

Results of screening serologic reactors found during an intensive house-to-house survey in New York City demonstrate the value of multiphasic screening procedures in suspect neighborhoods.

House-to-House Serologic Survey With Multiphasic Screening

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DURING the 10-week period April 18–June 25, 1955, the New York City Health Department conducted, with the cooperation of the Public Health Service, an intensive house-to-house blood testing program in the Central and East Harlem Health Districts of Manhattan. The Central Harlem Health District was selected for testing because of the known high prevalence of syphilis. This district reported 22.5 percent of all the syphilis cases in New York City in 1953 and 20.5 percent in 1954. Furthermore, the mass blood testing street survey of 1953 indicated that about 20,000 residents of this district were in need of antisyphilitic therapy. The East Harlem Health District was included in the 1955 intensive survey because it is contiguous to Central Harlem and is the fifth area in the city in syphilis prevalence, having reported 6.8 percent of the cases in 1953 and 6.3 percent in 1954. At least 2,000 persons in this district were in need of antisyphilitic treatment, according to the 1953 mass street survey.

A house-to-house serologic survey in Newark in 1954 demonstrated the special value of this type of survey (1). By concentrating on an

area of known high prevalence and proceeding systematically from house to house, and from street to street, it is possible to test more people for less money than in street surveys. A higher yield of cases of syphilis brought to treatment may also be expected.

In the 10 weeks of the survey, 23,675 persons were tested for syphilis. Testing was done in three health areas of Central Harlem and in areas 20, 25, and 29 of East Harlem. This was accomplished by 4 teams, each composed of a technician who drew the blood and a clerk who kept the records. Two teams and a publicity agent worked as a unit on a particular street. First, the publicity agent alerted the residents by personal contact, by handbills, and by posters placed in neighborhood stores. On the following day, the 2 teams began their testing, proceeding methodically from house to house. In this manner, about 400 specimens of blood were collected daily and forwarded to the health department's bureau of laboratories for serologic examination. The reports were transmitted to the division of social hygiene. Negative reports were promptly mailed to patients. Positive and doubtful reports were checked against the health department's syphilis registry to separate reactors with a previous record from others. Letters were then mailed to all reactors advising that further examinations

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should be done by their own physicians or by health department clinics. Home visits were made to those who failed to report after 1 week.

Results of Blood Testing

Of the 23,675 persons tested, 6,701 were white, 14,872 were nonwhite, and 2,102 were classified as "other." The total number included 8,739 Puerto Ricans, of whom 5,978 were classified as white, 917 as nonwhite, and 1,844 as "other." "Other" Puerto Ricans are those who could not readily be classified as either white or nonwhite. Also included in this group were 258 non-Puerto Ricans of undetermined race.

The laboratory reported a total of 3,406 abnormal serologic reactions, an overall STS reactivity rate of 14.4 percent. This does not include an estimated 10 percent who had positive Mazzini reactions which were not confirmed by Kolmer or VDRL tests. Of the 3,406 abnormal serologic reactions, 2,131 were positive and 1,275 were doubtful. The reactivity rate for nonwhites was 17.6 percent, for nonwhite Puerto Ricans 11.3 percent, for white Puerto Ricans 9.2 percent, for "other" Puerto Ricans 12.9 percent, and for "other" whites 4.0 percent.

The number and percentage of abnormal blood tests found in the survey are shown by age and sex in table 1. The percentage of abnormal reactions increases for both sexes in each succeeding age decade. Abnormal reactions in males increased from 3.9 percent in the 15-24

year age group to 25.5 percent in the 55 years and over age group. Abnormal reactions in females increased from 5.6 percent in the 15-24 year age group to 18.4 percent in the 55 years and over age group.

Results of Successive Screening

The final results of screening the reactors are shown according to race in table 2. Of the 3,406 reactors to the initial STS, 2,345 (68.8 percent) reported to the clinic or private physician for further examinations. As a result, 1,918 individuals were found to have syphilis. This was 81.8 percent of those examined and 8.1 percent of those originally tested. Of the individuals with syphilis, 1,317, or 56.1 percent of the 2,345 reactors examined, were in need of treatment.

Although most of the white persons tested in the survey were Puerto Ricans, in this study they have been considered together with nonwhites and "other" Puerto Ricans. In a group of 723 white persons, not Puerto Ricans, residing in the Harlem area, a reactivity rate of 4.0 percent was found. The 13 cases of syphilis discovered made up 1.8 percent of the 723 persons tested.

