A STUDY OF RESPIRATORY TUBERCULOSIS IN GLASGOW, WITH PARTICULAR REFERENCE TO CERTAIN ENVIRONMENTAL FACTORS.

By

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GLASGOW.

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TABLES

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TABLE I.

1953

(Data from Annual Reports of the Medical Officers of Health)

	Estimated Population	Respiratory Tuberculosis Case Rate per 10,000 Population.	Respiratory Tuberculosis Death Rate per 10,000 Population.
Glasgow	1,085,000	21.8	4.34
Edinburgh	470,847	16.9	2.3
Aberdeen	185,232	13.1	1.4
Dundee	177,174	16.4	1.7
Birmingham	1,118,500	11.1	2.4
Liverpool	789,700	17.5	3.3
Manchester	701,800	10.6	2.8
Newcastle	289,700	16.4	2.8
London (County)	3,343,000	14.0	2.1

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CHAPTER I.

THE PROBLEM

Glasgow's unenviable reputation for tuberculosis is well known. Table I gives the estimated population and case and death rates for respiratory tuberculosis in 1953 (per 10,000 of the population) for certain Cities and County Boroughs. The data are obtained from the annual reports of the Medical Officers of Health.

The study of respiratory tuberculosis, and the factors leading to infection and manifest disease are complicated by infection being widespread, while manifest disease develops in only a small proportion of infected persons. There is, too, the difficulty of establishing the time elapsing between infection and manifest disease, which may be caused by a re-awakening of a latent focus within the body, the difficulty being increased by the symptomless character of the early phases of many progressive lesions. Infection may result in acquired resistance to subsequent reinfection or may lead to manifest disease with its effect on the life and happiness of the patient and of his family.

In the report of the Scottish Health Services Council's

Committee on Tuberculosis, 1951, dealing with the situation up to 1947, paragraph 6 reads:

"The Main Problem defined.

The similarity of the trends of the respiratory and meningeal forms of tuberculosis, and the contrast between these forms and the other forms, support the view that the main problem of the retrograde changes in tuberculosis is one of human type infection. The cause of the post-war rise in the mortality rate of total tuberculosis should be revealed by an understanding of the causes of the increased mortality from the respiratory and meningeal forms of the disease."

The following is from the 1953 report of the Medical Officer of Health for Glasgow:

"The percentage of milk consumed as "Pasteurised" has now risen to over 95 per cent., the balance being Certified and Tuberculin-Tested."

During 1953, 207 samples of milk and 11 samples of cream were tested biologically for tubercle bacilli for the City and none were found to be infected with M. tuberculosis.

The problem in Glasgow, then, is one of infection with the human type bacillus.

Thus the most fruitful sources of information will be the study of respiratory tuberculosis and the tuberculin testing of sections of the population.

A study of the former may give guidance as to the relative importance of possible adverse factors in the environment determining the incidence of manifest disease, while a study of the latter will give an indication of the incidence of infection in different groups of people at different ages.

The early identification of sources of infection allows of the early institution of preventive measures against the spread of infection, while benefit may accrue also if the influence of the more important adverse factors in the environment can be moderated.

Adequate control of infection can be established only if potentially active cases of infection are notified at the earliest possible moment and the best use made of all aids in their detection, such as mass radiography.

Early detection and notification permit of treatment being established early and of early isolation in hospital or at home. They make possible the early training of the patient and his family in matters of hygiene, such as the disposal of sputum, the control of droplet infection, the disinfection of eating and drinking utensils, of handkerchiefs etc., and in the need for segregation from the younger members of the family. Early notification permits of the earlier rehousing of 'open' cases where necessary to give the patient a room to himself and permits

of the early B.C.G. vaccination of contacts who are without acquired resistance.

The danger of infection in Glasgow, being from the human type bacillus, comes from cases of respiratory disease having tubercle bacilli in the sputum. The danger may be presumed to vary with the knowledge, or lack of knowledge, of his condition by the patient and with the personal care taken by him. It will depend on his home circumstances, particularly the presence of susceptible contacts in the household. In those employed, the danger will, in part, depend on the nature and conditions of their employment, particularly in association with persons at susceptible ages. The use or abuse of leisure is also of moment, the frequenting of crowded places of entertainment, the unnecessary use of public transport and extensive social contacts, increasing the danger. The danger too will depend on the natural resistance of the contact, varying with age, and on the acquired resistance. Closeness of contact and duration of exposure, will influence the size of the infecting dose and the frequency of infection. Overwork, anxiety, unemployment and poverty, are not prominent features in the young adult population.

To avoid the dangers of secondary infection to themselves and the danger of infection to others, tuberculous patients should avoid crowded places of entertainment. The

common cold in the tuberculous patient is serious for both himself and his contacts, and those employed should be excluded from work until recovery is complete, particularly where the lesion has been recently active.

The positive case with abundant sputum should not be working unless under protected conditions permitting of segregation.

Among the environmental conditions worthy of consideration, therefore, are housing, employment and the use of leisure, particularly with reference to the extent of social contact. In the present investigation attention has been directed to housing and social class, which may be expected to have a broad influence on type of employment and the use of leisure.

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CHAPTER 2.

TUBERCULOSIS IN GLASGOW

A brief outline of the incidence of notifications and of deaths from tuberculosis for the City will serve to define the importance of tuberculosis to the population.

In 1953 of the 514 deaths from tuberculosis, 471 or 91.6 per cent. were due to respiratory disease.

Deaths from all causes in 1953, numbered 12,827 of which 514 or 4.0 per cent. were due to tuberculosis, representing 4.8 per cent of male deaths and 3.1 per cent of female deaths. Of the 1,017 deaths from all causes between 15 and 45 years, however, tuberculosis was responsible for 213 or 20.9 per cent; 18.2 per cent of male and 24.0 per cent of female deaths.

Further, of the 2,368 notifications of respiratory tuberculosis during the year, 1,558 or 65.8 per cent. occurred between 15 and 45 years, 55.7 per cent. of male notifications and 77.7 per cent. of female notifications.

Thus, between the ages of 15 and 45 years tuberculosis 'all forms' accounted for about one death in every five, and notifications of respiratory tuberculosis amounted to about two thirds of the total.

The following is quoted from the report of the Scottish Health Services Council's Committee on Tuberculosis, 1951:

".....the victims of tuberculosis are predominantly

Figure 1

Respiratory Tuberculosis – Glasgow 1931–1953

Both Sexes: Notifications ——

Deaths ——

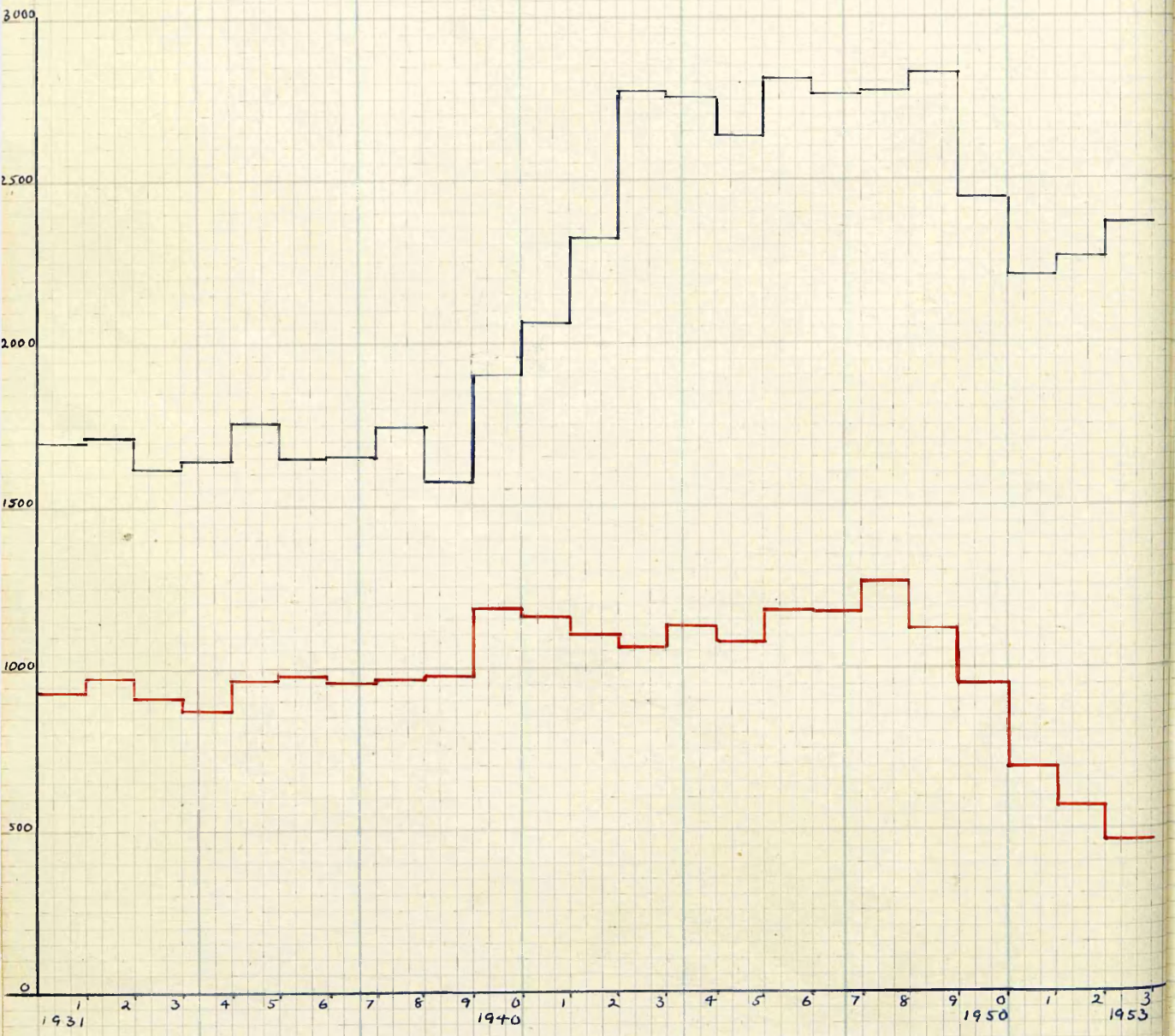


Figure 2.

Respiratory Tuberculosis — Glasgow 1931-53

Males: Notifications ——

Deaths ——

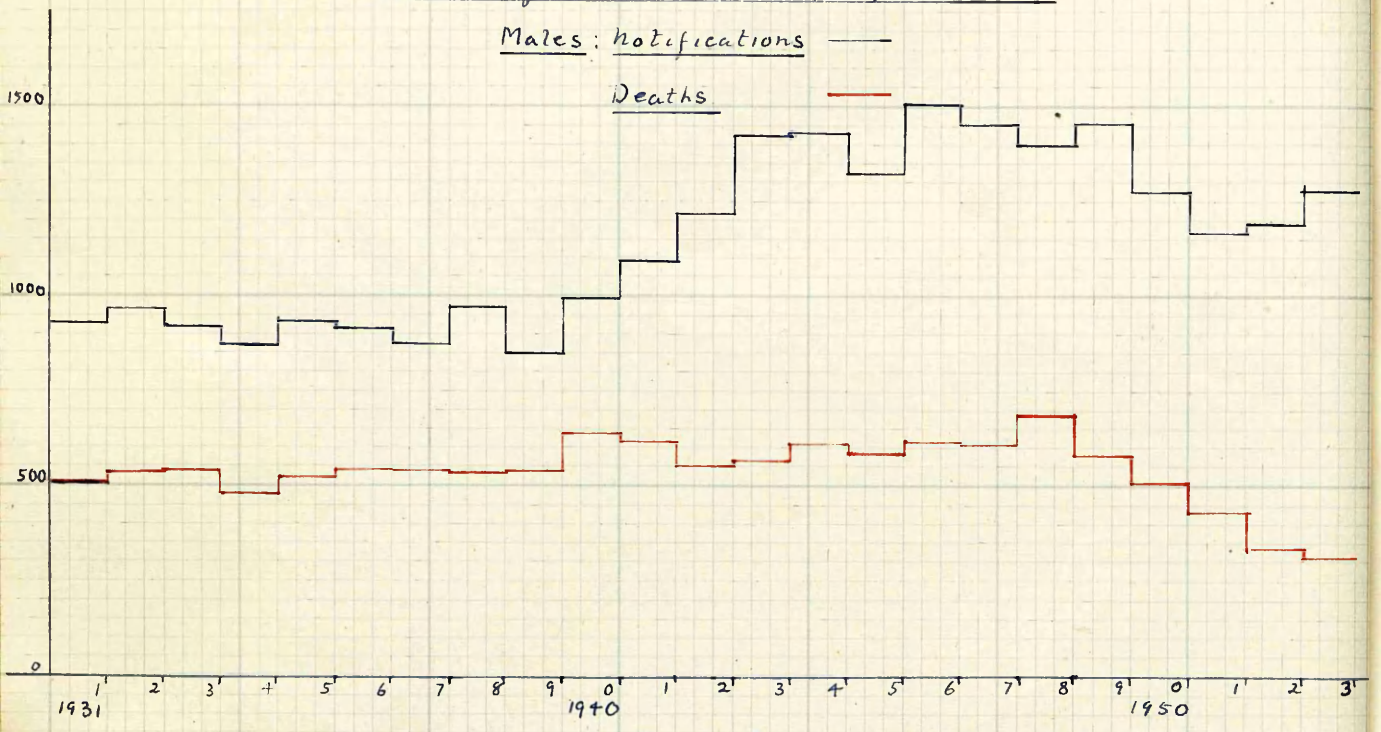
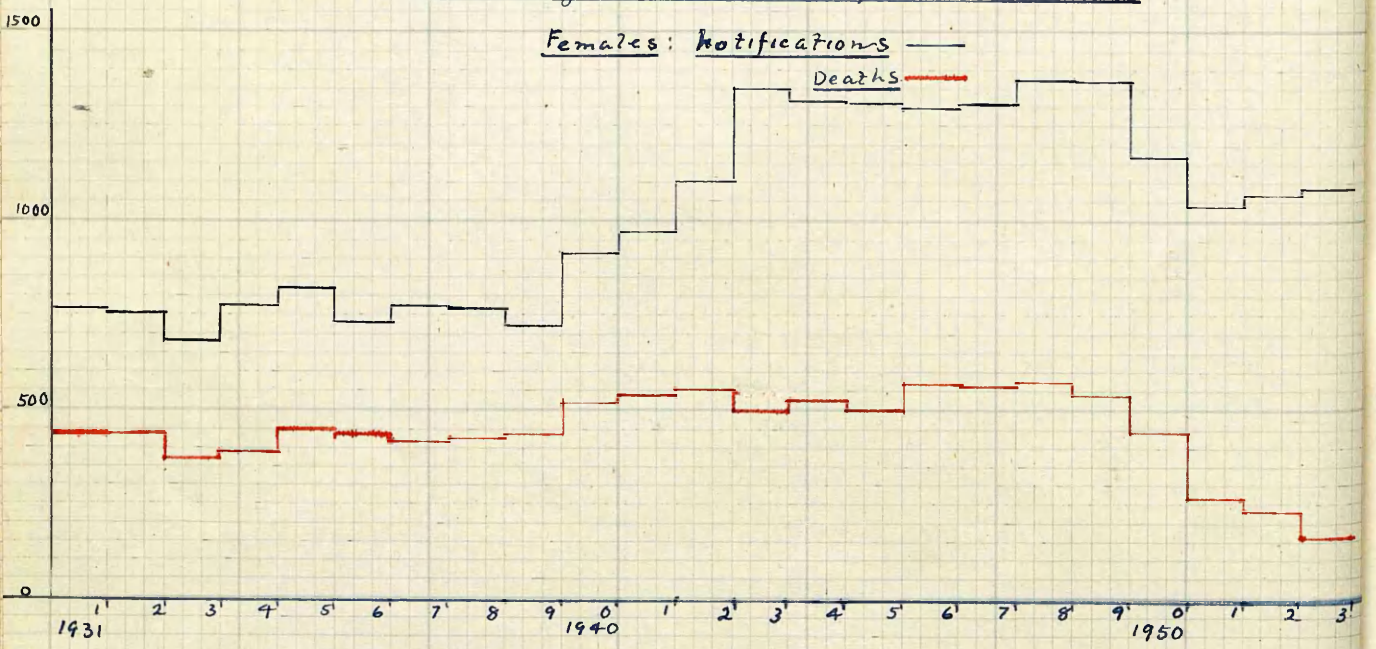


Figure 3

Respiratory Tuberculosis — Glasgow 1931-1953

Females: Notifications ——

Deaths ——



the young whose contributions to the common weal are not yet begun or are by no means completed."

