

TUBERCULOSIS CASE-FINDING IN THE RED HOOK AREA OF NEW YORK CITY¹

by JEAN DOWNES

HOW to locate unknown foci of infectious tuberculosis within a given area is an important problem in the control of tuberculosis. The death rate from the disease serves as an indication, though relatively crude, of the amount of active tuberculosis occurring within certain population groups and may be utilized to point out the need for intensive case-finding. Death rates by small areas in New York City revealed the fact that specific areas are contributing in a greater degree than others to the total tuberculosis mortality of the City. For example, the average annual tuberculosis death rate for Central Harlem during 1929-1931 was 275 per 100,000 population for colored and 175 for white, compared with a rate of 36 in a near-by area of Manhattan; the Red Hook district of Brooklyn had a rate of 232 and 96 for colored and white respectively, compared with 38 in the adjacent area of Bay Ridge.² Knowledge of these facts led the Department of Health of New York City to initiate in two areas (Harlem and Red Hook) where the death rate was

¹From the Division of Public Health Activities, Milbank Memorial Fund. This investigation, under the general direction of Dr. Shirley W. Wynne, Commissioner of Health of New York City at that time, and Dr. D. Clifford Martin, director of the Division of Tuberculosis, was carried out as one of the work projects for medical and nursing service, under an appropriation by the State Temporary Emergency Relief Administration. Supervision was furnished by members of the staff of the Department of Health, but the rest of the personnel (medical, nursing, and clerical) was taken from doctors, nurses, and others applying for assistance. The Milbank Memorial Fund cooperated in this project by a grant of funds and personnel. Grants were also made by the National Tuberculosis Association and certain individuals. This analysis of the statistical results of the investigation has been made by the Division of Research of the Milbank Memorial Fund at the request of Commissioner Wynne.

²Areas of High Mortality During 1929-1931. Department of Health, City of New York, and Committee on Neighborhood Health Development.

extremely high, a new type of investigation for the discovery of tuberculosis; that is, the examination by X-ray (paper film) of individuals from relief families rather than examining a random sample population from each area or a population composed of children selected by means of the tuberculin test.³

The plan of this special experiment in finding tuberculosis was (1) to examine by X-ray members of all families on home relief in the two areas; (2) immediate follow-up of all diagnosed cases and examination of family contacts of all diagnosed cases. Since some of the findings, mainly for the Harlem area, have been presented,⁴ this report concerns itself primarily with the results of the X-ray examinations and follow-up of cases and family contacts in the Red Hook area of Brooklyn.

By means of the X-ray, those individuals in whom the tubercle bacilli have brought about an anatomical change in the lungs can be detected within a reasonable range of accuracy provided the X-rays are read with a fair degree of precision. Consequently, the examination by X-ray of a population sufficiently large for stability of results may indicate the actual prevalence of pulmonary tuberculosis at different ages and within what age groups tuberculosis occurs most frequently; data which have been lacking and which

³It should be stated that paper films are not quite so accurate for the detection of pulmonary lesions as are celluloid films, but they have proved serviceable for diagnostic purposes and may be advantageously used for large groups of children or adults. Amberson, J. Burns Jr., M.D.; Barnard, Margaret Witter, M.D.; Loew, Marion Franklin, M.D.: Comparative Value of Paper and Celluloid Films for Roentgenograms of the Chest. Transactions of the Twenty-Eighth Annual Meeting, National Tuberculosis Association, 1932.

⁴Barnard, Margaret Witter: The X-ray in Tuberculosis Case-Finding. The Milbank Memorial Fund *Quarterly Bulletin*, July, 1933, xi, No. 3, pp. 233-239.

Barnard, Margaret Witter: The X-ray in Tuberculosis Case-Finding. The Transactions of the Twenty-Ninth Annual Meeting, National Tuberculosis Association, 1933.

are of fundamental importance to those interested in tuberculosis as a public health problem.