In the entire group of 1,918 individuals with syphilis, 406 were new cases, 911 were cases requiring further treatment, and 601 were cases which had already received adequate treatment. When this was related to the total of 23,675 persons tested, it was found that 1.7 percent had

Table 1. Number and percentage of positive and doubtful blood tests for syphilis, by age and sex, house-to-house survey, New York City, 1955

Age	Total			Male			Female		
	Number tested	Positive and doubtful		Number tested	Positive and doubtful		Number tested	Positive and doubtful	
		Number	Percent		Number	Percent		Number	Percent
All ages.....	23, 675	3, 406	14. 4	11, 810	1, 797	15. 2	11, 865	1, 609	13. 6
10-14.....	327	6	1. 8	144	3	2. 1	183	3	1. 6
15-24.....	5, 330	248	4. 7	2, 933	113	3. 9	2, 397	135	5. 6
25-34.....	6, 868	882	12. 8	3, 282	413	12. 6	3, 586	469	13. 1
35-44.....	5, 469	1, 061	19. 4	2, 667	571	21. 4	2, 802	490	17. 5
45-54.....	3, 378	712	21. 1	1, 670	416	24. 9	1, 708	296	17. 3
55 and over.....	2, 251	491	21. 8	1, 088	277	25. 5	1, 163	214	18. 4
Age unknown.....	52	6	11. 5	26	4	15. 4	26	2	7. 7

Table 2. Results of successive screening, house-to-house survey, New York City, 1955

Category	Number tested	STS reactors		STS reactors examined		Cases of syphilis found		
		Number	Percent of number tested	Number	Percent of reactors	Number	Percent of STS reactors examined	Percent of total number tested
White.....	723	29	4.0	18	62.1	13	72.2	1.8
Nonwhite.....	13,955	2,453	17.6	1,636	66.7	1,433	87.6	10.3
Puerto Rican ¹	8,997	924	10.3	691	74.8	472	68.3	5.2
Total.....	23,675	3,406	14.4	2,345	68.8	1,918	81.8	8.1

¹ Includes 5,978 white and 917 nonwhite Puerto Ricans; also 1,844 Puerto Ricans and 258 non-Puerto Ricans of undetermined category.

Table 3. Number and percentage of positive and doubtful blood tests among whites and nonwhites, by age and sex, house-to-house survey, New York City, 1955

Age	White						Nonwhite					
	Male			Female			Male			Female		
	Number tested	Positive and doubtful		Number tested	Positive and doubtful		Total tested	Positive and doubtful		Total tested	Positive and doubtful	
		Number	Percent		Number	Percent		Number	Percent		Number	Percent
All ages.....	475	16	3.4	248	13	5.2	7,112	1,320	18.6	6,843	1,133	16.6
10-14.....	3		.0	3		.0	53	1	1.9	54	1	1.9
15-24.....	77		.0	37		.0	1,324	47	3.5	1,213	77	6.3
25-34.....	102	4	3.9	60	2	3.3	2,089	293	14.0	2,214	346	15.6
35-44.....	90	1	1.1	52	5	9.6	1,818	439	24.1	1,658	353	21.3
45-54.....	94	5	5.3	43	2	4.7	1,110	313	28.2	1,025	224	21.9
55 and over.....	108	6	5.6	51	4	7.8	704	223	31.7	665	131	19.7
Unknown.....	1		.0	2		.0	14	4	28.6	14	1	7.1

newly discovered syphilis, and 3.8 percent had syphilis requiring additional treatment. Thus 5.5 percent of the total number tested were in need of treatment. The 406 new cases of syphilis were diagnosed as follows: primary 1, secondary 7, early latent 34, late and late latent 353, and congenital 11.

Nonwhite Population Tested

A total of 13,955 nonwhites were tested in the survey (table 2). Positive or doubtful serologic reactions occurred in 2,453, or 17.6 percent. The reactivity rate, lowest in the 10-14 year age group (1.9 percent), rose in each successively

older group, until it reached the high level of 25.9 in the 55 years and over age group (table 3). In general, males had a slightly higher rate than females, 18.6 percent compared with 16.6 percent. However, the rate for females was somewhat higher than for males in the 15-24 and 25-34 year age groups dropping below the rate for males after 35 years.