When the annual incidence of cases and deaths from respiratory tuberculosis are reviewed, it is noted (Figure I) that while the deaths have progressively declined since the high level of 1948, the notifications which fell in 1950 and again in 1951, rose slightly in 1952, with a further rise in 1953.

The percentage fall from the 1948 figure for deaths from respiratory tuberclosis was, in 1953, for both sexes 62.8 per cent., (Males 55.6 per cent.; females 71.5 per cent.) while the notifications for both sexes fell only by 14.7 per cent. (Males 8.4 per cent.; females 21.0 per cent.). Further, the notifications in 1953 for both sexes were 7.3 per cent. higher than in 1950 (Males 9.8 per cent.; females 4.5 per cent.). The percentage fall in notifications and deaths has been greater among the female population.

As has been pointed out, the fall in notifications has not corresponded with the fall in deaths and will result in an increased number of tuberculous cases in the community. Thus modern therapy while reducing the number of deaths, may not have reduced the reservoir of infection as much as might have been expected.

In Figures 4 ~~and 5~~ 6 7 are shown the rates for age and sex

Figure 4

Respiratory Tuberculosis — Glasgow

Male Case Rates per 100,000

1931 and 1951

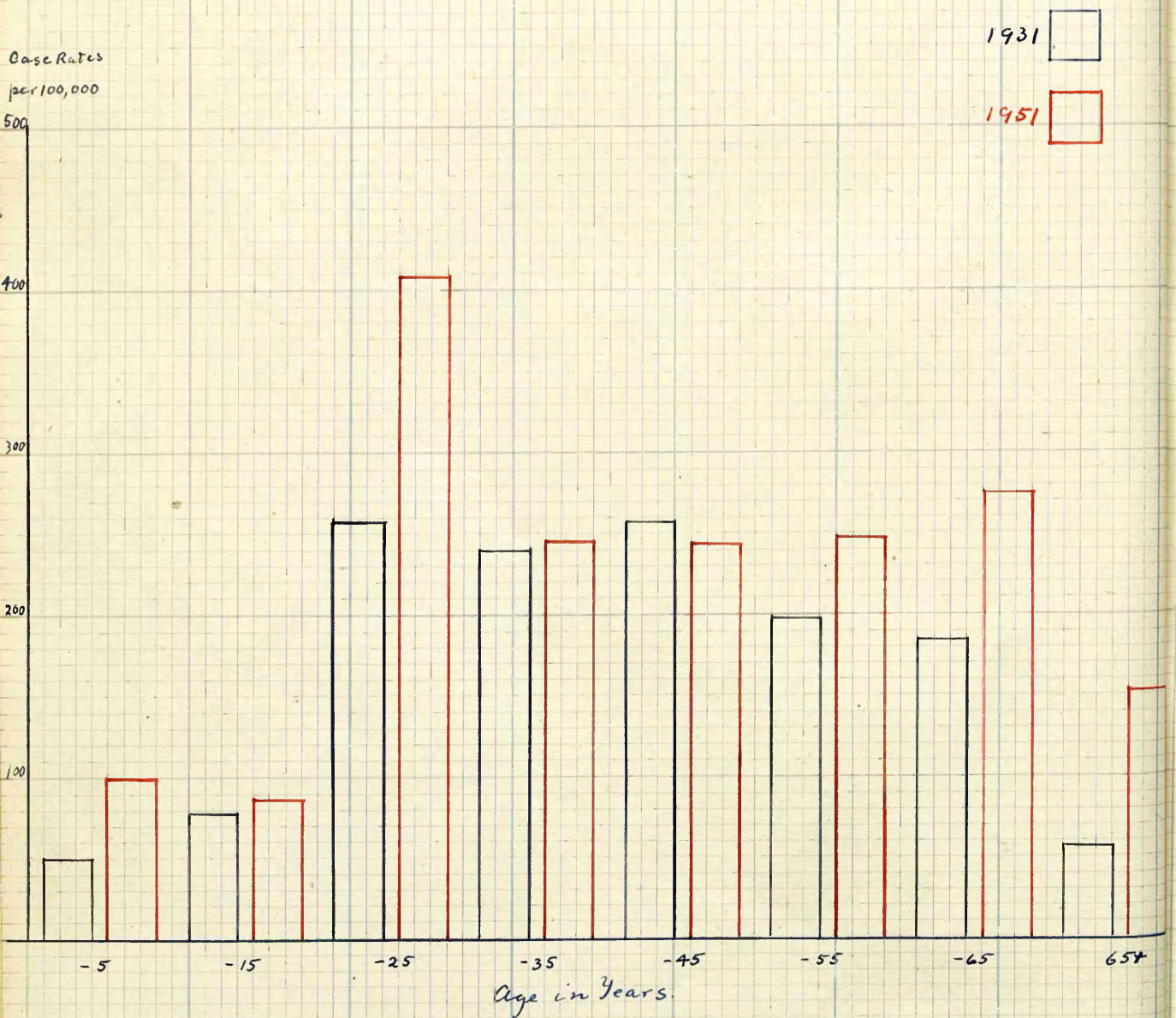


Figure 5

Respiratory Tuberculosis — Glasgow.

Female Case Rates per 100,000

1931 and 1951

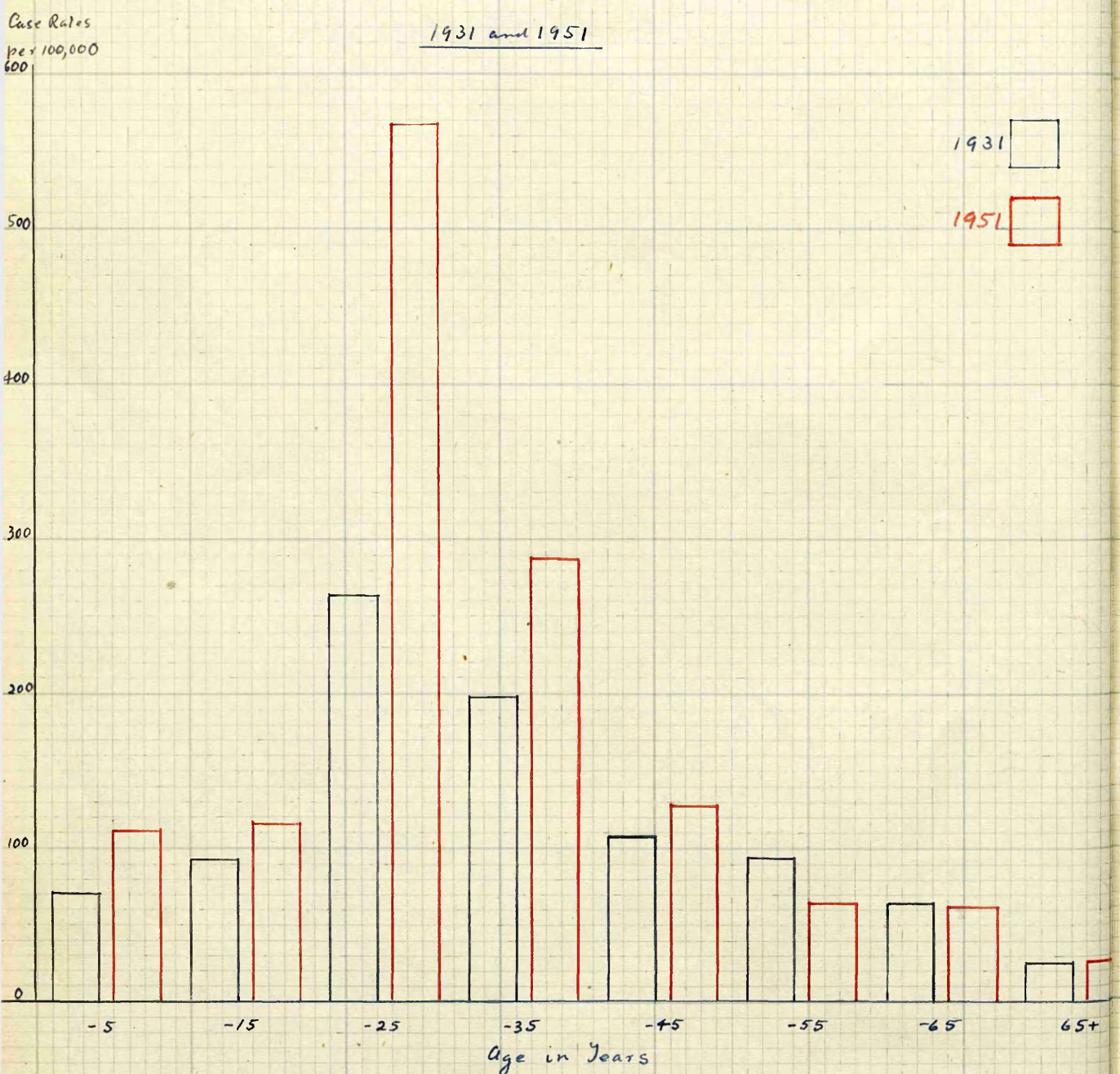


Figure 6.

Respiratory Tuberculosis - Glasgow

Male Death Rates per 100,000

1931 and 1951

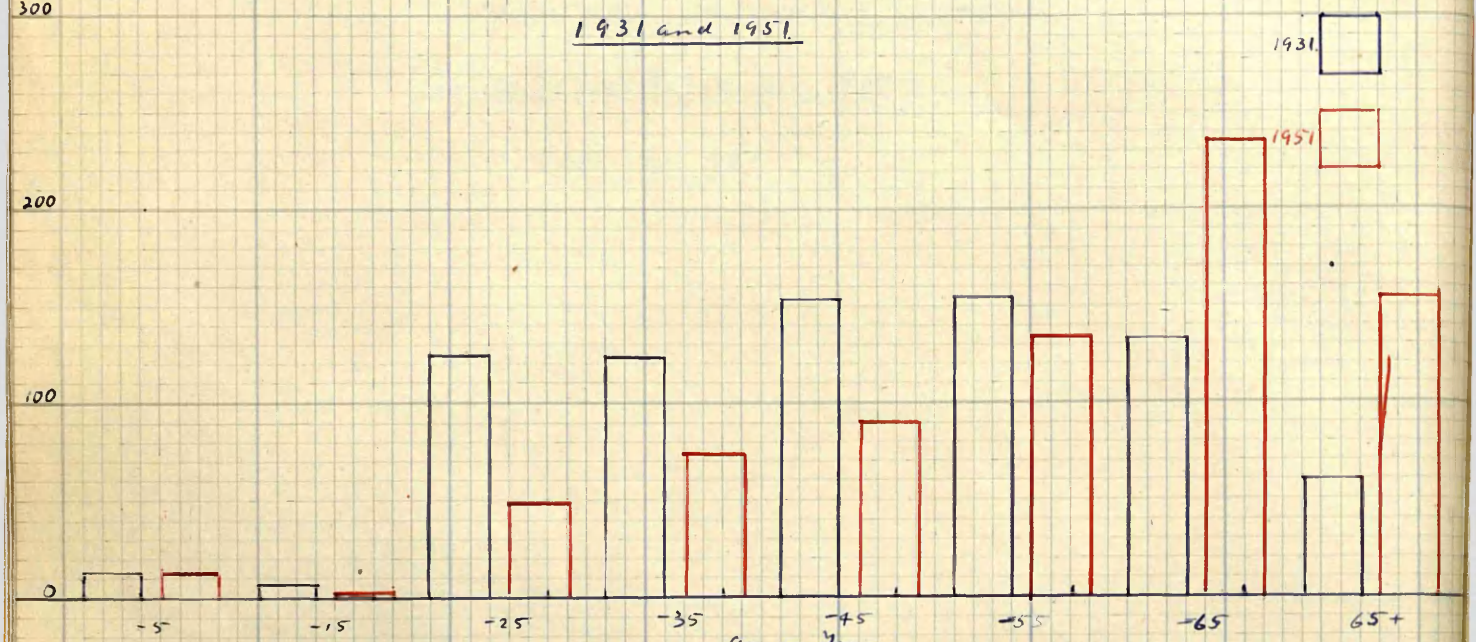


Figure 7.

Respiratory Tuberculosis - Glasgow.

Female Death Rates per 100,000

1931 and 1951.