RESULTS OF THE X-RAY EXAMINATION IN RED HOOK⁵

The data reported upon in this paper represent a sample population drawn from members, 15 years of age and older, of the families on home relief in the Red Hook section of Brooklyn. The sample consists of 962 Negro and 8,938 white persons.⁶ A sample population drawn from relief families cannot be considered strictly representative of the total population of the Red Hook area. Neither can it be considered as representing only the indigent for under normal conditions many of these families would not be in the relief group. In general, the families examined are probably fairly typical of wage-earning families in the lower income classes to be found in normal times in the congested areas of New York City.

Table 1 shows the prevalence of important tuberculosis found at different ages among the white and Negro indi-

⁵The X-ray survey in Brooklyn, made during April and May, 1933, was under the direct supervision of Dr. Israel Steinberg, who at that time was supervisor of Consultation Chest Clinic Services in the New York City Department of Health. The reading of each X-ray was checked by Dr. Steinberg and questionable cases were taken up with Dr. J. Burns Amberson, attending physician, Tuberculosis Service, Bellevue Hospital, who served as consultant at the Bellevue-Yorkville Health Center. The follow-up clinic was set up and supervised by Dr. Steinberg.

The diagnoses relative to tuberculosis were classified as follows: 1. important tuberculosis (needing investigation); 2. suspect tuberculosis (investigation for diagnosis); 3. healed tuberculosis (no investigation) and 4. non-tuberculous pulmonary lesion (investigation). Small calcified lesions, Gohn tubercles, or lesions indicated by several fibrotic strands, were classified as healed tuberculosis. More extensive fibrosis, signs of infiltration, or of recent tuberculosis, all lesions which seemed to be of actual or potential danger to the individual were included under important tuberculosis.

⁶A small proportion of the total white persons (1,565) came from relief families in Bay Ridge section adjoining Red Hook.

COLOR AND SEX	AGE GROUPS					
	All Ages ¹	15-19	20-29	30-39	40-49	50 Plus
PER CENT						
White—Total	3.2	.8	2.2	3.3	4.2	5.2
Male	3.3	.5	1.8	3.1	5.0	5.1
Female	3.0	1.0	2.5	3.4	3.1	5.4
Colored—Total	2.3	0	2.2	2.5	2.4	3.6
Male	2.0	0	.9	2.5	2.1	4.0
Female	2.7	0	3.1	2.5	2.8	3.3
NUMBER OF CASES						
White—Total	282	10	42	78	82	70
Male	157	3	15	40	56	43
Female	125	7	27	38	26	27
Colored—Total	22	0	6	8	4	4
Male	9	0	1	4	2	2
Female	13	0	5	4	2	2
NUMBER X-RAYED						
White—Total	8,934	1,325	1,907	2,388	1,969	1,345
Male	4,717	641	825	1,275	1,130	846
Female	4,217	684	1,082	1,113	839	499
Colored—Total	942	81	269	314	167	111
Male	460	48	110	157	95	50
Female	482	33	159	157	72	61

¹Adjusted per cents obtained by applying the per cent for each age group to the age distribution of the combined colored and white population.

Table 1. Per cent of 9,876 persons in Red Hook found by X-ray to have important tuberculosis classified by sex, age, and color.

viduals in Red Hook classified according to sex.⁷ The rates for white males show a definite increase with age, from less than 1 per cent among individuals aged 15-19 to approximately 5 per cent for those aged 40 and over. The rates for white females rise from 1 per cent in the age group 15-19

⁷Important tuberculosis includes all lesions which seemed to be of actual or potential danger to the patient; only the obviously healed lesions were excluded from this classification.

to 5.4 in the age group 50 and over. The prevalence of tuberculosis among the Negroes shows the same tendency to increase with age. However, the age specific rates for Negroes

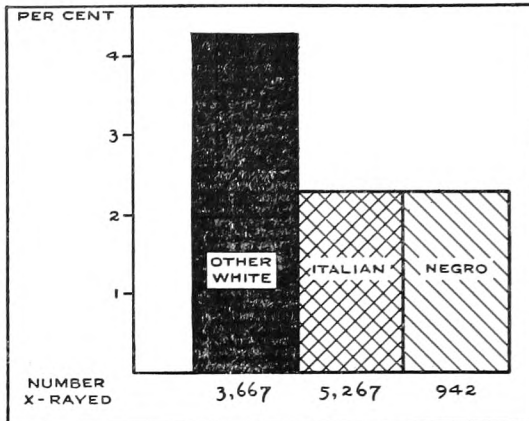


Fig. 1. Per cent of persons, 15 years of age and over, classified as having "important" tuberculosis for individuals of Italian parentage, for all other whites and for Negroes in families on home relief in Red Hook district of New York City.