Among the 1,433 cases of syphilis found in the nonwhite reactors examined, 313 had syphilis never previously treated, 681 had syphilis requiring further treatment, and 439 had syphilis requiring no additional treatment. Thus, of the 13,955 nonwhites tested, 2.2 percent had newly discovered syphilis and 4.9 percent had

Table 4. Number and percentage of positive and doubtful blood tests among Puerto Ricans, by age and sex, house-to-house survey, New York City, 1955

Age	White						Nonwhite						Other (category undetermined) ¹					
	Male			Female			Male			Female			Male			Female		
	Number tested	Positive and doubtful		Number tested	Positive and doubtful		Number tested	Positive and doubtful		Number tested	Positive and doubtful		Number tested	Positive and doubtful		Number tested	Positive and doubtful	
		Number	Percent		Number	Percent		Number	Percent		Number	Percent		Number	Percent		Number	Percent
All ages...	2,830	303	10.7	3,148	246	7.8	431	47	10.9	486	57	11.7	962	111	11.5	1,140	160	14.0
10-14.....	66	1	1.5	74	1	1.4	6	—	.0	24	—	.0	16	1	6.3	28	1	3.6
15-24.....	1,023	48	4.6	792	28	3.5	183	3	1.6	95	4	4.2	326	15	4.6	260	26	10.0
25-34.....	732	75	10.2	888	68	7.7	112	12	10.7	122	17	13.9	247	29	11.7	302	36	11.9
35-44.....	497	80	16.1	696	68	9.8	69	17	24.6	110	16	14.5	193	34	17.6	286	48	16.8
45-54.....	301	63	20.9	408	35	8.6	40	12	30.0	77	9	11.7	125	23	18.4	155	26	16.8
55 and over..	202	36	17.8	285	46	16.1	19	3	15.8	55	10	18.2	55	9	16.4	107	23	21.5
Age unknown...	9	—	.0	5	—	.0	2	—	.0	3	1	33.3	—	—	.0	2	—	.0

¹ Includes 258 non-Puerto Ricans of undetermined category.

syphilis requiring further treatment. The 994 individuals with syphilis brought to treatment because of the survey represent 7.1 percent of those originally tested.

Population estimates by race and age are not available for 1955. However, the estimated population of the Central Harlem District, as of July 1, 1955, does not differ markedly from the census enumeration, 250,000 in 1955 compared with 259,594 in 1950, of whom 222,033 were 10 years old or older. Data from the 1950 Federal census are therefore utilized in the following computations.

According to the 1950 census, about 66,089 persons over 10 years of age reside in the three health areas of Central Harlem that were tested. The survey tested 18.5 percent of these and about 5.5 percent of the entire district. About 95 percent of the residents of Central Harlem are nonwhite. By applying the syphilis rates for nonwhites found in the survey, it is estimated that 1,454 persons with undiscovered syphilis reside in these areas. The survey found 313 of these, leaving 1,141 still undiscovered. Similarly, it is estimated that 3,238 persons with syphilis requiring further treatment reside in these areas. The survey

found 681 of these, leaving 2,557 still undiscovered. From this it is apparent that the survey succeeded in finding only about one-fifth of the syphilitics requiring treatment in these health areas.

By applying the same percentages to the entire population over age 10 of the Central Harlem Health District and deducting the cases found in the survey, it is estimated that there are 4,572 undiscovered syphilitics and 10,199 syphilitics requiring further treatment, or altogether a total of 14,771. This emphasizes the need for continued serologic surveying, education, and vigilant venereal disease control effort.

Puerto Rican Population Tested

Morbidity data do not furnish accurate information regarding the incidence of syphilis among Puerto Ricans in New York City (2). For this reason an attempt was made to obtain this information by including a question as to national origin on the report form used in the survey.

Altogether, 8,997 Puerto Ricans over age 10 were tested and 924, or 10.3 percent, had posi-

tive or doubtful blood tests (table 2). About three-quarters of these reactors reported for examination, and syphilis was discovered in 472, or 68.3 percent of the reactors examined, and this was 5.2 percent of the 8,997 Puerto Ricans tested. Of the Puerto Ricans tested, new cases of syphilis were found in 1.0 percent, cases requiring additional treatment in 2.5 percent, and 1.6 percent were cases that had already received adequate treatment. Thus, 3.5 percent of Puerto Ricans tested in the survey had syphilis requiring treatment.