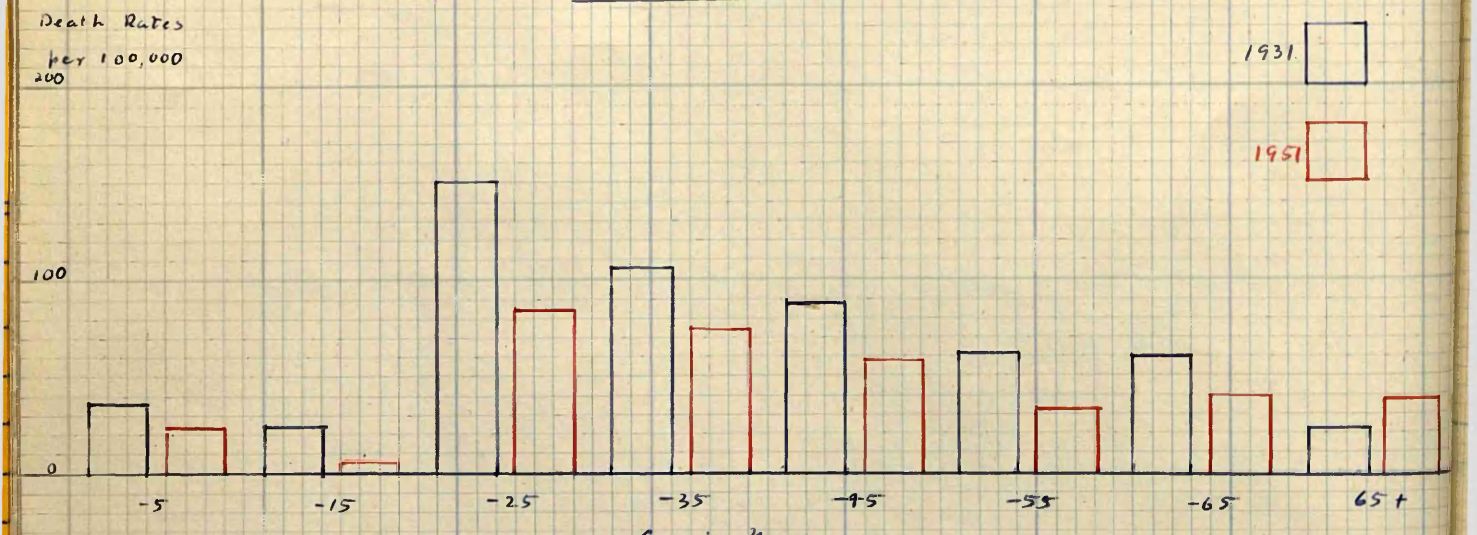


Figure 8

Respiratory Tuberculosis — Glasgow

Notifications and Deaths

Males 1953

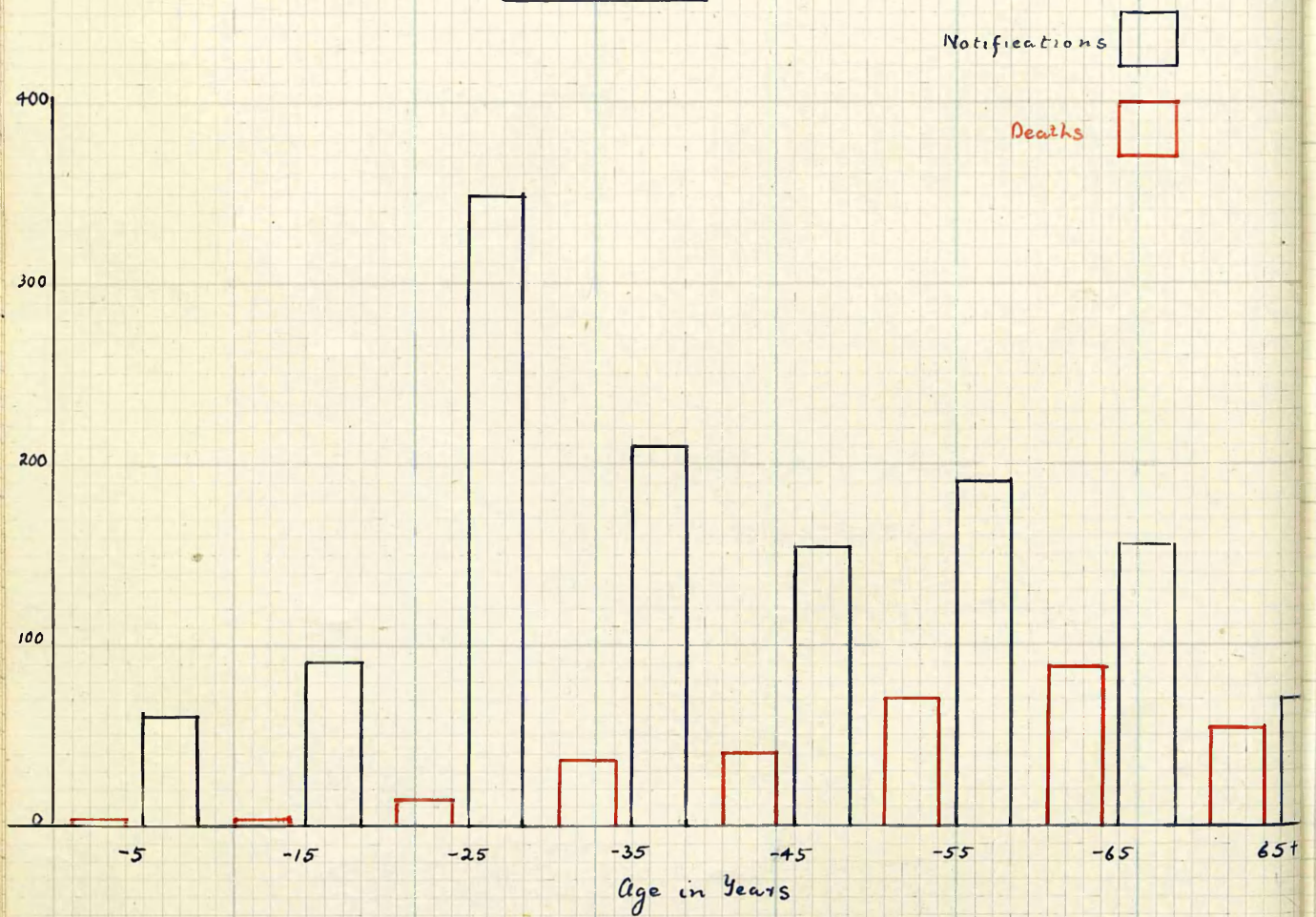
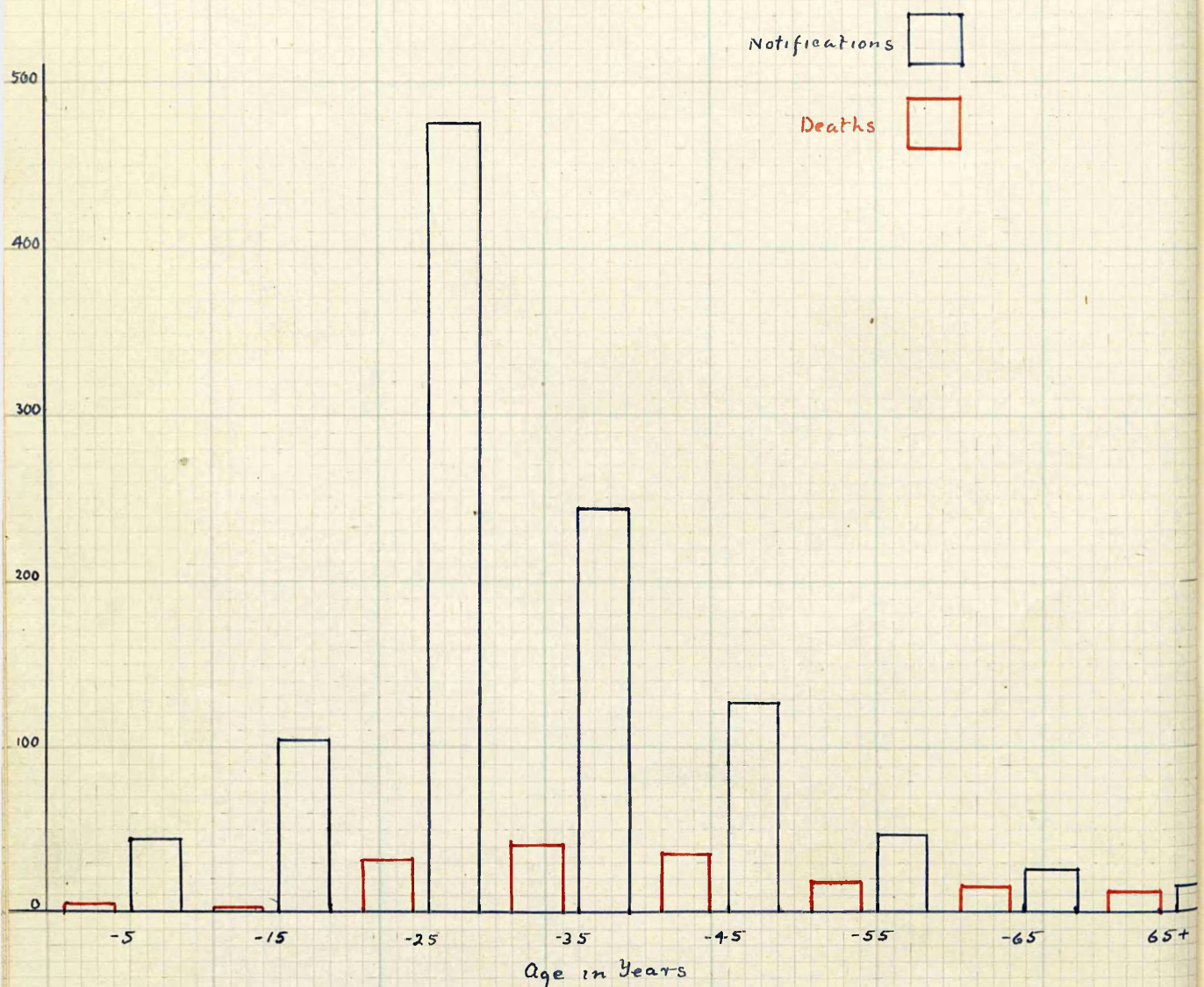


Figure 9

Respiratory Tuberculous – Glasgow.

Notifications and Deaths

Females - 1953



of notifications and deaths for respiratory tuberculosis per 100,000 for the years 1931 and 1951, respectively. In males, except for the age period 35-44 years, the notification rates at all ages are higher in 1951, but the increases over 1931 are most noteworthy at 15-24 years and at ages over 45 years. With females, the notification rates in 1951 are higher at all ages under 45 years, the increases being noteworthy at 15-24 years and 25-34 years, especially the former.

In males in 1951 (Figure 6), the death rates over 15 years gradually increased with age to 65 years and while lower than in 1931 at ages under 55 years, over that age are markedly higher. In females, on the other hand, the death rates at all ages under 65 years are lower in 1951 (Figure 7).

In Figures 8 and 9 are shown the notifications and deaths for age and sex in 1953. In males the incidence of notifications falls from the high level at 15-24 years during the following two decades, though remaining high throughout late middle life, while the deaths steadily increase with advancing age until 65 years. In females there is a high incidence of notifications in adolescent and young adult life which subsequently fall, while the deaths reflect, to a very slight extent, the incidence of disease though they are relatively greater at older ages.

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CHAPTER 3.

A CONSIDERATION OF THE DEATH RATES FROM VARIOUS CAUSES. METHOD ADOPTED TO CALCULATE THE STANDARD ERRORS.

Preliminary to the more detailed study of the environmental factors, the death rates from tuberculosis and from other causes and the case rates for respiratory tuberculosis have been reviewed in the Wards of the Northern Division of the City.

To compare the death rates and case rates on more or less equal terms, adjustments for age and sex were made. The age and sex constitutions of the Wards of the City were made available by the 1951 Census, but with the progress of re-housing and consequent movement of population within the City, the information rapidly becomes obsolete and is, therefore, only applicable to the Census Year and, perhaps, the years immediately adjoining.

Adjusting factors, which when applied to the Ward death rates allowed of more strict comparisons, were calculated by the 'indirect method'.

The sum of the mean deaths for the years 1950, 1951 and 1952 at different ages and for each sex was expressed as a rate per 1,000 for the City; and, for the Wards, the sum of the expected deaths at different ages and for each sex, estimated by taking the proportion of the mean deaths equal to the ratio of the Ward population to the City population

TABLE 2.

1952 - ADJUSTED DEATH RATES PER 1,000 OF THE POPULATION

Causes of Death	City.	Wards of Northern Division. 8	9	10	14	15	16	17	18	Northern Division
All Causes.	12.74	11.66	10.97	13.97	13.22	13.88	13.62	11.83	12.78	12.74
Cardiovascular Disease.	3.80	3.06	3.26	3.33	3.71	3.70	3.51	3.82	4.13	3.52
Malignant Neoplasms.	2.05	1.75	2.08	2.32	2.09	2.24	2.10	1.98	2.37	2.11
Vasc. lesions affecting the C.N.S.	1.75	1.51	1.54	1.88	1.72	1.93	1.76	1.90	2.09	1.78
Respiratory Disease other than Tuberc.	1.36	1.53	1.11	1.79	1.53	1.76	1.72	1.35	1.06	1.51
Tuberculosis - All Forms.	0.59	0.60	0.44	0.66	0.81	0.41	1.17	0.29	0.43	0.66
Other Causes.	3.18	3.22	2.61	3.81	3.44	3.84	3.30	2.44	2.78	3.20

TABLE 2.

1951 - ADJUSTED DEATH RATES PER 1,000 OF THE POPULATION

Causes of Death	City.	Wards of Northern Division. 8	9	10	14	15	16	17	18	Northern Division
All Causes.	13.13	12.02	12.82	12.69	14.24	14.11	14.45	12.08	13.25	13.22
Cardiovascular Disease.	3.94	3.25	4.37	3.60	4.50	3.64	3.89	4.17	4.54	3.94
Malignant Neoplasms.	2.00	1.78	1.58	1.91	2.23	2.33	2.40	1.68	2.10	2.02
Vasc. lesions affecting the C.N.S.	1.68	1.29	1.94	1.44	1.48	1.91	1.98	2.01	1.65	1.70
Respiratory Disease other than Tuberc.	1.27	1.26	1.06	1.55	1.56	1.91	1.63	1.25	1.34	1.46
Tuberculosis - All Forms.	0.73	0.55	0.75	0.59	0.98	0.94	1.08	0.44	0.34	0.74
Other Causes.	3.34	3.93	3.22	3.61	3.47	3.43	3.42	2.47	3.33	3.38

for the particular age and sex, was expressed as a rate per 1,000, the City rate divided by the Ward rate giving a factor which, when applied to the crude Ward rate, makes an allowance for the age and sex distribution of the Ward population.

While the Census populations, whose age and sex distributions were known, were employed in the calculation of the adjusting factors, in calculating the Ward death rates, the private house population as quoted in the Annual Reports of the Medical Officer of Health for 1951 and 1952 respectively, were used, the adjusting factors being applied to the Ward rates so obtained.

The Tables alongside show the adjusted death rates for various disease groups for 1951 and 1952, respectively.

The Standard Errors of the death rates have been calculated.

(Calculation of Standard Errors - The stand errors of the death rates have been estimated from the formula $\sqrt{\frac{pq}{n}}$, where p was taken as the death rate per 1,000 for the City for the year and cause under consideration divided by 1,000,

q as 1,000 minus the death rate per 1,000, divided by 1,000, and

n as the size of the Ward sample, that fraction of the City population for the year under consideration given by the ratio of the index deaths for the Ward for the

TABLE 3.

DEVIATIONS OF THE ADJUSTED WARD DEATH RATES (NORTHERN DIVISION) FROM THE CITY DEATH RATES EXPRESSED IN TERMS OF THEIR STANDARD ERRORS

(A + sign or - sign indicates whether the deviation is in a positive or negative direction)

1951

Causes of Death.	Wards. 8	9	10	14	15	16	17	18	Northern Division.
All Causes.	-1.73	-0.45	-0.73	+1.52	+1.39	+2.25	-1.50	+0.16	+0.38
Cardiovascular Disease.	-1.98	+1.11	-1.03	+1.36	-0.77	-0.15	+0.59	+1.48	0.00
Malignant Neoplasms.	-0.86	-1.58	-0.38	+0.79	+1.18	+1.77	-1.16	+0.35	+0.22
Vasc. lesions affecting the C.N.S.	-1.72	+1.01	-1.11	-0.74	+0.90	+1.36	+1.32	-0.11	+0.23
Respiratory Disease other than Tuberc.	-0.05	-0.98	+1.49	+1.28	+2.91	+2.52	-0.09	+0.31	+2.59
Tuberculosis - All Forms.	-1.07	+0.14	-0.96	+1.49	+1.26	+2.75	-1.69	-2.28	+0.18
Other Causes.	+1.84	-0.36	+0.92	+0.37	+0.26	+0.28	-2.52	-0.03	+0.35

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DEVIATIONS OF THE ADJUSTED WARD DEATH RATES (NORTHERN DIVISION) FROM THE CITY DEATH RATES EXPRESSED IN TERMS OF THEIR STANDARD ERRORS

(A + sign or - sign indicates whether the deviation is in a positive or negative direction)

1952

Causes of Death	Wards. 8	9	10	14	15	16	17	18	Northern Division.
All Causes.	-1.71	-2.62	+1.78	+0.81	+1.65	+1.52	-1.32	+0.06	0.00
Cardiovascular Disease.	-2.16	-1.42	-1.45	-0.22	-0.26	-0.89	+0.05	+0.83	-2.18
Malignant Neoplasms.	-1.16	+0.11	+1.12	+0.14	+0.67	+0.22	-0.25	+1.10	+0.64
Vasc. lesions affecting the C.N.S.	-1.04	-0.80	+0.59	-0.11	+0.69	+0.04	+0.59	+1.25	+0.34
Respiratory Disease other than Tuberc.	+0.82	-1.13	+2.23	+0.73	+1.76	+1.90	-0.04	-1.27	+1.97
Tuberculosis - All Forms.	+0.07	-1.15	+0.53	+1.46	-1.20	+5.07	-1.95	-1.04	+1.42
Other Causes.	+0.12	-1.71	+2.15	+0.75	+1.94	+0.42	-2.15	-1.11	+0.17

particular cause or causes estimated when determining the adjusting factors, to the index deaths for the City, the sum of the mean deaths over the three years 1950, 1951 and 1952 for the various age groups of both sexes. In this way it was hoped to obtain a fair estimate of the size of the Ward sample, having allowed for the difference in age and sex distributions of the Ward and City populations. $1{,}000\sqrt{\frac{pq}{n}}$ gives the standard error for the death rate per 1,000).

