

# Tuberculosis Casefinding Among Contacts in Seven South Carolina Counties

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**E**RADICATION of tuberculosis is the new theme and philosophy of authorities working with the disease. To eradicate means to pluck up by the roots, and in order for eradication of tuberculosis to become a reality, all forces, medical and others, must be mobilized to attack the immediate problems on all fronts.

In South Carolina the treatment of persons with known active cases of tuberculosis in sanatoriums and the continuation of antituberculosis therapy on an outpatient basis have been strengthened and improved over the years. This is progress, but it is not enough. Unknown cases of tuberculosis are being discovered every day. This still is not enough. Unless and until all cases of tuberculosis are discovered and adequately treated, eradication will continue to be a myth. We must seek, and seek diligently, if we are to find all unknown cases of tuberculosis.

With this goal in mind, the section of tuberculosis control of the South Carolina State Board of Health with the cooperation of local health departments in seven counties in the southern part of South Carolina began, in March 1961, a special project aimed at the eradication of tuberculosis. The counties selected were Beaufort, Berkeley, Charleston, Colleton, Dorchester, Hampton, and Jasper.

The seven-county project area contains 5,474 square miles, 18 percent of the total land area of South Carolina. Its population is 380,626, with 58 percent white and 42 percent Negro. South Carolina's total population is 2,382,594, with 65 percent white and 35 percent Negro. Population density per square mile in the seven counties ranges from a high of 229.9 in Charleston County to a low of 26.5 in Colleton County.

The annual per capita income ranges from \$1,523 in Charleston to \$835 in Jasper County.

The seven counties were selected for the following reasons.

1. The incidence and prevalence of tuberculosis were high.

2. All county health departments in the area had facilities for casefinding, treatment, and followup.

3. The tuberculosis nurse coordinator, whom we had employed, was familiar with the mores of the people.

4. At Pinehaven Tuberculosis Hospital in Charleston, facilities were available for medical evaluation and followup of tuberculosis patients, contacts, and suspects.

The specific objectives of this special project were to determine (a) the number of known active cases of tuberculosis and the number under medical supervision and treatment, (b) the number of persons with known active cases of tuberculosis at home who have had a bacteriological examination within a 6-month period, (c) the number of persons suspected of having tuberculosis and the number who have had an adequate diagnosis and disposition within a 6-month period, and (d) the number of contacts closely associated with newly re-

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ported active cases of tuberculosis and the number who have had a satisfactory examination and evaluation within a 6-month period.

This paper presents some characteristics of the reported active cases of tuberculosis during 1961 and some findings among the close contacts of these cases in the project area.

### Characteristics of Newly Reported Cases

In 1961, 146 active cases of tuberculosis were newly reported in the project area (table 1). Forty of these were in white persons (29 males and 11 females), and 106 were in Negroes (63 males and 43 females). For males, both white and Negro, the incidence of newly reported active cases of tuberculosis in 1961 increased

with age. For white females the peak was reached in the 40- to 59-year age group, and for Negro females the highest incidence occurred between ages 20 and 29 years and 40 and 49 years. Reported incidence of active cases of tuberculosis by race, sex, and age groups provides valuable information for planning a tuberculosis casefinding program.

Active pulmonary tuberculosis accounted for 84 percent of the active cases newly reported in the project area during 1961 (table 2). It is significant that of the active so-called "reinfection" or adult type cases (34 in white persons and 89 in Negroes), 79 percent of the white persons and 89 percent of the Negroes had advanced disease when first discovered. Included in "All other active forms" of tuberculosis are

**Table 1. Rate per 100,000 population of 146 newly reported active cases of tuberculosis, by race, sex, and age, South Carolina project area, 1961**

Age (years)	White				Negro			
	Male		Female		Male		Female	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
0-4	1	7	2	15	0	0	0	0
5-9	0	0	0	0	1	8	1	8
10-14	0	0	0	0	0	0	2	18
15-19	1	7	0	0	5	60	4	50
20-29	6	28	3	18	9	117	12	138
30-39	6	37	1	6	12	163	8	85
40-49	5	41	3	25	14	190	11	132
50-59	5	61	2	24	9	180	3	53
60-69	2	42	0	0	8	269	1	24
70 and over	3	111	0	0	5	259	1	36
Total	29	25	11	10	63	83	43	52

**Table 2. Distribution of 146 newly reported active cases of tuberculosis, by stage of disease, race, and sex, South Carolina project area, 1961**

Stage of disease	White				Negro				Total			
	Male		Female		Male		Female		White		Negro	
	Number	Per-cent	Number	Per-cent	Number	Per-cent	Number	Per-cent	Number	Per-cent	Number	Per-cent
Far advanced	9	31	1	9	34	54	20	47	10	25	54	51
Moderately advanced	14	49	3	27	17	27	8	19	17	43	25	24
Minimal	3	10	4	37	3	5	7	16	7	18	10	9
All other active forms	3	10	3	27	9	14	8	19	6	15	17	16
Total	29	100	11	100	63	100	43	100	40	100	106	100

6 white persons (3 males and 3 females) and 17 Negroes (9 males and 8 females) in the following categories.

