The pulmonary (re-infection or communicable) type was found in 75, (35.4 per cent) of the student with tuberculosis. This form of the disease was found more commonly in the older children occurring most frequently at the senior high school level (67 per cent). If the 11 cases of minimal pulmonary tuberculosis in elementary grades had remained classified with the original Health Department diagnosis of active primary, this entire group would have been limited to the high schools, with 80 per cent being at the senior level. This conforms well with the expected, since the re-infection type, under usual circumstances, occurs far less frequently in younger than older children.

The advanced forms of pulmonary tuberculosis were found exclusively in the high schools, and 13 and of the 15 cases were in non-white and Latin-American students, of whom 11 were newly moved into San Francisco. The far advanced cases were found during the first two years of the program (1956-1958). One of the far advanced cases (1956), a Chinese girl with extensive disease, a cavity, and heavily positive sput-
um was responsible for the tuberculin conversion of at least 19 per cent of her classroom contacts. All recent converters were treated with INH and no other case developed. The second far advanced case (1956), a Negro girl with cavitary disease and heavily positive sputum, was responsible for active primary tuberculosis in a six year old sibling who slept in the same bed. No other case was traceable to this high school student.

There has been no other evidence of cross-infection between one student and another, and no case of tuberculosis in a student was traceable to another student in the school or classroom. This is remarkable considering that 64 of the students at the high school levels had a communicable form of the disease. When the source case was located it was always found in the immediate family group or family circle. The finding of 105 cases of tuberculosis in family contacts, and the apparent lack of evidence of communicability from one student to another, reemphasizes the importance of active tuberculosis in the home and family circle as a source of the disease in young children and adolescents. Further, from observations made in this program it would seem that young children with active primary tuberculosis who are asymptomatic and who are doing well under adequate chemotherapy are not a public health problem, at least so far as the communicability of their disease is concerned.

It would seem that the usual casual school contact with advanced pulmonary tuberculosis is sufficient to produce infection with tuberculin conversion, but insufficient to produce clinical disease. On the other hand, the intimacy of the contacts in the home environment with pulmonary forms of the disease are not only adequate to produce tuberculin conversion, but frequently are sufficient to produce clinical disease.

However, there have been several family groups in which one or two of five or six children were tuberculin reactors and the remainder negative, with the father having open active tuberculosis. Further investigation into family environmental factors revealed that the father had closer contact with the positive reactors for one reason or another, and little or no contact with the negative reactors. Not infrequently the patient knew that he was ill and separated himself from the family; except for the wife, older children, or favorites.

The entire 23 cases of extra-pulmonary tuberculosis (10.8 per cent of the total school cases) occurred in non-white and Latin-American students. Tuberculous meningitis and miliary tuberculosis has not been found since 1957. One child with meningitis was ill with unrecognized symptoms at the time of discovery, and the second child developed symptoms by the time he was hospitalized. Renal tuberculosis was discovered in a 17-year-old Negro boy, newly arrived from Mississippi, who had, in addition, the congenital absence of one kidney. Tuberculous lymphadenitis and tuberculous pleurisy with effusion have been found each year.

IV. General Comments

There have been no unfavorable generalized or systemic reactions due to tuberculin skin testing during the five years of this program, despite the fact that non-whites and Latin-Americans, and students with extensive disease have been tested. Necrotic reactions, the so-called 4 plus reaction, are seen two or three times a year, or approximately 1/10,000 tests. These occur most frequently in students with active disease, or who have been in close contact with active tuberculosis in the home. Whereas the necrotic reaction is uncomfortable for the student, there is no cause for anxiety. All that have occurred in this program have responded well, but slowly, to topical and symptomatic treatment.

Exceptionally large non-necrotic reactions (40 - 70 mm. of induration) occur approximately ten times a year, or about 1/2,500 tests. These were seen usually in non-whites or Latin-Americans. All of the reactions subsided gradually without any unfavorable results.
V. Future Plans for the Program

It is planned to continue the program without change for another two or three years, and then to limit annual testing to high risk and high prevalence groups:
1. All students new to San Francisco.
2. The entire tenth and twelfth grades.
3. The seventh grade in public junior high school.
4. Elementary schools in areas of high incidence of tuberculosis.

During the past five years, there has been an intensification of all tuberculosis case-finding programs in San Francisco, so that the number of newly diagnosed active cases has risen each year. However, in spite of the increased incidence by diagnosis, the percentage of reactors at the first, tenth and twelfth grades has decreased. The increased incidence of new cases merely reflects the increased finding, isolating, and treating of reservoir tuberculosis in the community. The decrease in the percentage of reactors reflects the removal of these cases from the family group or family circle.

During 1961 there were 1.1 per cent tuberculin reactors in 6,457 pre-school children tested in Health Centers throughout the city. It is predicted that by 1963 there will be 1 per cent or less positive reactors in the first grade, and approximately 10 per cent in the twelfth grade. When this level of reactivity is reached, tuberculin skin testing in schools will no longer be highly productive as a case finding program, except in high risk groups or high prevalence areas. At that time, and not before, tuberculin skin testing in San Francisco schools will be limited to high risk groups and high prevalence areas.