In Table 3 are shown for 1951 and 1952 the deviations from the City rates of the adjusted Ward death rates expressed in terms of their standard errors and preceded by a + sign where the adjusted Ward rate exceeds the City rate and by a - sign where it is less.

Where the deviations are greater than or equal to twice their standard errors, they are regarded as not likely to be due to chance, though this assumption must be regarded with some reserve in view of the number of individual items in the Table, as an unlikely event may well, on occasions, occur by chance.

Reviewing the deviations equal to or greater than twice the standard error it is noted that deaths from tuberculosis in Ward 16 are significantly higher than in the City generally, while in Ward 17 deaths from 'other causes' are

lower, that is from causes other than those included in the five main disease groups.

The general death rate was high in Ward 16 in 1951 and low in Ward 9 in 1952. Deaths from cardiovascular disease were low in the division in 1952 and particularly in Ward 8, while the death rates for malignant neoplasms and for vascular lesions affecting the central nervous system corresponded closely with those of the City.

Deaths from respiratory disease other than tuberculosis were, in 1951, high, both in the division considered as a whole and with special reference to Wards 15 and 16, while in 1952 deaths in Ward 10 were high.

The high death rate from tuberculosis in Ward 16 has been noted. In Ward 18 the death rate from tuberculosis was low in 1951. Deaths from 'other causes' were high in Ward 10 in 1952 and, as mentioned earlier, in Ward 17 both in 1951 and 1952, were low.

The high death rate from tuberculosis in Ward 16 is associated with the rehousing of tuberculous families for, when the tuberculosis deaths are attributed to the Ward of notification, the adjusted death rates for Ward 16 were found to be 0.65 per 1,000 in 1951 and 0.70 in 1952, which differed from the City rates by 0.63 times the standard error in 1951 and 0.96 times the standard error in 1952 and, therefore, are not of significance.

The Ward death rates from tuberculosis, therefore, have not proved of value for the purposes of the present investigation.

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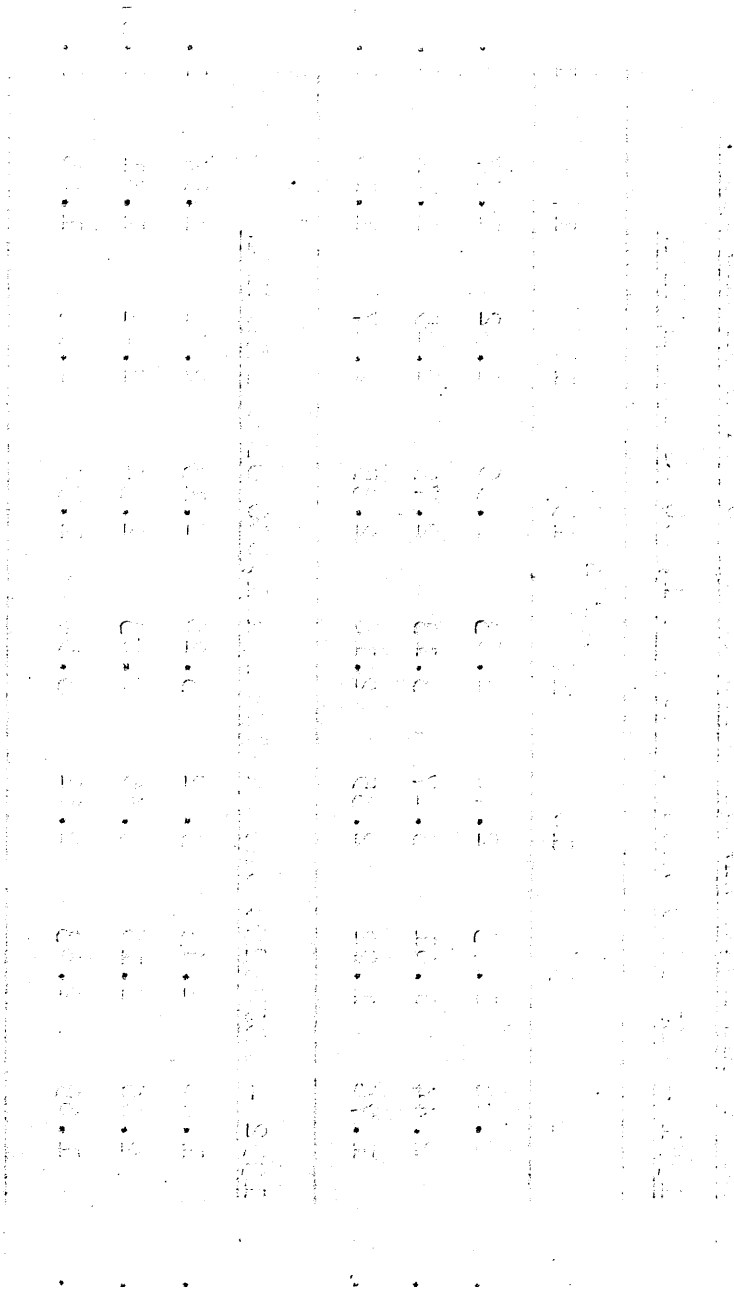

TABLE 4.

ADJUSTED CASE RATES FOR RESPIRATORY TUBERCULOSIS PER 1,000 OF THE POPULATION FOR THE WARDS OF THE NORTHERN DIVISION OF THE CITY, 1951 AND 1952.

1951 - ADJUSTED CASE RATES PER 1,000 OF POPULATION

	City	Wards 8	9	10	14	15	16	17	18	Northern Division
Both Sexes	2.03	2.08	1.73	2.78	2.63	2.56	2.32	1.47	2.11	2.22
Male	2.25	2.44	1.61	3.27	3.13	2.79	2.25	1.81	2.35	2.43
Female	1.82	1.76	1.82	2.35	2.18	2.35	2.37	1.16	1.89	2.03

1952 - ADJUSTED CASE RATES PER 1,000 OF POPULATION

Both Sexes	2.08	1.86	2.43	3.02	3.20	2.13	2.48	1.54	1.40	2.32
Male	2.31	2.06	2.16	3.46	2.83	2.34	2.42	1.41	1.37	2.30
Female	1.88	1.69	2.63	2.62	3.54	1.94	2.53	1.66	1.44	2.33

TABLE 5.

DEVIATIONS OF THE ADJUSTED CASE RATES FOR RESPIRATORY TUBERCULOSIS PER 1,000 OF THE POPULATION FOR THE WARDS OF THE NORTHERN DIVISION FROM THE CITY RATES EXPRESSED IN TERMS OF THEIR STANDARD ERRORS.

1951 and 1952

(A + sign or - sign indicates whether the deviation is in a positive or negative direction.)

1951

	8	9	10	14	15	16	17	18	Northern Division
Both Sexes	+0.18	-1.31	+3.11	+2.19	+1.91	+1.43	-1.95	+0.27	+2.13
Male	+0.46	-1.79	+2.75	+2.12	+1.27	0.00	-1.00	+0.24	+1.32
Female	-0.17	0.00	+1.69	+1.00	+1.47	+2.10	-1.76	+0.19	+1.81

1952

	8	9	10	14	15	16	17	18	Northern Division
Both Sexes	-0.80	+1.51	+3.85	+4.04	+0.18	+1.95	-1.86	-2.41	+2.66
Male	-0.60	-0.41	+3.06	+1.24	+0.07	+0.35	-2.02	-2.19	-0.07
Female	-0.52	+2.54	+2.33	+4.54	+0.16	+2.45	-0.58	-1.18	+3.82

CHAPTER 4.

A REVIEW OF THE CASE RATES FOR RESPIRATORY TUBERCULOSIS IN THE WARDS OF THE NORTHERN DIVISION.

In the present study attention has been directed more profitably to the notifications of respiratory tuberculosis than to the deaths, because of the influence of rehousing on Ward death rates.

The notification or case rates for respiratory tuberculosis for the Wards of the Division have been adjusted for age and sex as for the deaths, the standard errors have been calculated and the deviations from the City rates expressed in terms of the standard errors.

The adjusted case rates for 1951 and 1952 are given in Table 4, with their deviations from the City rates expressed in terms of their standard errors in the Table which follows. (Table 5.).

The Division, both in 1951 and 1952 (Table 4), had a notification rate for respiratory tuberculosis higher than for the City as a whole, this high rate in 1952 being due to the high notification or case rate in the female population.

In Wards 10 and 14 the case rates have been particularly heavy, while in Wards 17 and 18 the case rates compare favourably with the City rates, especially the male rates in 1952 which were significantly less than those of the City.

In Ward 16, which consists largely of housing schemes,

the case rate for females was high in both years and in Ward 9 in 1952 the female rate was high.

Thus the incidence of respiratory tuberculosis is not uniformly distributed over the City but falls more heavily on some areas than on others and a study of the environmental conditions in such areas may give some indication of their relative importance, the proper evaluation of which is of great moment in the campaign against the disease.

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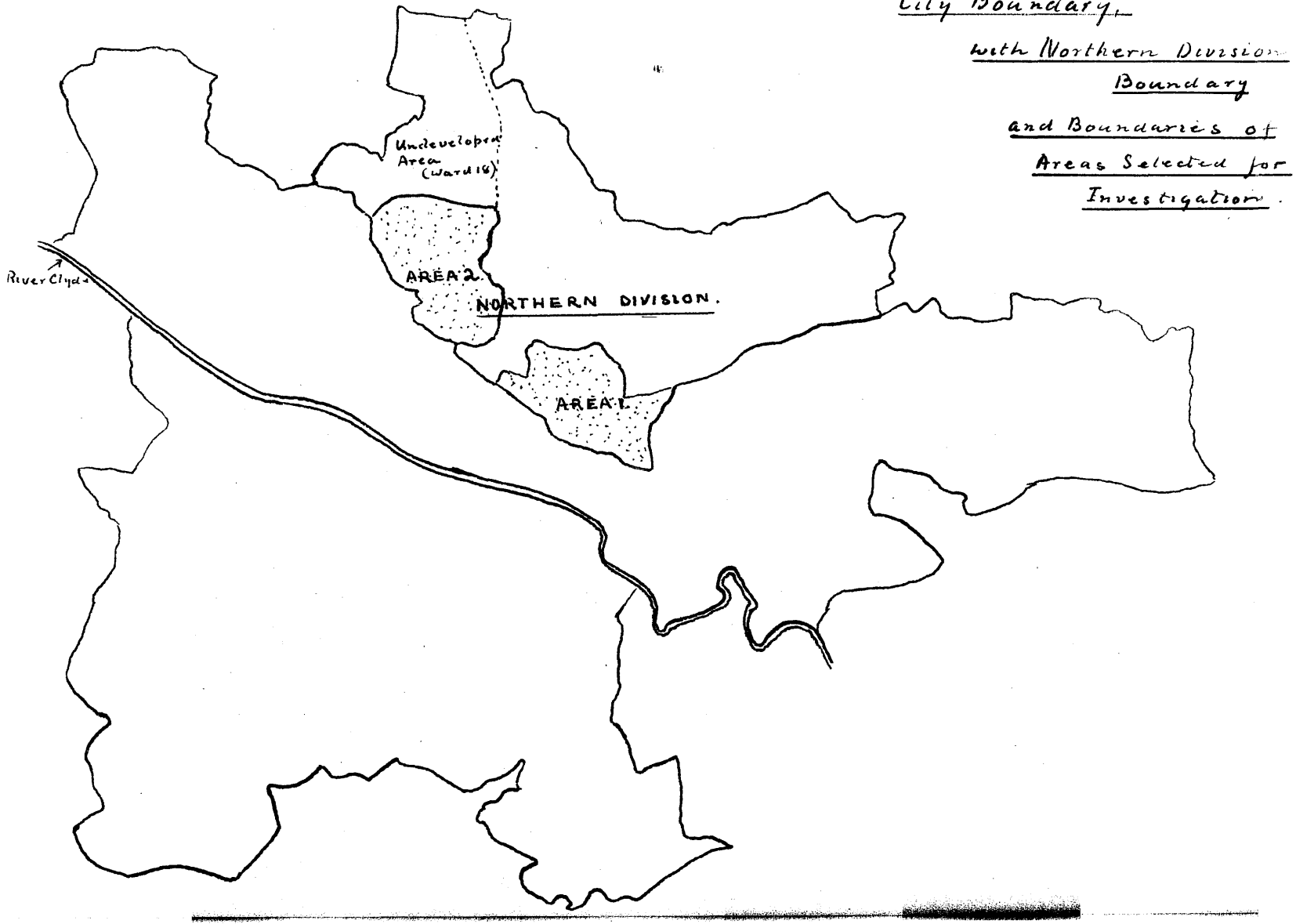

City Boundary.
with Northern Division Boundary
and Boundaries of Areas Selected for Investigation.
Undeveloped Area (Ward 16)
River Clyde
AREA 2.
NORTHERN DIVISION.
AREA 1.

CHAPTER 5.

AREAS SELECTED FOR SPECIAL INVESTIGATION

In attempting to evaluate the influence of the environment on the incidence of respiratory tuberculosis, a consideration of Table 5 led to the selection of two areas, Area I comprising the adjoining Wards 10 and 14, and Area 2 the adjoining Wards 17 and 18.

In the annual returns for 1951, 161 notifications of respiratory tuberculosis were recorded in Area 1 and 88 in Area 2.

TABLE 6.

ADJUSTED CASE RATES PER 1,000 OF THE POPULATION - 1951

	City	Area I	Area 2
Both Sexes	2.03	2.62	1.87
Male	2.25	3.02	2.14
Female	1.82	2.27	1.60

Deviations of the Adjusted Case Rates from the City Rates expressed in terms of their Standard Errors

	Area I	Area 2
Both Sexes	+3.27	-0.80
Male	+2.78	-0.36
Female	+1.91	-0.84

Accepting that a difference of as much as twice the standard error is not likely to have been due to chance, in Area I the case rates in males and in the two sexes together are materially greater than for the City as a whole, while the

rates in Area 2 do not differ materially from the City rates.

When the cases came to be individually reviewed, it was found that in Area I, in two cases there had been an error in the location of cases on the periphery of the area, and in one instance a case of tuberculous disease of the hip joint had been wrongly classified as a case of respiratory disease. Table 7 shows the age and sex distribution of cases after correction for the aforesaid errors.

TABLE 7.

AGE DISTRIBUTION OF 'CORRECTED' NOTIFICATIONS OF RESPIRATORY TUBERCULOSIS - 1951.

	Age in Years.								
Area I.	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	Totals
Both Sexes	12	11	45	39	22	19*	6	4*	158*
Male	5	6	19	16	15	16*	6	4*	87*
Female	7	5	26	23	7	3	0	0	71
Area 2.									
Both Sexes	3	6	30	19	13	9	5	3	88
Male	2	5	15	8	6	8	4	2	50
Female	1	1	15	11	7	1	1	1	38

(* Included are two male cases, aged 54 and 71 years respectively, living in common lodging houses and who, as institutional cases, have been excluded from the analysis.)

* * * * * * *

CHAPTER 6.