tuberculosis for individuals of Italian parentage, all other whites and Negro, as shown in Figure 1.⁸ For the group "other whites" the rate (4.3 per cent) is practically double that recorded for the Italian and Negro, both of which are equal—namely, 2.3 per cent. It should be emphasized that while the differences between the rates for "other whites" and Italian and "other whites" and Negro respectively are identical, the reasons for these differences cannot be considered as identical. The low rate among Italians is probably due to less frequent occurrence of tuberculosis in

⁸Data concerning parentage and nativity were secured for the individuals X-rayed in Red Hook. The 941 Negro persons were for the most part native born of native-born parents. Of the 8,938 white persons, 5,270, or 59 per cent, were of Italian parentage; the remaining 41 per cent were chiefly distributed as follows: 33 per cent of native-born parents, 15 per cent of parents born in

(continued on page 139)

are for the most part lower than for the white group. Also, the rates for all ages both male and female are somewhat lower for the Negro than for the white.

Since the white group was heavily weighted with Italians, it is of interest to make a comparison of the total prevalence of important

this group than among other whites since Italians generally have a relatively low tuberculosis death rate.⁹ On the other hand, it is an indisputable fact that the Negroes have an extremely high mortality from tuberculosis when compared with any group of white individuals. The low rate of tuberculous disease among Negro individuals revealed by a survey of this sort is probably due to the excessive operation of two factors affecting both mortality and morbidity, that is, more rapidly progressive disease and a much higher fatality rate among Negro than among white persons.¹⁰ Consequently, case-finding surveys would seem a less effectual method of attacking the tuberculosis problem among Negro than among white persons unless such surveys are made with great frequency. It might be added that frequent surveys of Negroes would be desirable, not only to discover new cases but also because the already discovered tuberculosis would be more

Ireland, and 12 per cent in the Scandinavian countries. Among those of Italian parents, one-third were native born and the remainder foreign born; the foreign-born Italians were found chiefly in the ages over 30. Among the 3,655 with parentage other than Italian, slightly more than half the persons over 30 years of age were foreign born.

⁹Data are available showing the average annual tuberculosis mortality by nativity in New York City for 1930-1931. The rate of 53 per 100,000 among Italians is considerably lower than the rate of 71.9 for other whites and 250 among colored. Data taken from *Weekly Bulletin*, Department of Health, New York City, October 8, 1932.

¹⁰Everett, Franklin R.: The Pathological Anatomy of Pulmonary Tuberculosis in the American Negro and in the White Race. *The American Review of Tuberculosis*, May, 1933, xxvii, No. 5, pp. 411-464.

Pinner, Max and Kasper, Joseph A.: Pathological Peculiarities of Tuberculosis in the American Negro. *The American Review of Tuberculosis*, November, 1932, xxvi, No. 5, pp. 463-491.

Pathological studies of tuberculosis among Negro and white individuals indicate that "Tuberculosis pursues a more rapidly fatal course in the Negro than in white people. The childhood type of pulmonary tuberculosis with caseous tuberculosis of tracheo-bronchial lymph nodes occurs in nearly half of Negro adults but in only a small percentage of white adults who have died from pulmonary tuberculosis."