Category	White	Negro
Lymphadenitis.....	3	4
Pleurisy with effusion.....	2	5
Primary active.....	1	4
Hematogenous.....	0	2
Tuberculosis of knee.....	0	1
Tuberculous peritonitis.....	0	1

The sputum findings are important indices of the infectiousness of tuberculosis. The sputum status of 120 cases of newly reported reinfection is presented in table 3 according to the stage of the disease. Of the 25 white males with active pulmonary tuberculosis, 22, or 88 percent, had sputum positive by smear or culture, as did 3, or 38 percent, of the 8 newly reported white females with active reinfection.

Of the 52 newly reported active reinfections among Negro males, 43, or 83 percent, had sputum positive by either smear or culture. Three additional cases of active reinfection tuberculosis among Negro men in 1961 were

recorded in death certificates. Available information on these was as follows: (a) age 67, died July 3, 1961—moderately advanced, unknown sputum status; (b) age 35, died March 22, 1961—far advanced, unknown sputum status; and (c) age 37, died April 2, 1961—pulmonary tuberculosis, stage and sputum status unknown. Twenty-three, or 66 percent, of the Negro females with newly reported active reinfection tuberculosis had sputum positive by smear or culture.

### Findings Among Contacts Under 20

The tuberculosis services section of the South Carolina State Board of Health has for years recommended that all tuberculosis contacts under 16 years of age be tuberculin tested before they are examined by X-ray unless they are known to be positive reactors. Contacts with induration of 5 mm. or more in diameter have been considered tuberculin reactors in this report. Further, it has been our observation, as well as that of others, that an induration greater than 9 mm. is more likely to denote active tuberculosis in contacts. This observation holds true in this study.

Discussion of the tuberculin status of contacts of the 146 newly reported active tuberculosis cases in the project area in 1961 is limited to those contacts under 20 years. It is well to keep in mind that the tuberculin status presented for those contacts in the age group 15-19 years predominantly represents 15- and 16-year-olds.

A total of 357 close contacts under 20 years of age were tuberculin tested. One hundred and thirteen, or 32 percent, of these contacts were positive reactors on first examination. Among the 81 close contacts of the newly reported cases of active tuberculosis in white persons who were tuberculin tested, 12, or 15 percent, were positive reactors. Among the 276 close contacts to newly reported cases of active tuberculosis in Negroes, 101, or 37 percent, were positive reactors (table 4). The greater percentage of positive reactors among Negro contacts was not surprising and can be explained by environmental, economic, and social factors. However, it was unexpected that no tuberculin reactors were found among the white contacts under 5 years of age.

**Table 3. Distribution of 120 newly reported active cases of reinfection tuberculosis, by stage of disease, sputum status, race, and sex, South Carolina project area, 1961**

Stage of disease, race, and sex	Sputum status			Total
	Positive smear and culture	Negative smear, positive culture	Negative smear and culture	
<b>Far advanced:</b>				
White male.....	7	0	1	8
White female.....	1	0	0	1
Negro male.....	29	1	3	33
Negro female.....	17	1	2	20
<b>Moderately advanced:</b>				
White male.....	9	5	0	14
White female.....	2	0	1	3
Negro male.....	9	2	5	16
Negro female.....	3	1	4	8
<b>Minimal:</b>				
White male.....	1	0	2	3
White female.....	0	0	4	4
Negro female.....	1	1	1	3
Negro female.....	1	0	6	7
<b>Total:</b>				
White male.....	17	5	3	25
White female.....	3	0	5	8
Negro male.....	39	4	9	52
Negro female.....	21	2	12	35

The tuberculosis patient with positive sputum is of paramount importance in the spread of tuberculosis. More detailed information regarding the findings among contacts who were positive reactors is presented in table 5. Of the 50 contacts under 20 years of age to tuberculosis source cases in white persons whose sputum was positive by smear and culture, 10, or 20 percent, were positive reactors, but all had negative chest X-ray films and no clinical evidence of extrapulmonary tuberculosis. Of the 7 contacts to white source patients with active tuberculosis whose sputum was negative by smear but positive by culture, 2, or 29 percent, were positive reactors but had negative chest films and no clinical evidence of extrapulmonary tuberculosis. There were

no reactors among contacts to white source patients with sputum negative by smear and culture or among contacts to source cases with other forms of active tuberculosis.