CERTAIN VITAL STATISTICS FOR THE SELECTED AREAS WITH THE HOUSING ACCOMMODATION AND CASE RATES PER 10,000 FOR RESPIRATORY TUBERCULOSIS IN CERTAIN CITIES AND COUNTY BOROUGHS

TABLE 8.

CENSUS FIGURES - 1951.

	Population	Density of Population Persons per 100 Acres.	Rooms per House.	Persons per Room.	Percentage of Population living more than 2 per room.
Area I.					
Ward 10	35,005	11,826	2.28	1.51	32.3
Ward 14	27,229	5,535	2.08	1.72	41.6
Area 2.					
Ward 17	25,817	9,816	2.52	1.26	26.8
Ward 18	25,515	1,192	2.52	1.42	28.0

In Area I the houses have, on the average, fewer rooms and there is more overcrowding than in Area 2. Because of areas unoccupied by private dwellings, the figures for density of population are somewhat misleading.

TABLE 9.

PERCENTAGE OF THE POPULATION IN EACH OF THE FOUR MAIN AGE GROUPS - 1951

	0-4 years	5-14 years	15-64 years	65+ years
Area I.				
Ward 10	10.7	15.8	64.5	9.0
Ward 14	11.9	18.2	62.6	7.3
Area 2.				
Ward 17	9.5	15.2	66.2	9.1
Ward 18	9.4	16.1	66.4	8.1

TABLE 10.

BIRTH RATES, INFANT MORTALITY RATES AND DEATH RATES 1951-1953.

ANNUAL REPORTS OF THE MEDICAL OFFICER OF HEALTH.

BIRTH RATES AND DEATH RATES EXPRESSED PER MILLION.

INFANT MORTALITY RATE EXPRESSED PER 1000 BIRTHS.

	Birth Rates.			Infant Mort. Rates.			Death Rates.		
	1951	1952	1953	1951	1952	1953	1951	1952	1953
Area I.									
Ward 10.	24,154	23,426	25,241	42	55	38	13,095	14,235	12,352
Ward 14.	22,732	23,349	24,752	46	35	41	12,712	11,887	10,883
Area 2.									
Ward 17.	19,617	19,725	20,964	28	28	19	12,431	12,175	10,643
Ward 18.	19,969	20,537	20,532	54	47	26	12,610	12,162	11,518

TABLE 11.

	Respiratory Tuberculosis Case Rate per 10,000 1953.	Percentage of Occupied Houses with Total Rooms as follows: (One per cent Sample Tables, Census 1951)				Number of Houses in Area.*
		1-2 Rooms	3 Rooms	4 Rooms & over	All Houses.	
Glasgow	21.8	48.0	28.6	23.4	100.0	289,500
Edinburgh	16.9	27.8	32.2	40.0	100.0	134,000
Birmingham	11.1	2.0	12.6	85.4	100.0	288,900
Liverpool	17.5	3.4	8.8	87.8	100.0	189,800
Manchester	10.6	2.0	8.7	89.2	100.0	200,400
Newcastle	16.4	12.3	27.5	60.2	100.0	80,700
London (County)	14.0	12.0	17.4	70.6	100.0	761,600

* Being based on a one per cent sample, these numbers will vary somewhat from the numbers given in the completed Census return.

TABLE 12.

	Respiratory Tuberculosis Case Rate per 10,000 1951.	Percentage of Occupied Houses (Census 1951) with Total Rooms as follows:					
		1 Room	2 Rooms	3 Rooms	4 Rooms & over.	All Houses.	Number of Houses in Area.
Glasgow	20.3	11.0	36.3	28.2	24.5	100.0	294,467
Area I.ø	26.1	16.7	55.6	21.9	5.8	100.0	17,044
Area 2.ø	17.6	11.8	49.1	26.3	12.7	100.0	14,915

ø Case rates determined from 'corrected' notifications and from Census population in private households.

The percentage of small houses is greater in Area I, which has the higher incidence of respiratory tuberculosis.

In Table 11 are given the case rates for respiratory tuberculosis per 10,000 of the population, and the percentage of occupied houses with between one and two rooms, three rooms and four rooms and over, respectively, for certain Cities and County Boroughs. The percentages are based on figures obtained from the 'One Per Cent Sample Tables, Census 1951.' Figures are not available for Aberdeen and Dundee.

The high percentage of small houses in Glasgow and also in Edinburgh are striking.

Table 12 for the areas selected for investigation corresponds to Table 11, except in so far as the percentage of houses of one and two rooms are given separately and the percentages and numbers are as given in the completed Census Return, while the case rates per 10,000 are for 1951.

* * * * * * *

CHAPTER 7.

EXTRACTS FROM THE REPORT OF THE SCOTTISH HEALTH SERVICES COUNCIL'S COMMITTEE ON TUBERCULOSIS - 1951

AND FROM

'TUBERCULOSIS AND THE 'SOCIAL COMPLEX' IN GLASGOW'

(LILLI STEIN 1952)

WITH AN EXTRACT

FROM A BOOK REVIEW (THE MEDICAL OFFICER 10.9.54) ON

'A PRACTICAL MANUAL OF DISEASES OF THE CHEST'

(MAURICE DAVIDSON)

The following extracts are from Section 29 dealing with "Housing Conditions in relation to the Incidence of Tuberculosis" of the Report of the Scottish Health Services Council's Committee on Tuberculosis - 1951.

"Building in Scotland during the XIXth century took the form in the main of the construction of houses of one and two apartments. In the early XXth century, although the standards of construction and equipment were improved, the types and the sizes of the houses most commonly built were still those of the XIXth century..... Thus while it might be arguable that in England and Wales, families living in these small houses did so because of their general socio-economic circumstances, in Scotland the limitations of choice and availability must have been factors which largely determined in what kind of houses the people lived.

"When the results of all the investigations that have been carried out in Scotland concerning this matter are considered together, it is found that although within them there is a certain irregularity they do indicate quite strongly that crowded living conditions affect the rate of incidence and the rate of mortality of tuberculosis. But clearly it must remain impossible to indicate the exact degree to which they do so. Where overcrowding affects a whole locality the evidence suggests that rates are increased, but again there is lack of uniformity or regularity in respect of this increase. It suggests further that size of house and size of family are factors of considerable importance, especially in the case of households which include children or known cases of tuberculosis.

"The more deeply enquiry probes the clearer it becomes that existing knowledge concerning the pattern of group life and concerning the reactions of different communities or different socio-economic levels to this disease is most imperfect."

Lilli Stein in studying the influence of socio-economic conditions in Glasgow on the Ward tuberculosis rates from 1930 to 1947, found evidence, in her opinion, to "support the widely held view that 'tuberculosis is a social disease'."

She reaches the following conclusion:

"In this study of respiratory tuberculosis in the Wards of

Glasgow, the investigation of small, homogeneous areas reveals that the inequalities of incidence in this disease are very largely accounted for by disparities in social conditions..... The relationship of respiratory tuberculosis with the social complex demonstrates the important role played in Glasgow by housing conditions. Ordinary density* of dwelling occupation, together with overcrowding, represents the dominant influence in infection and in death from this disease."

* Average persons per house.

The following is an extract from a book review (The Medical Officer 10.9.1954 on 'A Practical Manual of Diseases of the Chest' by Maurice Davidson.

"With regard to the association of tuberculosis mortality and social conditions, the author does not too readily accept the obvious conclusion; he emphasises that there is no justification for regarding phthisis (as some enthusiasts are inclined to do) mainly as a class disease..... ....The key of the problem, we are told, is the study of tuberculosis in the child."

* * * * * * *

TABLE 13.

NUMBER OF PRIVATE HOUSEHOLDS, NUMBER OF PERSONS, AND THE AVERAGE NUMBER OF PERSONS PER HOUSEHOLD ACCORDING TO THE NUMBER OF ROOMS OCCUPIED

(CENSUS 1951)

Households Occupying	Area I. All Private Households			Area 2. All Private Households		
	Number	Persons	Average Persons per Household.	Number	Persons	Average Persons per Household.
1 Room	3,648	9,555	2.6	2,274	5,752	2.5
2 Rooms	9,556	32,139	3.4	7,427	23,441	3.2
3 Rooms	3,630	14,070	3.9	3,873	13,956	3.6
4 Rooms and over	856	3,926	4.6	1,823	6,915	3.8
All Households	17,690	59,690	3.4	15,397	50,064	3.3

CHAPTER 8.

HOUSING - THE PRESENT INVESTIGATION

SECTION I. THE INCIDENCE OF RESPIRATORY TUBERCULOSIS RELATIVE TO THE NUMBER OF ROOMS IN THE HOUSE AND OCCUPIED BY THE HOUSEHOLD.

In the following analysis, for the sake of brevity, the terms 'tuberculous cases', 'tuberculous houses', and 'tuberculous households' are used in reference to cases of respiratory tuberculosis notified during 1951 and the houses and households in which they occur.

Table 13 shows for private households, the average number of persons, according to the number of rooms occupied.

As might be expected, the average number of persons per household increases with the number of rooms occupied and, with the relatively larger population in large houses, to avoid a weighting against the larger house or number of rooms occupied by the household, in the Tables which follow in estimating an expected number of cases, the number of persons (Census numbers) living in houses of varying size or in households occupying a variable number of rooms have been employed and not the actual number of houses or households.

If the number of rooms in a house or the number of rooms occupied by a household does not influence the occurrence of respiratory tuberculosis, then the expected number of cases in those notified, would be proportional to the population

TABLE 14.

COMPARISON OF THE DISTRIBUTION OF CASES OF RESPIRATORY TUBERCULOSIS ACCORDING TO THE NUMBER OF ROOMS IN HOUSE WITH THE EXPECTED DISTRIBUTION BASED ON THE HOUSE POPULATION (CENSUS NUMBERS)

Area I. House of:	All Private Houses. Number of Persons.	Tuberculous Cases Number Observed.	Tuberculous Cases Number Expected.	Difference ± 0.5	Difference^2	Difference^2 / Expected
1 Room	7,568	24	19.8	3.7	13.69	0.69
2 Rooms	32,204	74	84.2	9.7	94.09	1.12
3 Rooms	14,830	39	38.8	0.3	0.09	0.00
4 Rooms and over	5,088	19	13.3	5.2	27.04	2.03
All Private Houses.	59,690	156	156.0			
Area 2.						
1 Room	4,617	6	8.1	1.6	2.56	0.32
2 Rooms	23,303	45	41.0	3.5	12.25	0.30
3 Rooms	14,443	25	25.4	0.1	0.01	0.00
4 Rooms and over	7,701	12	13.5	1.0	1.00	0.07
All Private Houses.	50,064	88	88.0			

TABLE 15.

COMPARISON OF THE DISTRIBUTION OF CASES OF RESPIRATORY TUBERCULOSIS ACCORDING TO THE NUMBER OF ROOMS OCCUPIED BY THE HOUSEHOLD WITH THE EXPECTED DISTRIBUTION BASED ON THE POPULATION DISTRIBUTION OF ALL PRIVATE HOUSEHOLDS ACCORDING TO THE NUMBER OF ROOMS OCCUPIED (CENSUS NUMBERS)

Households Occupying:	All Private Households. Number of Persons.	Tuberculous Cases Number Observed.	Tuberculous Cases Number Expected.	Difference $\pm$ 0.5	Difference^2	$\frac{\text{Difference}^2}{\text{Expected}}$
Area 1.						
1 Room	9,555	33	25.0	7.5	56.25	2.25
2 Rooms	32,139	73	84.0	10.5	110.25	1.31
3 Rooms	14,070	35	36.8	1.3	1.69	0.05
4 Rooms & over	3,926	15	10.3	4.2	17.64	1.71
All Private Households.	59,690	156	156.0			
Area 2.						
1 Room	5,752	11	10.1	0.4	0.16	0.02
2 Rooms	23,441	45	41.2	3.3	10.89	0.26
3 Rooms	13,956	21	24.5	3.0	9.00	0.37
4 Rooms & over	6,915	11	12.2	0.7	0.49	0.04
All Private Households.	50,064	88	88.0			

occupying houses of such size or occupying such accommodation and would not differ materially from the observed. If the difference should prove significant then the assumption is that the difference is not a chance one. It has not been possible to allow for age and sex.

In the Tables which follow, the column 'Difference^2/ Expected' gives the x^2 value which would equal or exceed 3.84 by chance only in some five per cent. of instances, so that a value equal to or exceeding 3.84 is not likely to have arisen by chance and the difference, therefore, can be regarded as of significance.

A correction for 'continuity' has been made by reducing by 0.5 the values which are greater than expectation and increasing by 0.5 those which are less.

In the two areas, Table 14, there has been no demonstrable association between the incidence of respiratory tuberculosis and the number of rooms in the houses in which cases have occurred.

Also in the two areas, Table 15, there has been no demonstrable association between the incidence of respiratory tuberculosis and the number of rooms occupied by the tuberculous household.

Thus in these two dissimilar areas there is no evidence that either the number of rooms in the house or the number of rooms occupied by the tuberculous household has influenced the incidence of the disease.

TABLE 16.

COMPARISON OF THE OBSERVED CASES OF RESPIRATORY TUBERCULOSIS WITH THE EXPECTED CASES, BASED ON THE PROPORTION OF THE POPULATION IN AREAS 1 AND 2 IN HOUSEHOLDS OCCUPYING A CORRESPONDING NUMBER OF ROOMS

Households Occupying:		All Private Households Number of Persons.	Tuberculous Cases Number Observed.	Tuberculous Cases Number Expected.	Difference ± 0.5	Difference^2	$\frac{\text{Difference}^2}{\text{Expected}}$
1 Room	Area 1	9,555	33	27.5	5.0	25.00	0.91
	Area 2	5,752	11	16.5	5.0	25.00	1.52
		15,307	44	44.0			
2 Rooms	Area 1	32,139	73	68.2	4.3	18.49	0.27
	Area 2	23,441	45	49.8	4.3	18.49	0.37
		55,580	118	118.0			
3 Rooms	Area 1	14,070	35	28.1	6.4	40.96	1.46
	Area 2	13,956	21	27.9	6.4	40.96	1.47
		28,026	56	56.0			
4 Rooms & over	Area 1	3,926	15	9.4	5.1	26.01	2.77
	Area 2	6,915	11	16.6	5.1	26.01	1.57
		10,841	26	26.0			
All Private Households.	Area 1	59,690	156	132.7	22.8	519.84	3.92
	Area 2	50,064	88	111.3	22.8	519.84	4.67
		109,754	244	244.0			

TABLE 17.

Households Occupying:	All Private Households			Tuberculous Households		
	Households Number	Persons Number	Average Persons per Household	Households Number	Persons Number	Average Persons per Household
Area I.						
1 Room	3,648	9,555	2.6	31	103	3.3
2 Rooms	9,556	32,139	3.4	73	290	4.0
3 Rooms	3,630	14,070	3.9	33	159	4.8
4 Rooms and over	856	3,926	4.6	12	70	5.8
All Households	17,690	59,690	3.4	149	622	4.2
Area 2.						
1 Room	2,274	5,752	2.5	11	31	2.8
2 Rooms	7,427	23,441	3.2	44	183	4.2
3 Rooms	3,873	13,956	3.6	20	113	5.7
4 Rooms and over	1,823	6,915	3.8	11	62	5.6
All Households	15,397	50,064	3.3	86	389	4.5

The two areas have been further compared by combining households in the two areas occupying a similar number of rooms and calculating an expected number for each area on the basis of the proportion of the combined population in that area, the observed and expected numbers so calculated being compared as before. The results of the comparison are given in Table 16 and show that while the total cases in Area I are significantly greater, and in Area 2 significantly less, than might be expected by chance and that the differences though not significant when the individual number of rooms occupied by the households are considered, are consistently higher in Area 1 and consistently lower in Area 2 than the expected.