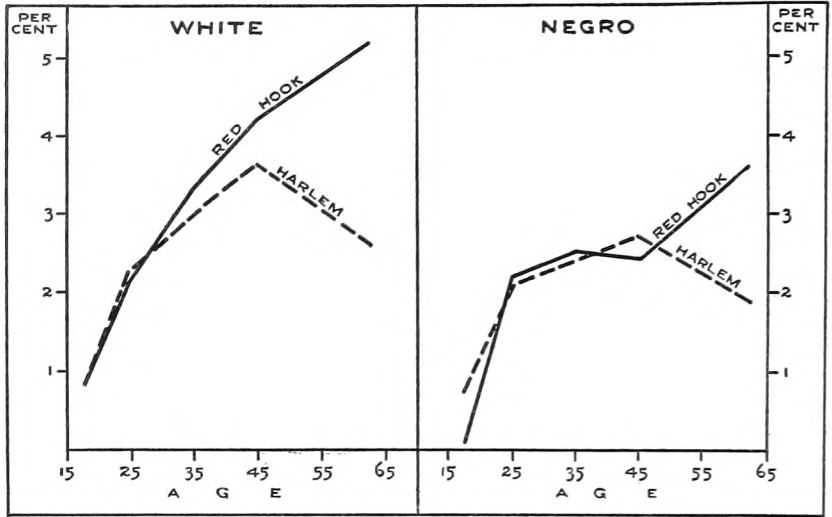


Fig. 2. Prevalence of "important" tuberculosis at specific ages among white and Negro families in Red Hook and in Harlem districts, New York City.

apt to go on to progressive disease in Negroes than it would in white persons.

It is of interest to compare the prevalence of important tuberculosis at different ages for the sample population of Red Hook with that drawn from Central and East Harlem. The age specific rates shown in Figure 2 are strikingly similar for each group by color except for persons over 49 years of age where the rate for white and Negro respectively in Red Hook is almost twice as high as that for the same age and color groups in Harlem. This difference can hardly be attributed to a unique condition as to tuberculosis among persons 50 years of age and older in either one or the other area, but rather to a difference of opinion among those interpreting the X-ray findings as to the importance of tuberculosis after age 50.¹¹ The general agreement in the findings in two widely

¹¹That this may be due to a difference of opinion is confirmed by the fact that if the healed tuberculous lesions found by X-ray are added to "important tuberculosis," the decided difference between the Harlem and Red Hook find-

(continued on page 141)

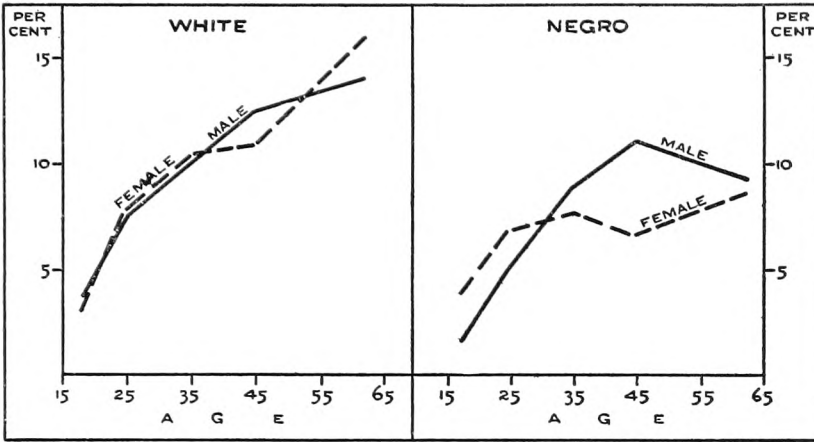


Fig. 3. Prevalence of all tuberculous lesions detected by X-ray by sex and at specific ages among white and Negro families. Data for Red Hook and Harlem are combined.

separated districts, but made up of families living under somewhat the same general conditions, affords convincing evidence that the results may be taken as characteristic of similar population groups in New York City.

The implication of the data presented in this study is that for the most part tuberculous lesions, designated as important tuberculosis (clinical tuberculosis and extensive fibrosis), are acquired during adult life and the prevalence increases throughout life. For example, the rate for white males at age 40-49 is almost three times that for age 20-29 and ten times the rate among males 15-19 years of age. It is a significant fact that the increase in prevalence with age remains (Fig. 3) even though all lesions detectable by X-ray are included, that is healed and important tuberculosis.¹² Conse-

ings among older people no longer exists for either white or colored. The rates are almost identical, namely: White, Harlem 14 and Brooklyn 15; Colored, Harlem 9 and Brooklyn 8, per 100 persons X-rayed.