Syphilis was only half as prevalent among the Puerto Ricans tested as among the nonwhites tested. Of interest was the finding that on the basis of available evidence reactions to serologic tests for syphilis were considered as false positive in 31.7 percent of the Puerto Rican reactors. This was almost three times the percentage of false positive tests found in the indigenous nonwhite group. These apparent differences warrant further study with the newer laboratory procedures which utilize specific antigen.

Table 4 gives the number and percentage of positive and doubtful blood tests by age, sex, and race. The reactivity rate for the white Puerto Ricans was 9.2 percent; 10.7 percent for males and 7.8 percent for females. The rate increased with age and was highest in the 55 years and over age group. The reactivity rate for nonwhite Puerto Ricans was 11.3 percent; 10.9 percent for males and 11.7 percent for females. The reactivity rate for "other" Puerto Ricans was 12.9 percent; 11.5 percent for males and 14.0 percent for females. A small number of indigenous individuals of undetermined ancestry could not be separated from the Puerto Ricans of undetermined ancestry. These two groups, 1,844 Puerto Ricans and 258 non-Puerto Ricans are combined in the table. As with white and nonwhite Puerto Ricans, the reactivity rates increased with age.

Of the 87 new cases of syphilis found among Puerto Ricans, 2 were secondary, 8 were early latent, 72 were late latent, and 5 were congenital syphilis.

An accurate estimate of the potential number of STS reactors and cases of syphilis in the population of the entire East Harlem Health District is difficult to make from the data avail-

able from the survey. This is because the population is not as homogeneous as in the Central Harlem district, and because of inadequate sampling. An estimate will therefore be made only for areas 20 and 25 of the East Harlem Health District where, with the exception of 605 specimens taken in area 29, practically all of the tests were done.

The population of areas 20 and 25 is almost entirely Puerto Rican. According to the 1950 census, there are 44,200 persons over age 10 residing in these areas. In the survey, approximately one-fifth of the residents over age 10 were tested for syphilis. Assuming that the same percentages of syphilis in Puerto Ricans found in the survey held for the entire population in these areas, it may be estimated that there are 355 cases of undiscovered syphilis and 880 cases of syphilis requiring additional treatment, a total of 1,235 cases in need of antisyphilitic therapy.

Multiphasic Screening of Reactors

Of the 3,406 persons with positive blood tests in the survey, 2,116 reported to the health department clinic and underwent a multiphasic screening procedure. This included a complete physical examination, repetition of the blood test, genital smears for gonorrhea (done routinely in women and only when indicated in men), a urine examination for sugar, and an X-ray of the chest. Papanicolaou smears of the cervical secretions in 1,011 female reactors over 21 years of age were also obtained. These were

Table 5. Results of multiphasic screening of serologic reactors, house-to-house survey, New York City, 1955

Condition	Number reactors screened	New cases found	
		Number	Percent
Syphilis ¹	2, 116	344	16. 3
Gonorrhea.....	2, 116	18	. 8
Diabetes.....	2, 116	23	1. 0
Carcinoma of cervix.....	1, 011	13	1. 3
Chest disease.....	(²)	23	-----

¹ New cases. An additional 62 new cases were found by private physicians and other clinics.

² Number of individuals X-rayed was not determined. (See text.)

examined by the cancer detection service of the bureau of adult hygiene.

As a result of these procedures, the following conditions were discovered:

Veneral disease

Syphilis:	
Number new cases.....	344
Number cases requiring additional treatment.....	848
Number cases not requiring additional treatment.....	564
Gonorrhoea (females 16, males 2).....	18
Nongonococcal urethritis.....	1

Glycosuria

Number individuals with glycosuria.....	60
Diabetes:	
Previously known.....	23
Under treatment.....	13
Returned to treatment.....	10
Not previously known.....	23
Excluded on reexamination.....	6
Failed to return for reexamination.....	8

Abnormal chest findings by X-ray

Tuberculosis:	
Active.....	3
Arrested.....	2
Cured.....	3
Type not disclosed.....	1
Stage undetermined.....	1
Suspicious.....	1
Pneumonitis.....	1
Cystic disease of lungs.....	1
Aneurysm.....	5
Enlarged heart.....	5

Abnormal Papanicolaou smears

Squamous cell carcinoma in situ.....	12
Invasive squamous cell carcinoma.....	1
Suspicious, still under study.....	6
Chronic endocervicitis with squamous metaplasia, still under study.....	3
Chronic endocervicitis.....	7
Cervical polyp.....	1