These results are again consistent with the number of rooms occupied by households not having an influence on the incidence of disease; the population in small homogeneous areas sharing in the general prevalence independent of the housing accommodation.

SECTION 2. SIZE OF FAMILY AND OVERCROWDING.

For the number of rooms occupied by the household, Table 17 gives the number of households, the number of persons and the average number of persons per household for all private households and for tuberculous households.

This Table shows that in Area I and Area 2, irrespective of the number of rooms occupied, the average number of persons

TABLE 18.

POPULATION IN TUBERCULOUS HOUSEHOLDS.

OBSERVED NUMBER OF PERSONS AND THE EXPECTED NUMBER BASED ON THE AVERAGE NUMBER OF PERSONS IN ALL PRIVATE HOUSEHOLDS

Households Occupying:	Tuberculous Households Persons Number Observed	Expected	Difference ± 0.5	Difference^2	$\frac{\text{Difference}^2}{\text{Expected}}$	Percentage Increase of Observed over Expected.
Area I.						
1 Room	103	81.2	21.3	453.69	5.59	26.8%
2 Rooms	290	245.5	44.0	1936.00	7.89	18.1%
3 Rooms	159	127.9	30.6	936.36	7.32	24.3%
4 Rooms and over	70	55.0	14.5	210.25	3.82	27.3%
All Households	622	502.8	118.7	14,089.69	28.02	23.7%
Area 2.						
1 Room	31	27.8	2.7	7.29	0.26	11.5%
2 Rooms	183	138.9	43.6	1,900.96	13.69	31.7%
3 Rooms	113	72.1	40.4	1,632.16	22.64	56.7%
4 Rooms and over	62	41.7	19.8	392.04	9.40	48.7%
All Households	389	279.6	108.9	11,859.21	42.41	39.1%

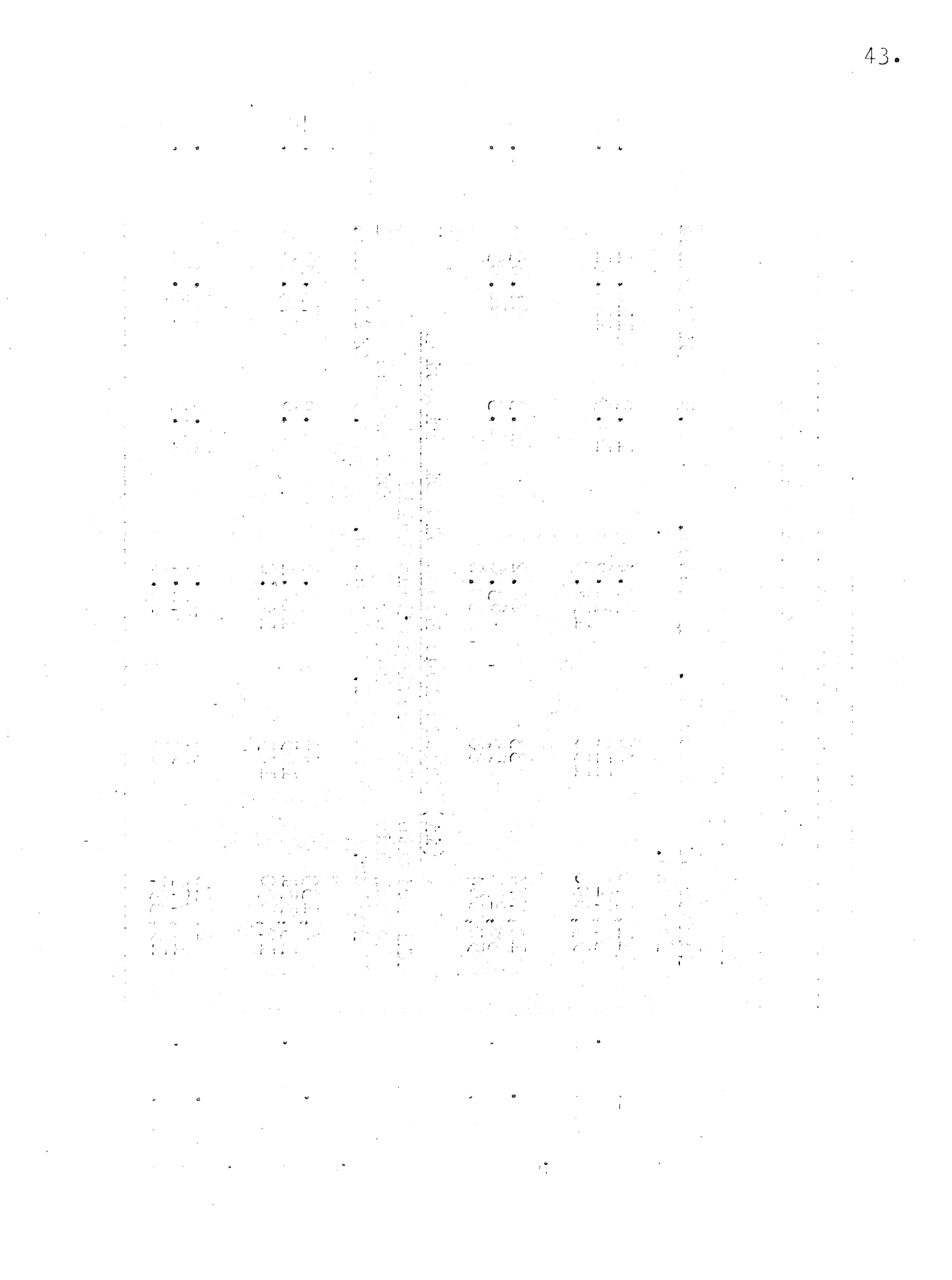


TABLE 19.

COMPARISON OF THE TUBERCULOUS CASE AND HOUSEHOLD DISTRIBUTIONS, OBSERVED AND EXPECTED, ACCORDING TO THE NUMBER OF PERSONS LIVING PER ROOM BEING MORE OR NOT MORE THAN TWO.

(i) Tuberculous Case Distribution

Persons living per Room:	All Private Households Number of Persons.	Tuberculous Cases Number Observed.	Tuberculous Cases Number Expected.	Difference ± 0.5	Difference^2	$\frac{\text{Difference}^2}{\text{Expected}}$
Area I.						
More than 2.	21,970	46	57.4	10.9	118.81	2.07
Not more than 2.	37,720	110	98.6	10.9	118.81	1.20
All Persons.	59,690	156	156.0			
Area 2.						
More than 2.	13,774	33	24.2	8.3	68.89	2.85
Not more than 2.	36,290	55	63.8	8.3	68.89	1.08
All Persons.	50,064	88	88.0			

(ii) Tuberculous Household Distribution

Persons living per Room:	All Private Households Number.	Tuberculous Households Number Observed.	Tuberculous Households Number Expected.	Difference ± 0.5	Difference^2	$\frac{\text{Difference}^2}{\text{Expected}}$
Area I.						
More than 2.	4,139	44	34.9	8.6	73.96	2.12
Not more than 2.	13,551	105	114.1	8.6	73.96	0.65
All Persons.	17,690	149	149.0			
Area 2.						
More than 2.	2,618	32	14.6	16.9	285.61	19.56
Not more than 2.	12,779	54	71.4	16.9	285.61	4.00
All Persons.	15,397	86	86.0			

in the tuberculous household is consistently greater than in private households generally.

In Table 18 the observed number of persons in tuberculous households, according to the rooms occupied, is compared with the expected number taken as the product of the number of tuberculous households and the average number of persons in all private households occupying similar accommodation.

In all cases, with the exceptions of persons living in four or more rooms in Area I and in one room in Area 2, the observed number of persons living in tuberculous households is significantly greater than the expected number, and in all the observed was greater than the expected.

There is thus an association between the incidence of disease and the size, number of persons, of the household, the average tuberculous household being larger than the average household in the areas investigated.

In considering problems of crowding, it is simplest, and probably best, to consider the number of persons living per room, regarding as overcrowded a household having more than two persons living per room.

In Table 19 the numbers of tuberculous cases and tuberculous households have been compared with the expected numbers based on the Census figures as to the number of persons living per room.

TABLE 20.

Tuberculous Households.

Area I. Households Occupying:	Area I. Households Number.	Area I. Households Per cent. of Total.	Area I. Households with more than 2 persons living per room. Number.	Area I. Households with more than 2 persons living per room. Per cent.	Area 2. Households Number.	Area 2. Households Per cent. of Total.	Area 2. Households with more than 2 persons living per room. Number.	Area 2. Households with more than 2 persons living per room. Per cent.
1 Room	31	20.8	17	54.8	11	12.8	7	63.6
2 Rooms	73	49.0	23	31.5	44	51.2	17	38.6
3 Rooms	33	22.1	5	15.2	20	23.3	7	35.0
4 Rooms and over	12	8.1	1	8.3	11	12.8	1	9.1
All Households	149	100.0	46	30.9	86	100.0	32	37.2

Area 2.

Persons living per Room:	All Private Households. Households Number.	All Private Households. Persons Number.	All Private Households. Average Person per Household.	Tuberculous Households. Households Number.	Tuberculous Households. Persons Number.	Tuberculous Households. Average Persons per Household.
More than 2	2,618	13,774	5.3	32	192	6.0
Not more than 2	12,779	36,290	2.8	54	197	3.6
All Persons.	15,397	50,064	3.3	86	389	4.5

In both areas the proportion of cases overcrowded does not differ significantly from the proportion overcrowded in the general population; on the other hand the tuberculous households in Area 2 show a much greater proportion of overcrowding than do the households in the area generally.

As the number of private households, grouped as to rooms occupied, with the further subdivision as to persons living per room, are not available, it has not been possible to compare the observed with the expected number of tuberculous households, according to rooms occupied and overcrowding.

The average number of persons in tuberculous households being greater than in all private households, an association with overcrowding is to be expected, especially in households occupying a small number of rooms, the average in all private households occupying one room being above the level of two persons per room. (Table 17). Further, in tuberculous households occupying four or more rooms, where there is little overcrowding, the average number of persons is also higher than in private households as a whole. Table 20 shows for Area 2 that the average number of persons per household, both overcrowded and not overcrowded, is more than the average in all households. As, in addition, no evidence has been established to show an association between the number of rooms in a house, or occupied by a household,

and the occurrence of respiratory tuberculous, the number of cases coming from overcrowded households may be largely a reflection of the association of size of household with the occurrence of the disease.

Thus, in the two areas in which the incidence of respiratory tuberculosis is high in the one and low in the other, there is no evidence that, either the number of rooms in the house, or the number of rooms occupied by the household, has influenced the occurrence of tuberculosis. Further, in Area I, no association between overcrowding and the incidence of tuberculosis has been established. While in Area 2 the proportion of tuberculous households overcrowded is much greater than of households in the area generally, this may well be accounted for by the larger average size of the tuberculous household.

SECTION 3. THE FITNESS OF A HOUSE AS A POSSIBLE INFLUENCE ON THE INCIDENCE OF RESPIRATORY TUBERCULOSIS.

Area I and Ward 18 of Area 2 were surveyed in detail as to housing in recent years, the houses being classified according to the standards set out below. Ward 10 of Area I was surveyed in 1949 and Ward 14 of Area I in 1950, while Ward 18 of Area 2 was surveyed in the latter half of 1952. Measures have been taken as far as practicable to keep the survey up to date and the figures quoted for Area I (Wards 10 and 14) are as given at 31.12.1951. It will be noted

that some discrepancy exists between the total number of houses in the survey and the number obtained at the Census, the survey figure for Area I being 17,343 compared with the Census figure of 17,044, while for Ward 18 the corresponding figures were 7,023 and 6,846, the discrepancy amounting to only one per cent in both areas. Ward 17 of Area 2 has not been surveyed, and thus has been excluded from the analysis, only figures applicable to Ward 18 being given. From a knowledge of Ward 17, the number of unfit houses amount only to some 47, 20 of one room, 26 of two rooms, and one of three rooms.

The built up area of Ward 18 covers only a part of the total area of the Ward and a squatters' camp, remote from the built up area and with separate access to the City and in which no case of tuberculosis was notified in 1951, has been excluded from the survey figures, as have the houses of the married quarters of Maryhill Barracks, being Government property.

For the purpose of these surveys the houses were classified according to four standards.

Classification of House:

Standard Houses - Houses containing all modern conveniences, including separate water closet, bathroom, adequate food storage accommodation, adequate cooking facilities, and hot and cold water supply.

Such houses are seldom of less than three rooms.

Substandard "A" Houses - Houses falling short in some degree of the standard house, but situated in a building of good fabric which could be adapted to provide houses of standard type.

Such houses may be of one or more rooms.

Substandard "B" Houses - Houses which, while not considered unfit, are unsatisfactory. They fall short of the standard type, and because of the age of the building, and the condition of the fabric, are not suitable for reconstruction.

Substandard "B" Houses have been further subdivided into - "Bi" Houses, approaching in design and state of repair, houses in the substandard "A" group, and

"Bii" Houses, approaching the 'unfit' class.

(It has not been possible in the present analysis, because of the small numbers of houses with tuberculous patients, to consider the subdivisions of substandard "B" Houses).

Unfit Houses - Houses unfit for human habitation because of defective design or the degree of sanitary defects existing, or both.

In the analysis which follows the distribution, according to type of house, of houses from which tuberculous cases have been notified, has been compared with the expected distribution based on (a) the distribution of all houses

TABLE 21.

CLASSIFICATION OF HOUSE.

Type of House:	Houses Occupied by Tuberculous Families		All Houses Surveyed		Estimated Population	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Area I.						
Standard	17	11.4	1,721	9.9	7,434.5	12.2
Substandard A.	55	36.9	6,745	38.9	23,493.7	38.5
Substandard B.	58	38.9	6,695	38.6	23,215.3	38.1
Unfit.	19	12.8	2,182	12.6	6,843.9	11.2
All Houses.	149	100.0	17,343	100.0	60,987.4	100.0
Ward 18 of Area 2.						
Standard	24	48.0	2,945	41.9	11,959.6	47.5
Substandard A.	17	34.0	3,302	47.0	10,723.6	42.6
Substandard B.	9	18.0	727	10.4	2,324.7	9.2
Unfit.	0	0.0	49	0.7	151.3	0.6
All Houses.	50	100.0	7,023	100.0	25,159.2	100.0

according to type of house and (b) the estimated population in these houses. The actual numbers of persons living in houses of different types are not available and, because a large proportion of houses in the unfit group are of one and two rooms, while the standard houses are of three or more rooms, and because of the association between the number of persons and the number of rooms occupied (Table 17), it has been necessary to make an estimate of the population in the houses of different type for the purposes of comparison. The best estimate is obtained by multiplying the number of houses, according to the number of rooms and the type, by the average number of persons occupying houses of one, two, three and four rooms and over, respectively, in the area. (Census figures).