¹²Figure 3 shows the age curve of total lesions by sex for the combined populations of Red Hook and Harlem according to color. The rates are based upon 13,740 white and 4,397 Negro persons. The differences in the age curves for white and Negro will be discussed in a subsequent article.

quently, the increase in prevalence of important tuberculosis with age cannot be attributed wholly to the lighting up of old lesions but probably is in part due to the acquisition of new tuberculosis. These data have an important bearing upon case-finding procedures in that they show strikingly that important tuberculous disease is found with increasing frequency among persons of adult ages.

RESULTS OF FOLLOW-UP OF DIAGNOSED CASES AND FAMILY CONTACTS¹³

A special follow-up clinic was established for the twofold purpose of (1) securing a complete clinic examination of all cases of tuberculosis and other diagnoses needing investigation discovered through the survey and (2) to secure the examination of all family contacts of tuberculosis cases as speedily as possible.

The follow-up of individual cases applied to the following: 328 cases of tuberculosis classed as needing investigation, 93 cases of suspect tuberculosis for whom either a positive or negative diagnosis should be made, and 181 cases diagnosed as having a non-tuberculous pulmonary lesion which needed further investigation. The clinic examination consisted of a sputum test, physical examina-

Table 2. Clinical diagnosis of 272 cases of tuberculosis after clinic examination.¹

Clinical Diagnosis	Number	Per Cent
TOTAL CASES	272	100.0
Tuberculosis:		
Minimal	196	72.1
Moderately advanced	28	10.3
Advanced	18	6.6
Undiagnosed	9	3.3
Reversed	21	7.7

¹Fifty-six additional were not examined in clinic. They were classified on the basis of the paper film as follows: 41 minimal, 3 moderately advanced, and 6 advanced tuberculosis, 6 unclassified.

¹³Data for white and Negro families are not tabulated separately for the analysis of follow-up.

tion, X-ray when considered important by examining physician, the tuberculin test for children under 16, and special tests, such as a Wassermann, when necessary.

Table 3. Diagnosis of 73 cases of suspect tuberculosis after clinic examination.¹

Clinical Diagnosis	Number	Per Cent
TOTAL CASES OF SUSPECT TUBERCULOSIS	73	100.0
Tuberculosis:		
Minimal	16	21.9
Moderately advanced	0	0
Advanced	0	0
Childhood Type	1	1.4
Undiagnosed	21	28.8
Non-Tuberculosis	35	47.9

¹Twenty additional cases of suspect tuberculosis did not have a clinic examination but were reclassified on the basis of the paper film—7 were classified as minimal tuberculosis.

Tables 2 and 3 show the classification of the clinical diagnoses for cases of tuberculosis and suspect tuberculosis. It is interesting to note that 72 per cent of the 272 cases of tuberculosis examined in clinic (Table 2) were classed as minimal and only 17 per cent as moderately advanced or advanced. Three per

cent were undiagnosed and for approximately 8 per cent the diagnosis was reversed. Twenty-two per cent of the 73 suspects examined in clinic (Table 3) were diagnosed as minimal tuberculosis and one case was diagnosed as childhood type.¹⁴

The examination of household contacts should have applied only to contacts of tuberculosis cases but the examination of contacts was started simultaneously with the follow-up of the cases and the contacts of all cases whether tuberculous or non-tuberculous were asked to come to clinic for an examination. This meant that 424 members of 207 families were examined in clinic even though there was no justification

¹⁴An additional 5 (4 minimal and 1 childhood type) cases of tuberculosis were diagnosed among the 181 cases classified as having a non-tuberculous pulmonary lesion.

AGE GROUPS	TOTAL FAMILY CONTACTS	PER CENT	
		Examined	Not Examined
TOTAL FOR 543 FAMILIES			
<i>All Ages</i>	1,873	64.8	35.2
Under 20 years	1,166	58.9	41.1
20-49	558	74.7	25.3
50+	149	73.8	26.2
282 FAMILIES—PRIMARY CASE MINIMAL			
<i>All Ages</i>	966	68.1	31.9
Under 20 years	607	64.6	35.4
20-49	281	74.4	25.6
50+	78	73.1	26.9
54 FAMILIES—PRIMARY CASE ADVANCED OR MODERATELY ADVANCED			
<i>All Ages</i>	171	77.2	22.8
Under 20 years	104	73.1	26.9
20-49	49	79.6	20.4
50+	18	94.4	5.6
207 FAMILIES—PRIMARY CASE, SUSPECT TUBERCULOSIS FOUND NEGATIVE AND NON-TUBERCULOUS LESIONS			
<i>All Ages</i>	736	57.6	42.4
Under 20 years	455	48.1	51.9
20-49	228	74.1	25.9
50+	53	67.9	32.1

Table 4. Per cent of family contacts examined in 543 families, classified according to types of primary case in family.

from either the survey or clinic findings for the examination of family contacts.