A comparison of Negro source patients and contacts reflects a different picture. There were 165 contacts under 20 years of age to 60 Negro tuberculosis source patients whose sputum was positive by smear and culture. Seventy-seven, or 47 percent, were positive reactors, and 31 of these were found to have active tuberculosis. Although not shown in table 5, an additional 10 contacts had X-ray evidence of inactive pulmonary tuberculosis. Of the 19 contacts under 20 years of age to Negro source patients whose sputum was negative by smear but positive by culture, 6, or 32 percent, were positive reactors.

**Table 4. Positive reactors on first examination of 357 contacts 0-19 years, by race and sex of index case, South Carolina project area, 1961-62**

Age of contact (years)	Index case in white male			Index case in white female			Index case in Negro male			Index case in Negro female		
	Number tested	Number reacting	Percent reacting	Number tested	Number reacting	Percent reacting	Number tested	Number reacting	Percent reacting	Number tested	Number reacting	Percent reacting
0-4	18	0	-----	12	0	-----	58	21	36	41	17	42
5-9	15	1	7	10	1	10	45	14	31	37	10	27
10-14	10	6	60	4	1	25	44	15	36	26	12	46
15-19	10	2	20	2	1	50	14	7	50	11	5	45
Total	53	9	17	28	3	11	161	57	36	115	44	38

**Table 5. Tuberculin test findings and number of active cases found on first examination among 357 contacts 0-19 years, by sex and race of contacts and sputum status of index cases, South Carolina project area, 1961-62**

Race and sex of contacts	Sputum of index case positive by smear and culture			Sputum of index case negative by smear positive by culture			Sputum of index case negative by smear and culture			All other index cases			Total		
	Tuberculin tested	Reacting	Active disease	Tuberculin tested	Reacting	Active disease	Tuberculin tested	Reacting	Active disease	Tuberculin tested	Reacting	Active disease	Tuberculin tested	Reacting	Active disease
White male	35	7	0	7	2	0	8	0	0	3	0	0	53	9	0
White female	15	3	0	0	0	0	4	0	0	9	0	0	28	3	0
Negro male	115	49	21	12	3	0	17	3	0	17	2	0	161	57	21
Negro female	50	28	10	7	3	1	28	8	3	30	5	3	115	44	17
Total	215	87	31	26	8	1	57	11	3	59	7	3	357	113	38

Five of these six positive reactors had negative chest X-ray films, but the remaining one had X-ray evidence of active primary tuberculosis. Eleven, or 24 percent, of the 45 contacts to 21 Negro source patients with active disease whose sputum was negative by smear and culture were positive reactors. Of the 11, 8 had negative chest films and 3 had X-ray evidence of active primary tuberculosis, a finding which emphasizes the importance of examining contacts of persons with active cases of tuberculosis whose sputum is reported negative by smear and culture. Apparently these active pulmonary source cases with sputum reported negative by smear and culture were intermittently expectorating tubercle bacilli.

Of the 47 contacts under 20 years of age to source cases with other forms of tuberculosis, 7, or 12 percent, were positive reactors. Three active primary cases of tuberculosis were found among the seven reactors, and four had negative chest films. All three new cases were contacts of a Negro female who had hematogenous tuberculosis.

#### Relation of Index Cases to Contacts

A total of 205 close contacts of all ages were associated with the 40 active source cases in white persons, an average of 5.1 contacts per case. Of the 205 contacts identified, 190, or 93 percent, were examined. Three cases of active tuberculosis and one inactive case were identified among these contacts. Two of the active

cases in contacts were found on first examination. Both were in men, ages 48 and 50 years, who were contacts of a white female patient whose sputum was positive by smear and culture. The third active case was found as a result of a second examination of a contact of a white male whose sputum was positive by smear and culture. The inactive case of pulmonary tuberculosis was in a 40-year-old white male, a contact of a white male patient with sputum positive by smear and culture. Significantly, no new cases were found among contacts of active pulmonary tuberculosis cases in white persons who had sputum negative by smear and culture or among contacts of active extrapulmonary tuberculosis source cases.