In Table 21, the percentage distribution in Area I of the types of house occupied by tuberculous families does not differ materially from the distribution of all houses in the area. In Ward 18 of Area 2, the percentage of houses in the substandard "A" Class, occupied by tuberculous families, may appear low and in the "B" Class high, but when, for substandard "A", the observed number is compared by the x^2 test with the expected number, based first on the proportion of the population and secondly on the proportion of all houses, values of 0.64 and 1.53 are obtained which are of no significance, for significance a value equal to or exceeding

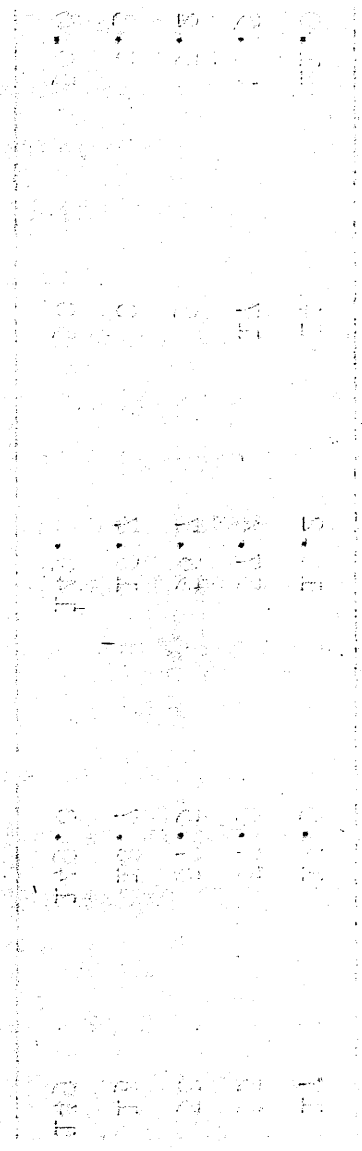


TABLE 22.

CLASSIFICATION OF HOUSES OCCUPIED BY TUBERCULOUS FAMILIES - OBSERVED AND EXPECTED.

Type of House:	Area I.			Ward 18 of Area 2.		
	Observed.	Expected. a) Based on All Houses.	Expected. b) Based on Estimated Population.	Observed.	Expected. a) Based on All Houses.	Expected. b) Based on Estimated Population.
Standard	17	14.9	18.2	24	21.0	23.8
Substandard A	55	57.9	57.4	17	23.5	21.3
Substandard B	58	57.5	56.7	9	5.2	4.6
Unfit	19	18.7	16.7	0	0.3	0.3
All Houses	149	149.0	149.0	50	50.0	50.0

3.84 being required. In the substandard "B" Class, the expected number is too low for comparison.

When the observed number of houses occupied by a tuberculous household (Table 22) is compared with the expected number in any category, based either on the proportion of houses or on the estimated population in that category, the numbers are found to correspond closely, and without suggestion of an increase in any one type.

Such a grouping, as in Table 22, is perhaps not entirely satisfactory for the purposes of this investigation, for a house of one room, whether classed as substandard "A" or "B" is not a fit home in which to bring up a family who have to cook, live and sleep in the same room, a room, almost of necessity, back-to-back in type and deficient in ventilation, where storage of food, clothing and coal is limited, if existent, which is without a fixed bath or hot water supply, and where the water closet is external and shared by other tenants.

No association has been found between the number of rooms in a house and the incidence of respiratory tuberculosis, but an attempt has been made to further analyse the housing of tuberculous patients on the basis of the following classification.

Group I. Standard Houses.

Group 2. Substandard "A" and "B" of 3 or more rooms.

TABLE 23.

Classification of Houses.

Type of House:	Houses Occupied by Tuberc. Families. Number.	Houses Occupied by Tuberc. Families. Per Cent.	All Houses Surveyed. Number.	All Houses Surveyed. Per Cent.	Estimated Population. Number.	Estimated Population. Per Cent.
Area I.						
Group I	17	11.4	1,721	9.9	7,434.5	12.2
Group 2	33	22.1	3,342	19.3	13,807.8	22.6
Group 3	63	42.3	8,189	47.2	27,812.4	45.6
Group 4	36	24.2	4,091	23.6	11,932.7	19.6
All Houses.	149	100.0	17,343	100.0	60,987.4	100.0
Ward 18 of Area 2.						
Group I	24	48.0	2,945	41.9	11,959.6	47.5
Group 2	6	12.0	522	7.4	2,138.4	8.5
Group 3	19	38.0	2,936	41.8	9,411.5	37.4
Group 4	1	2.0	620	8.8	1,649.7	6.6
All Houses.	50	100.0	7,023	100.0	25,159.2	100.0

TABLE 24.

CLASSIFICATION OF HOUSES OCCUPIED BY TUBERCULOUS FAMILIES OBSERVED AND EXPECTED NUMBERS

Type of House:	Area I. Observed	Area I. Expected a) Based on All Houses Surveyed.	Area I. Expected b) Based on Estimated Population.	Ward 18 of Area 2. Observed	Ward 18 of Area 2. Expected a) Based on All Houses Surveyed.	Ward 18 of Area 2. Expected b) Based on Estimated Population.
Group I	17	14.8	18.2	24	21.0	23.8
Group 2	33	28.7	33.7	6	3.7	4.2
Group 3	63	70.4	67.9	19	20.9	18.7
Group 4	36	35.1	29.2	1	4.4	3.3
All Houses	149	149.0	149.0	50	50.0	50.0

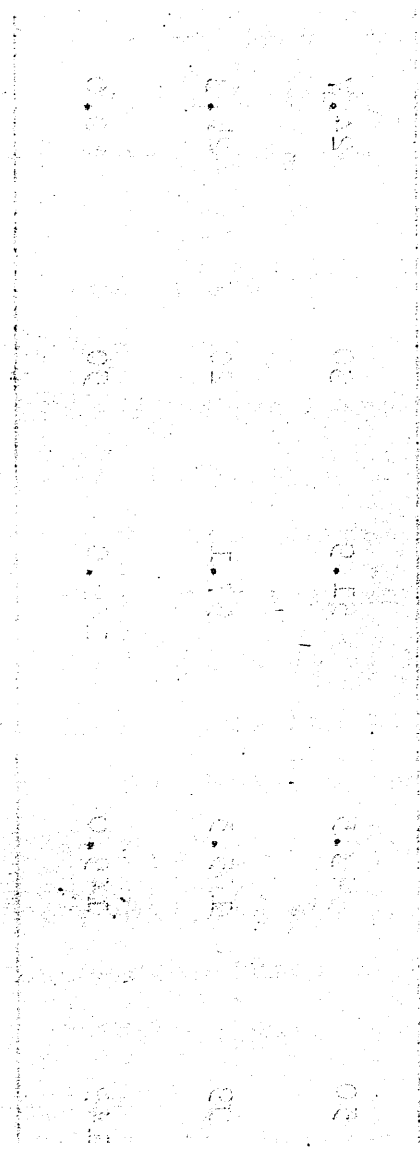


TABLE 25.

CLASSIFICATION OF HOUSES OCCUPIED BY TUBERCULOUS FAMILIES AS TO WHETHER SATISFACTORY OR UNSATISFACTORY OBSERVED AND EXPECTED NUMBER.

Classification of House:	Area I. Observed	Area I. Expected a) Based on all Houses	Area I. Expected b) Based on Estimated Population	Ward 18 of Area 2. Observed	Ward 18 of Area 2. Expected a) Based on all Houses	Ward 18 of Area 2. Expected b) Based on Estimated Population
Satisfactory (Groups I & 2)	50	43.5	51.9	30	24.7	28.0
Unsatisfactory (Groups 3 & 4)	99	105.5	97.1	20	25.3	22.0
All Houses.	149	149.0	149.0	50	50.0	50.0

Group 3. Substandard "A" and "B" of 2 rooms.

Group 4. Substandard "A" and "B" of 1 room and Unfit Houses.

Groups I and 2 may be classed as satisfactory houses, Groups 3 and 4 as unsatisfactory. This classification is probably the best that can be advanced with the available information.

Tables 23 and 24 are of similar design to Tables 21 and 22, respectively.

Again, Table 23 shows there is a fairly close correspondence between the type of house occupied by the tuberculous family and the general standard of the area.

Table 24 does not reveal any material difference between the grouping of houses of tuberculous families and those of the general population in the area.

In Table 25 the houses of tuberculous families have been classified as to whether satisfactory, Groups I and 2, or unsatisfactory, Groups 2 and 3, and the observed numbers and the expected numbers based on the proportions(a) of all houses and (b) of the estimated population in the houses in each category are given.

From a consideration of the Tables, the occurrence of respiratory tuberculosis would appear to be independent of the fitness, or otherwise, of the house.

SECTION 4. SUMMARY AND DISCUSSION.

Within the areas selected, one with a high incidence of respiratory tuberculosis and the other with a low incidence; the former more overcrowded, with smaller houses, a high proportion of which are of unsatisfactory type, no association has been found between the incidence of disease and either the number of rooms in the house or the number of rooms occupied by the tuberculous household, nor has any association been found with the fitness or otherwise of the house as a habitation.

Irrespective of the number of rooms occupied, the average number of persons in the tuberculous household was consistently greater than in private households, taken as a whole. In Area I the average size of the private household is larger than in Area 2.

While, in Area 2, tuberculous households show a greater degree of overcrowding than all private households, the association is possibly, if not probably, merely a reflection of the larger size of the tuberculous household. In Area I no association with overcrowding has been found.

Thus within a localised area, the incidence of respiratory tuberculosis would seem very possibly to be associated with the general prevalence of the disease in that area, rather than any particular housing aspect.

It is not the writer's intention to minimise the importance to the mental health, personal hygiene, wellbeing

and happiness of the people, or the importance to positive health of the removal of the evils of overcrowding and of the slums, but the present analysis suggests that with respiratory tuberculosis, the incidence is associated rather with general prevalence, and that reliance cannot be placed on improved housing to solve the problem of tuberculosis.

From the social aspect, in the campaign against tuberculosis, we must look beyond housing to other problems, such as conditions of employment and the use of leisure.

The writer has not touched on the problem of those cases of respiratory tuberculosis who were living, or had lived, in the same house with a case of tuberculosis, but has considered such contact cases in the following chapter.

* * * * * * *

CHAPTER 9.

FAMILY CONTACT IN RESPIRATORY TUBERCULOSIS

In this chapter the term 'contact case' has been used with reference to a case of respiratory tuberculosis living at the time of sickening, or having lived in the same house, with a case of the disease.

Table 26 gives an indication of the contact history of the contact cases notified during 1951. The groups are not clearly defined in so far, for example, as contact with 'Brother, Sister' may include contact with a parent. Broadly, however, the classification gives a picture of the contact history in the family.

TABLE 26

CONTACT HISTORY OF CASES OF RESPIRATORY TUBERCULOSIS NOTIFIED IN 1951

Contact with:	Area I	Area 2	Combined Areas Number	Per Cent.
Parent or Parents.	8	4	12	18.5
Brother, Sister.	18	8	26	40.0
Husband or Wife.	6	3	9	13.8
Children.	9	3	12	18.5
Other Relations.	3	3	6	9.2
	44	21	65	100.0

The degree of contact with a previous case is given in Table 27.

TABLE 27.

CASES OF RESPIRATORY TUBERCULOSIS LIVING OR HAVING LIVED IN THE SAME HOUSE WITH A PREVIOUS CASE OF TUBERCULOSIS

Contact:	Area I.				Area 2.			
	Contact with Resp. Tuberculosis		Contact with Non-Resp. Tuberc.	All Cases.	Contact with Resp. Tuberculosis		Contact with Non-Resp. Tuberc.	All Cases.
	Sputum +ve.	Sputum -ve.			Sputum +ve.	Sputum -ve.		
At Sickening	13	8	2	23	5	4	1	10
Within 5 years	12	4	2	18	6	3	0	9
More than 5 years	2	0	1	3	2	0	0	2
All Cases	27	12	5	44	13	7	1	21

Cases of Respiratory Tuberculosis with no History of contact as above.

Area I	111 cases*
Area 2	67 cases

* One case, excluded, a widow who lived alone and who died in a General Hospital and of whom no information as to previous contact was available.

A comparison has been made in Table 28 between the proportion of 'contact' cases of respiratory tuberculosis in the two areas and the proportions show no significant difference.

TABLE 28.

Comparison by the x^2 test of the number of 'contact' and 'no contact' cases of Respiratory Tuberculosis in Areas I and 2.

(i) Contacts - All cases living or having lived in the same house with a case of tuberculosis.

(ii) Contacts - All cases living or having lived within five years of sickening in the same house with a case of respiratory tuberculosis.

(iii) Contacts - All cases living in the same house with a case of respiratory tuberculosis at sickening.

(i)	Area I	Area 2	All Cases
Contact	44	21	65
No Contact	111	67	178
All Cases	155	88	243
Per cent Contact	28.4	23.9	26.7

$x^2 = 0.38$

(ii)/

TABLE 29.

COMPARISON OF NUMBER OF PERSONS IN HOUSEHOLDS OF CONTACT CASES WITH THE NUMBER OF PERSONS IN ALL 'TUBERCULOUS' HOUSEHOLDS

	All Tuberculous Households			Contact Households Contact with Resp.Tuberc.within 5 years of sickening.		
	Households Number.	Persons Number.	Average Persons per Household.	Households Number.	Persons Number.	Average Persons per Household.
Area I.	149	622	4.2	35	163	4.7
Area 2.	86	389	4.5	16	64	4.0

	Contact Households as above. Persons Number				
	Observed.	Expected.	Difference $\pm$ 0.5	Difference^2	$\frac{\text{Difference}^2}{\text{Expected}}$
Area I.	163	146.1	16.4	268.96	1.84
Area 2.	64	72.4	8.9	79.21	1.09

(The expected numbers for Area I amd Area 2 were determined by multiplying the number of tuberculous households by the average number of persons in all tuberculous households.)

(ii)	Area I	Area 2	All Cases
Contact	37	18	55
No Contact	118	70	188
All Cases	155	88	243
Per cent Contact	23.9	20.5	22.6

$x^2 = 0.20$

(iii)	Area I	Area 2	All Cases
Contact	21	9	30
No Contact	134	79	213
All Cases	155	88	243
Per cent Contact	13.5	10.2	12.3

$x^2 = 0.31$

A x^2 value of 3.84 would be equalled or exceeded in less than five per cent of instances.

It was noted while discussing housing that on the average the number of persons in the tuberculous household was greater than in households generally. However, between 'contact' households (households where the patient is living or has lived in the same house with a previous case) and all tuberculous households, there is no significant difference. (Table 29).

When considering the occurrence of 'contact' cases in a household two questions appear worthy of consideration:- (i) Do 'contact' cases occur more readily in overcrowded

families?

(ii) How does the risk to the immediate family of the patient of developing manifest disease compare with the risk to the general community?

(i) Do 'contact' cases occur more readily in over-crowded families?

This question may be put in a slightly different fashion: Is there more evidence of overcrowding in households where contact cases of respiratory tuberculosis have occurred? With the information available the best answer may be given by comparing the overcrowding (more than two persons living per room) in the households of contact cases, with the overcrowding in 'tuberculous' households where there has been no previous history of contact.

Table 30 gives a comparison between the households of 'contact' cases and the households where the cases have no previous history of 'contact'. (Detailed analysis of figures is given in Table 35 at end of this Chapter).

TABLE 30.

Comparison as to Overcrowding of 'Tuberculous' Households with 'Contact' cases with 'Tuberculous' Households where the Cases have had 'no Contact'.

The Data for Area I and Area 2 are combined.

(i) Contacts - All cases living or having lived in the same house with a case of tuberculosis.

(ii) Contacts - Contacts living or having lived in the same house with a case of respiratory tuberculosis within five years of sickening.

(iii) Contacts - Contacts living or having lived in the same house with a sputum +ve case of respiratory tuberculosis within five years of sickening.

(iv) Contacts - Contacts living or having lived in the same house with a sputum -ve case of respiratory tuberculosis within five years of sickening.

(i)

Persons living per room:	Households. Contact	Non-Contact	All Households.
More than 2.	24	54	78
Not more than 2.	37	124	161
All Households.	61	178	239*
Per Cent overcrowded.	39.3	30.3	32.6

$x^2 = 1.29$

* It will be noted (Table 29) 149 households are recorded in Area I and 86 in Area 2, giving a total of 235, compare 239 above. This apparent discrepancy is accounted for by a household being recorded twice when two cases were notified during the year, the first case being a primary notification in the household.