Summary

Since 1956 tuberculin skin testing has been done annually in all 202 public and parochial schools in San Francisco. The first, seventh, tenth and twelfth grades and all students recently moved to the City were tested. Of 134,458 students tested, 7,715, (5.7 per cent), were reactors. Whereas, participation in the program is voluntary, the follow-up of all reactors and their immediate family group was mandatory in order to exclude the possibility of active communicable disease in the community. As a result, 212 cases of tuberculosis were found in students and 105 cases in family contacts; or 41.2 cases of active tuberculosis per thousand reactors found. This stands out in sharp contrast to the casefinding rate of 2.4 per thousand tests given and emphasizes the importance of the follow-up of reactors and their immediate family group.

Of the 212 student cases, 125 were primary tuberculosis, of which 105 were in elementary grades and 19 in junior high school. There were 64 cases of communicable pulmonary tuberculosis found in the senior and junior high schools and none in the elementary grades. Extrapulmonary tuberculosis was found in 23 students. Of the student cases 79.4 per cent were in non-whites and Latin-Americans. The percentage of reactors at the twelfth grade level was reduced from 19.9 in 1956 to 12.7 in 1961; and at the first grade level from 3.9 in 1956 to 2.7 in 1961.

Resumen

Desde 1956, las reacciones tuberculínicas se hicieron anualmente en todas las 202 escuelas públicas y parroquiales de San Francisco. Los grados primero, séptimo, décimo y doceavo de estudiantes recientemente trasladados a la ciudad se pusieron a prueba. De 134,458 estudiantes sometidos a la prueba 7,175 (5.7 por ciento) fueron reactivos. Si bien la participación en el programa es voluntaria, el seguimiento de todos los reactivos y su familia inmediata fue ordenado obligatoriamente, a fin de excluir la posibilidad de una enfermedad comunicable, activa, en la comunidad. Como resultado, se encontraron 212 casos de tuberculosis en estudiantes y 105 en los contactos familiares; o bien 41.2 casos de tuberculosis activa por 1,000 reactivos positivos. Esto está en contraste definido con la proporción de hallazgos de casos de 2.4 por 1,000 pruebas dadas y enfatiza la importancia del seguimiento de los reactivos y de su grupo familiar inmediato.

De 212 estudiantes, 125 tenían tuberculosis primaria, de los que 105 estaban en grados elementales y 19 en los grados junior de escuela secundaria. Hubo 64 casos de tuberculosis pulmonar transmISIBLES encontrados en los grupos senior y junior de la escuela secundaria y ninguno...
en los grados elementales. La tuberculosis extrapulmonar se encontró en 23 estudiantes. De los casos de estudiantes 79,4 por ciento fueron encontrados entre los no blancos y latinoamericanos. El porcentaje de reactivos en el grado 12 fue reducido de 19,9 en 1956 a 12,7 en 1961; y en el nivel del primer grado de 3,9 en 1956 a 2,7 en 1961.

**Resumen**

Desde 1956, el test cutáneo a la tuberculosis a sido practicado anualmente en las 202 escuelas públicas y parroquiales de SAN FRANCISCO. Los primer, séptimo, décimo y duodécimo de grados, y todos los estudiantes que se han sometido al test. Durante este periodo testados, de 7,715 (5,7%) eran portadores de reacciones positivas. Atendiendo a que la participación en el programa es voluntaria, la supervisión de todos los portadores de reacciones positivas y de sus grupos familiares inmediatos fue exigida, por lo tanto la posibilidad de una enfermedad contagiosa en la colectividad. Como resultado, se identificaron 212 casos de tuberculosis entre los estudiantes, y 105 de los estudiantes de contacto familiar; y de los 41,2 casos de tuberculosis activa para mil estudiantes, 2,4 para mille, los cuales en el conjunto de tests practicados y met el acercamiento en el que el estudio de la supervisión de los portadores de reacciones positivas y de su entourage familiar inmediato.

Por lo tanto, en los 212 casos de estudiantes, 125 de los cuales eran de las clases elementales y 19 de las clases de escuelas. Y se encontró 64 de los casos de tuberculosis pulmonar contagiosa, de las lycées de jóvenes, 19 de las clases terminales, y en una sección de las clases del nivel. Una tuberculosis extrapulmonar fue descubierta en 23 estudiantes. Para los estudiantes, 79,4% concuerdan con los estudiantes del grupo blanca y originales de la América Latina. El porcentaje de reactivos de reacciones positivas en la clase 12° grado fue reducido de 19,9 en 1956 a 12,7 en 1961, y para la clase de 1er grado de 3,9 en 1956 a 2,7 en 1961.

**Zusammenfassung**


---

**ESOPHAGEAL-PLEURAL STRIPE**

The original conception of the esophageal-pleural stripe (a soft-tissue, sickle-like shadow, at the level of the clavicles, with concavity to the right, representing the right wall of the esophagus with its pleural covering), is extending to include a stripe with gentle concavity to the left, noted over the lower thoracic level in a small number of normal chest films. The concept was developed from the esophageal-pleural stripe, may be noted with hialtal hernia, representing the wall of the stomach with its peritoneal refection. Cammino, C. V.: "Further Notes on the Esophageal-Pleural Stripes," Radiol., 77:974, 1961.