A total of 624 close contacts of all ages were associated with the 106 active source cases in Negroes. This was an average of 5.9 contacts per Negro source case, and 509 contacts, or 82 percent, were examined.

Among a total of 699 contacts examined, 62 additional active cases were found. The stage of their disease and the age of these persons is presented in table 6. Forty-five, or 73 percent, of these cases were diagnosed as active primary tuberculosis. The prompt identification and treatment of early cases of tuberculosis discovered by contact examinations is a big step toward the eradication of the disease as a public health problem.

If new active cases in Negroes found as a result of contact examination are expressed in age-specific rates per 100,000 population, it will be

**Table 6. Distribution of 62 new active cases of tuberculosis among 699 contacts of index cases, by race, age, and stage of disease, South Carolina project area, 1961-62**

Age group of contacts (years)	Far advanced (Negro) <sup>1</sup>	Moderately advanced		Minimal		Primary		Extrapulmonary (Negro)	Total		Rate per 100,000	
		White	Negro	White	Negro	White	Negro		White	Negro	White	Negro
0-4	1	0	0	0	0	0	27	4	0	32	0	131
5-9	0	0	1	0	0	1	12	1	1	14	4	58
10-14	0	0	1	0	0	0	4	1	0	6		27
15-19	0	0	0	0	0	0	1	0	0	1		6
20-29	0	0	0	0	2	0	0	1	0	3		18
30-39	0	0	0	0	0	0	0	1	0	1		6
40-49	1	0	0	1	0	0	0	1	1	2	4	13
50-59	0	1	0	0	0	0	0	0	1	0	6	
Total	2	1	2	1	2	1	44	9	3	59	2	40

<sup>1</sup> No cases in this category in white contacts.

seen that the risk of developing tuberculosis, for contacts, was greatest for the age group under 4 years.

The 106 Negro patients with active tuberculosis yielded 59 new active cases, indicating an active tuberculosis case rate of 116 per 1,000 Negro contacts examined. Forty-one, or 70 percent, of these cases among contacts were found on first examination and 18, or 31 percent, on subsequent examination, emphasizing the importance of repeated examinations of close contacts of patients with active tuberculosis.

Of the 59 new active cases in Negro contacts, 34 were found among contacts of Negro male source cases. All 34 were contacts of 16 patients or 41 percent of the 39 index cases in Negro males who had sputum positive by smear and culture (table 3). Two source patients produced 5 and 6 cases, respectively, and the remaining 14, a total of 23 cases among their contacts. It is of interest that one case was found among contacts closely associated with a source case in a Negro whose sputum was negative by smear but positive by culture.

Twenty-five cases in contacts were traced to index cases in Negro females. Three new cases were among contacts of the Negro female pa-

tient with hematogenous tuberculosis, and three others were in contacts of a Negro female patient with active tuberculosis whose sputum was negative by smear and culture. However, there was a previous history of tuberculosis in this particular family.

### Conclusions

The results of this study—62 new active cases including 2 far advanced, 3 moderately advanced, 3 minimal, 9 extrapulmonary, and 45 primary active cases discovered by examination of 699 contacts—reaffirm the fact that the initial and subsequent examination of close contacts of newly reported active tuberculosis cases in all age groups is a most worthwhile procedure from a casefinding standpoint. In Negroes, it is clear that infant and preschool contacts to known active cases of tuberculosis are especially vulnerable.

Examination of contacts of patients with newly reported active tuberculosis is continuing in the seven counties, and the practice is also being extended to other counties in this State. This, we believe, will bring us closer to the objective of tuberculosis eradication in South Carolina.

## Indian Employees in the Division of Indian Health

Ten young Indians, graduated in June 1963 from Haskell Institute, Lawrence, Kans., have joined the Division of Indian Health, Public Health Service, Washington, D.C. The new employees, eight girls and two boys, are members of six tribes from five States.

The employment of graduates of the commercial department of the all-Indian boarding school in Lawrence is the result of a policy established in 1957. Since that time 55 Haskell graduates have been placed in clerical, stenographic, and administrative jobs in the division's Washington office.

Mrs. Hazel Poling, a member of the Ottawa Tribe, Michigan, and the first Haskell graduate to be employed by the division, is now administrative assistant in the division's executive office and recruitment officer in charge of the program.

It has also been the division's policy to employ persons of Indian descent in all the other phases of the Indian health program. More than half of the division's 5,200 employees are of Indian descent. Many of them serve as practical nurses, dental assistants, sanitarian aides, pharmacy aides, and health educators in field facilities.