Table 5 gives the number and percentage of new cases of syphilis, gonorrhoea, diabetes, carcinoma of the cervix, and chest disease found in the survey. The large number of syphilis cases was to be expected since the individuals examined were all serologic reactors. The 16 cases of gonorrhoea in women were asymptomatic. The 23 new diabetics found were referred to hospital clinics and private physicians who confirmed the diagnosis with blood sugar determinations. In addition, 10 known diabetics who were not under medical care were referred for further examination and treat-

ment. The 13 women with carcinoma of the cervix had biopsies which confirmed the diagnosis made by examination of the Papanicolaou smears. All were referred for surgical treatment. Patients with lung or heart disease were also referred for appropriate treatment of their condition.

These results confirm the value of multiphasic screening procedures in areas where the population is predominantly nonwhite. Since this was primarily a syphilis case-finding project, arrangements could not be made for the multiphasic screening of individuals who did not react to the initial blood test. The data indicate that a broader type of survey would have yielded many more cases of diabetes, chest disease, and cancer.

Summary

1. A house-to-house blood testing survey was conducted by the New York City Health Department in the Harlem section of Manhattan over a 10-week period during the spring of 1955.

2. A total of 23,675 persons were tested. These included 14,872 nonwhites, 6,701 whites, and 2,102 "others." The STS reactivity rate for the entire group was 14.4 percent.

3. Syphilis was found in 1,918 individuals, 8.1 percent of those tested; 406 were new cases, 911 were cases requiring further treatment, and 601 cases had been adequately treated.

4. Syphilis was found to be twice as prevalent in nonwhites as in the Puerto Ricans tested.

5. Reactions to serologic tests for syphilis (STS) considered as false-positive apparently occurred in 31.7 percent of the Puerto Rican reactors, three times the percentage found in the nonwhite group.

6. Of the STS reactors of all categories examined, 81.8 percent had syphilis and 56.1 percent were in need of treatment.

7. It is estimated that there are 14,771 nonwhites in the Central Harlem District who are in need of antisyphilitic treatment. Similarly it is estimated that in two areas of East Harlem that were tested there are 1,235 Puerto Ricans in need of antisyphilitic treatment.

8. Multiphasic screening of the reactors resulted in finding 18 persons with gonorrhoea, 23

with previously unknown diabetes, 13 women with squamous cell carcinoma of the cervix, 3 persons with active pulmonary tuberculosis, and 20 persons with evidence of heart or lung conditions. These results confirm the value of utilizing multiphasic screening procedures in suspect neighborhoods.

REFERENCES

- (1) Shepard, A. C.: 19,963 given serologic tests in Newark casefinding effort. *Pub. Health News, New Jersey Health Department* 37: 26-28, January 1956.
- (2) Vandow, J. E.: Venereal disease among Puerto Ricans in New York City. *Pub. Health Rep.* 70: 1242-1246, December 1955.

Traineeships in Neurological and Sensory Disorders

A new program of grants to research scientists for advanced training in neurological and sensory disorders has been announced by the National Institute of Neurological Diseases and Blindness, Public Health Service. The awards are designed to help research scientists obtain additional specialized training for careers in teaching and research.

A previous program, under which about 75 scientists received advanced training in 1957, was concerned only with clinical training. The current program encourages advanced training in either the clinical field or in such basic science areas as neurochemistry, neuropharmacology, neurophysiology, or neuroanatomy.

The traineeships may be awarded for study at any institution in the United States or abroad qualified to give the particular training desired. During training, which may begin within 10 months of the date of the award, the trainee will not be permitted to carry on the private practice of medicine.

Generally, the awards will be made for not less than 9 months and for not more than a year. They may be renewed, however, and in this way may continue up to a period of 3 years. Stipends range from \$5,500 to \$14,800 a year, according to the applicant's qualifications and training needs.

Applicants must be citizens of the United States or must have filed declarations of intent to become citizens. They must be free of any disability that would interfere with the proposed training. In addition, they must have completed either the residency in a clinical specialty, or its equivalent, or at least 3 years of pertinent postdoctoral training or research experience.

Application forms and instructions may be obtained by writing to the Chief, Extramural Programs Branch, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Public Health Service, Bethesda 14, Md.