For purposes of analysis the families in which the contacts were examined have been grouped according to the clinical diagnosis of the primary case discovered through the survey as follows: 282 families in which the primary case was mini-

AGE GROUPS	PER CENT				NUMBER				
	Tuberculosis			Sus- pects	Con- tacts Exam.	Tuberculosis Found			Sus- pects
	Mini- mal	Mod. Adv. or Adv.	Ch. Type			Mini- mal	Mod. Adv. or Adv.	Ch. Type	
TOTAL FOR 543 FAMILIES									
All Ages	.6	0	.3	1.6	1,214	7	1	4	19
Under 20 years	.1	0	.6	2.0	687	1	0	4	14
20-49	.7	0	0	1.2	417	3	0	0	5
50+	2.6	.9	0	0	110	3	1	0	0
282 FAMILIES—PRIMARY CASE MINIMAL									
All Ages	.6	0	.3	1.5	658	4	0	2	10
Under 20 years	0	0	.5	1.5	392	0	0	2	6
20-49	1.0	0	0	1.9	209	2	0	0	4
50+	3.5	0	0	0	57	2	0	0	0
54 FAMILIES—PRIMARY CASE MODERATELY ADVANCED OR ADVANCED									
All Ages	0	0	0	3.8	132	0	0	0	5
Under 20 years	0	0	0	5.3	76	0	0	0	4
20-49	0	0	0	2.6	39	0	0	0	1
50+	0	0	0	0	17	0	0	0	0
207 FAMILIES—PRIMARY CASE, SUSPECT TUBERCULOSIS FOUND NEGATIVE AND NON-TUBERCULOUS LESIONS									
All Ages	.7	.2	.4	.9	424	3	1	2	4
Under 20 years	.5	0	.9	1.8	219	1	0	2	4
20-49	.6	0	0	0	169	1	0	0	0
50+	2.8	2.8	0	0	36	1	1	0	0

Table 5. Tuberculosis cases diagnosed among contacts in 543 families, classified according to type of primary case in family.

mal tuberculosis, 54 families in which the primary case was advanced or moderately advanced tuberculosis, and 207 families in which the primary case was a suspect found nega-

tive or a non-tuberculous lesion.¹⁵ Table 4 shows the total contacts by broad age groups and the per cent examined in each group of families. From 58 to 77 per cent of the total contacts were examined in the different family groups, the highest proportion examined being in the 54 families with an advanced or moderately advanced case. A higher proportion of the contacts over 20 years of age than under 20 was examined in all three family groups.

Table 5 shows the number of cases diagnosed among family contacts in each group of families. It is plainly evident that the original survey revealed practically all of the cases in these families. No new cases were discovered in the 54 families with advanced or moderately advanced tuberculosis and only .9 and 1.3 per cent in the minimal and non-tuberculous respectively. However, it should be noted that a higher proportion of contacts (3.8 per cent) in the moderately advanced or advanced families was classed as suspects than in the other two groups with 1.5 (minimal families) and .9 per cent (non-tuberculous families).

The results of the analysis of the follow-up of cases and examination of contacts would seem to indicate that in a case-finding survey of this type, the examination of contacts should be made only in a more highly selected group of families. This selection might better be made after a detailed clinical study of the primary cases in order to determine activity and infectiousness. Otherwise, the examination of contacts may prove relatively ineffective as a case-finding procedure.

¹⁵It should be pointed out that the occurrence of more than one primary case in a family as discovered in the general survey was rare. Out of the 543 families considered only 5 were multiple case families, 1 in the 282 "minimal" families and 4 of the 54 families with an advanced or moderately advanced case. In all 5 families the cases occurred in both husband and wife.