(ii)

Persons living per room:	Households. Contact	Non-Contact	All Households.
More than 2.	17	54	71
Not more than 2.	34	124	158
All Households.	51	178	229
Per cent overcrowded.	33.3	30.3	32.6

$x^2 = 0.06$

(iii)

Persons living per room:	Households. Contact	Non-Contact	All Households.
More than 2.	10	54	64
Not more than 2.	23	124	147
All Households.	33	178	211
Per cent overcrowded.	30.3	30.3	30.3

(iv)

Persons living per room:	Households. Contact	Non-Contact	All Households.
More than 2.	7	54	61
Not more than 2.	11	124	135
All Households.	18	178	196
Per cent overcrowded.	38.9	30.3	31.1

$x^2 = 0.23$

(For significance x^2 would require to equal or exceed 3.84).

The analysis in Table 30 shows no evidence of more

overcrowding in the households of 'contact' cases when compared with other tuberculous households.

In Table 31 'contact' cases of both areas have been combined and the proportion of cases to other persons in the household compared as to overcrowding (more than two persons living per room) and again no evidence has been found that overcrowding plays a part.

TABLE 31.

*'Contact' cases and Overcrowding.

Persons in Household.	Not more than 2.	More than 2.	* All Persons.
Cases	40	25	65
Others	104	111	215
All Persons	144	136	280
Per cent of Cases	27.8	18.4	23.2

$x^2 = 2.96$

(x^2 to be of significance would require to equal or exceed 3.84).
(* refers to all contact cases (Table 27)).

Conclusions as to overcrowding must be treated with reserve. When the contact history and housing are considered, a difficulty arises because of the rehousing under the tuberculosis scheme of patients in an actively infectious stage and unable to have a room to themselves, and the matter is further complicated by delays in rehousing from financial reasons and from difficulties in meeting the wishes of the patient and his family in such matters as distance from work, nearness of relatives, and congeniality of area.

(ii) How does the risk to the immediate family of the patient of developing manifest disease compare with the risk to the general community?

In endeavouring to give an answer, even tentatively, to this question, difficulty is encountered and perhaps some speculation may be forgiven.

Taking the two areas together, there were in 235 households with 244 cases, a total 1011 persons of whom 767, therefore, were in contact with a case of respiratory tuberculosis notified during the year.

In 30 cases the patient had been in contact with a case of respiratory tuberculosis in the house at sickening and assuming that a contact implied another notified case in the family, and allowing for the households where more than one contact had been notified during the year, we can take another 26 from our 767, giving some 741 non-notified persons in the households of our cases.

Let us assume that over the years we have each year 741 new contacts, neither more nor less, in the households in which a case of respiratory tuberculosis has been notified, and that among these notified cases we have always (Table 27) 30 new cases living in the same house as a previous case of respiratory tuberculosis, again neither more nor less, then the rate of incidence among these contacts per 10,000 would theoretically be $\frac{30 \times 10,000}{741} = 404.9$, of which, since over

30 contacts were made up of 18 in contact with a sputum positive case and 12 in contact with a sputum negative case, three-fifths would be contacts of sputum positive cases and two-fifths contacts with sputum negative cases. Estimated in a similar fashion, rates per 10,000 in Area I of 469.8 and in Area 2 of 306.1 were found.

The total population of the two Areas is 109,754 and, in this population, 244 cases of respiratory tuberculosis arose, giving a case rate of 22.2 per 10,000, so that our theoretical risk to our contact in a tuberculous household is some 18 times greater than to a person in the general population, greater if we had subtracted the number of contacts and of 'contact' cases from the population figure and the number of notified cases respectively, when a rate of 19.6 per 10,000 would be the rate for the general population. Further, if we had included the additional 25 notified cases,who had lived within five years of sickening in the same house with a case of respiratory tuberculosis, we can increase our incidence rate in 'contacts' by 83 per cent to 742.2 per 10,000.

Admittedly we have been considering 'contact' cases living in the same house with a case of respiratory disease on the one hand, and the household contacts, on the other; but while a number of families lived with relatives (Table 26) more than 90% of contact was with a parent, brother or sister, husband or wife, or child.

All this can be regarded as rather wild speculation but, perhaps, it may serve to emphasise the danger to the tuberculous household and the need for the constant study of their problem and how best to protect their susceptible members. It suggests, too, the importance of the size of the infecting dose and of the duration of exposure, for with advancing years all may expect to be infected, though a genetic influence may play some part.

Figures for 1951 are not available, but for both areas at the end of 1952 there were on the tuberculosis register 1,169 cases of respiratory tuberculosis which, if the writer may be permitted to apply the figure to 1951, would mean for the combined population of 109,754, one case of respiratory tuberculosis for every 93.9 persons, approximately one in every 100 and not taking account of the unknown reservoirs of infection in the population.

By the rehousing of the actively infectious case, unable otherwise to have a room to himself, and by the teaching of hygiene and the control of infection by our health visitors, for years we have endeavoured to reduce the risk to the household contacts of respiratory tuberculosis, but the risk remains exceedingly great and has not been reduced by modern therapy, as much as might have been expected, though the outlook for the patient has never been brighter. Where then can we look for further help in our fight against the disease?

B.C.G. vaccine is our new weapon, and in its use, those of us in the preventive field, who have been for many years associated with tuberculosis, place great hopes in furthering our campaign against the disease.

By reinforcing natural resistance by acquired resistance when it is lacking, B.C.G. vaccine may prevent many cases arising, by making it more difficult for the tubercle bacillus to establish itself and produce disease; and, by the vaccination of the adolescent population we may hope for some reduction in the number of new households at risk.

In the past, in dealing with tuberculin negative reactors in the tuberculous household we have been careful, as to isolation from possible infection, of contacts for whom vaccination was contemplated, both to protect the good name of the vaccine by removing the danger of tuberculosis developing during the course of vaccination and because of a possible adverse effect on the course of the disease in such a circumstance.

Irvine, in his recent book, has stated that there is no evidence of such an adverse effect. In securing such isolation delay has occurred and it would seem not improbable that in certain instances natural infection has occurred before isolation could be arranged. If isolation, say within two weeks of examination of the tuberculin negative contact, cannot be obtained, either by removal of the patient to hospital, or by the isolation of the tuberculin negative

contacts with relatives or in preventoria, and parents have a natural reluctance to part with their children, it would seem that the great danger to the contact from natural infection would justify the vaccination of the negative reactors, even in the absence of adequate isolation. Isolation of the contact from the patient, however, must be demanded in every instance for it immediately removes the risk of natural infection, if this has not already taken place, while acquired resistance is becoming established. A period of three months allows the preliminary quarantine of six weeks before vaccination, but if only a period of six weeks could be attained, e.g. by treating all new cases during the first six weeks in hospital, it may well be the better procedure to vaccinate immediately, and then isolate, with the hope that vaccination has been carried out before natural infection has occurred. A negative reaction to 1/100 Old Tuberculin will avoid an immediate Koch reaction.

From the preventive aspect, the policy of perfection is the early recognition of the disease, immediate notification, the isolation in hospital of the patient within two weeks of diagnosis, the immediate examination of the household radiologically and by tuberculin testing, the continued isolation of the patient in hospital until vaccination of the tuberculin negative reactors in the household has been completed and the patient taught how to deal with his sputum and order his life and given treatment under the best conditions, and for the

TABLE 32.

Age and Sex Incidence of 'Contact' cases of Respiratory Tuberculosis living or having lived in the same House with a case of Tuberculosis. Areas I and 2.

	Age in Years.					
	0-4	5-14	15-24	25-34	35+	All Cases
Area I.						
Male	2	3	4	5	9	23
Female	3	1	9	5	3	21
Area 2.						
Male	2	2	2	0	2	8
Female	1	0	5	4	3	13
All Cases	8	6	20	14	17	65

TABLE 33.

Age Incidence of All Cases of Respiratory Tuberculosis of 'Contact' Cases, (Cases living or having lived in the same house with a case of Tuberculosis) and of Non-Contact Cases with the Percentage Distribution.

	Age in Years.											
	0-4		5-14		15-24		25-34		35+		All Cases	
	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total
All Cases	15	6.1	17	7.0	75	30.7	58	23.8	79	32.4	244	100.0
'Contact' Cases	8	12.3	6	9.2	20	30.8	14	21.5	17	26.2	65	100.0
'Non-Contact' Cases	7	3.9	11	6.1	55	30.7	44	24.6	62	34.6	179	100.0

The Percentage Age incidence does not vary greatly from that of all cases and of non-contact cases except in young children.

housing circumstances to be reviewed. Admitting that present circumstances make the early removal of the patient impracticable, never at any time should the desirability of this be lost sight of. While the provision of preventorium accommodation, until acquired resistance has been established, for infants born of tuberculous mothers or into tuberculous households is essential and has proved invaluable, the usefulness of preventoria for other contacts is limited and can never meet the needs of the situation, and those who advocate it in place of hospitalisation of the patient have failed to grasp the problem. The early isolation in hospital of new cases is the only way to adequately meet the needs of the household contacts without disruption of the family at a time of sever stress and strain. Whenever the diagnosis is in doubt and a period of observation considered necessary care should be taken that the household are x-rayed and the tuberculin negative reactors vaccinated. The apathetic family and the wilfully negligent, often highly infective and unco-operative patient, are a problem. The compulsory isolation of the latter in hospital with other patients would be a very great disservice to those patients who need encouragement.

It may be of interest to give the age incidence of the 65 'contact' cases notified in Areas I and 2 in 1951. (Table 32).

The percentage age incidence does not vary greatly from that of all cases and of non-contact cases, except in young children. (Table 33).

When the birthplace of parents and grandparents was considered, the data for grandparents was found to be incomplete. In Table 34 the percentages of contacts among the cases where both parents were born in Scotland, and among those where one or other, or both parents, were born outwith Scotland are given, and the proportions of contacts to non-contacts compared by the x^2 test. No significant difference in the proportions were found.

TABLE 34.

'Contact' and 'Non-Contact' Cases of Respiratory Tuberculosis Considered as to the Birthplace of the Parents.

A - Both Parents born in Scotland.

B - One or other or both parents born outwith Scotland.

	A.	B.	All Cases.
Contact Cases	55	10	65
Non-Contact Cases	159	19	178
All Cases	214	29	243
Percentage of Contacts	25.7	34.5	26.7

$$x^2 = 0.61.$$

No significant difference in the proportion of contact cases in the two areas has been found, nor has the average size of the tuberculous household in which a 'contact' case has occurred been found to differ significantly from tuberculous households as a whole. No evidence has been

adduced that overcrowding influences the occurrence of contact infection, but the rehousing of the overcrowded, actively infectious case complicates this problem. The great danger of manifest tuberculosis occurring in the family contacts of a tuberculous case has been stressed, consistent with the importance of the size of the infecting dose and, probably, the duration of exposure. The use of B.C.G. vaccine as an additional preventive measure has been discussed, especially since great danger to the family of a patient is still present despite the efforts of health visitors and the use of modern therapy.

TABLE 35.

Distribution of Contacts, Households of Contacts and Persons living in these Households, according to the Degree of 'Contact' and persons living per Room.

Column A = Cases.

Column B = Households.

Column C = Persons in Households.

Area I.

All Households			Persons living per Room. Not more than 2.			More than 2.		
A	B	C	A	B	C	A	B	C
All Contacts:								
44*	42*	215	28	26	107	16	16	98
Contacts with Respiratory Tuberculosis within five years of sickening:								
37*	35*	163	26	24	99	11	11	64

TABLE 35 (Continued)

All Households			Persons living per Room. Not more than 2.			More than 2.		
A	B	C	A	B	C	A	B	C
Contacts with a Sputum +ve case of Respiratory tuberculosis within five years of sickening:								
25	23	105	19	17	76	6	6	29
Contacts with a sputum -ve case of Respiratory Tuberculosis within five years of sickening:								
12	12	58	7	7	23	5	5	35

* In one household, three cases, contacts with a sputum +ve case, were notified respectively in April, September and November 1951. In April and September there were eight persons in the household occupying four rooms, and therefore living not more than two persons per room, but by November, when the third case was notified, an addition to the family had occurred so that they were then living more than two persons per room. However, because two cases had been notified while there were two persons per room, all these have been included as living not more than two persons per room when considered as a household and in respect of contact.

Area 2.

All Households			Persons living per Room. Not more than 2.			More than 2.		
A	B	C	A	B	C	A	B	C
All Contacts:								
21	19	75	12	11	37	9	8	38

TABLE 35 (Continued)

All Households			Persons living per Room. Not more than 2.			More than 2.		
A	B	C	A	B	C	A	B	C
Contacts with Respiratory Tuberculosis within five years of sickening:								
18	16	64	11	10	36	7	6	28
Contacts with a Sputum +ve case of Respiratory tuberculosis within five years of sickening:								
11	10	38	7	6	22	4	4	16
Contacts with a sputum -ve case of Respiratory Tuberculosis within five years of sickening:								
7	6	26	4	4	14	3	2	12

Cases with no 'Contact' and Persons in the Households of These Cases.

	All Cases.		Persons living per Room. Not more than 2.		More than 2.	
	Cases	Persons in House-hold.	Cases	Persons in House-hold.	Cases	Persons in House-hold.
Area I.	111 *	440	81	268	30	172
Area 2.	67	314	43	160	24	154

* In five cases a contact case subsequently arose in the household and while the number of these cases is taken as the number of 'no contact' households, in the five instances the households involved have also been included as 'contact' households.

CHAPTER 10.

THE RESULTS OF THE TUBERCULIN TESTING OF CHILDREN OF 13 YEARS IN THE AREAS UNDER INVESTIGATION 1953.

In September of 1953 Glasgow launched a School Campaign against tuberculosis under the leadership of Dr. Gemmill, and it is of interest to consider the extent of tuberculous infection in the 13-year-old population, determined by the Mantoux test with 1/1000 Old Tuberculin, in the two areas under investigation.

The school returns were listed, naturally enough, under the school of attendance and while attendance was largely territorial, districts overlapped to a very large extent and many pupils travelled considerable distances to school. A scrutiny of the returns showed that it would be valueless to compare the areas on the basis of the schools located in them and it was necessary to examine the records of all schools in the Northern Division and adjoining areas of the Central and Eastern Divisions. Information concerning pupils with addresses in either Area I or 2 was extracted from the records. This was an exceedingly laborious task and, while care was taken, an odd case may have been overlooked.

Of the 16,380 children of 13 years in the City, it proved

TABLE 36.

CHILDREN OF 13 YEARS TUBERCULIN TESTED IN THE SCHOOL CAMPAIGN OF 1953 AND THE APPROXIMATE NUMBER OF CHILDREN IN AREAS I and 2 ESTIMATED BY TAKING ONE-FIFTH OF THE POPULATION OF 10-14 YEARS AT THE CENSUS - 1951.

	Area I.		Area 2.	
	Ward 10	Ward 14	Ward 17	Ward 18
Children of 13 years Tuberculin Tested in 1953.	282	237	217	250
One-fifth of Children of 10-14 years at Census 1951.	535	482	365	416
Tested Children expressed as a percentage of figure obtained from Census.	52.7	49.2	59.5	60.1

TABLE 37.

RESULTS OF THE TUBERCULIN TESTING 1/1000 OLD TUBERCULIN OF CHILDREN OF 13 YEARS IN AREA I AND AREA 2 IN THE LAST QUARTER OF 1953.

	Area I.		Area 2.	
	Ward 10	Ward 14	Ward 17	Ward 18
Positive Reactors	124	95	89	103
Negative Reactors	158	142	128	147
Total Tested	282	237	217	250
Percentage of Positive Reactors	44.0	40.1	41.0	41.2

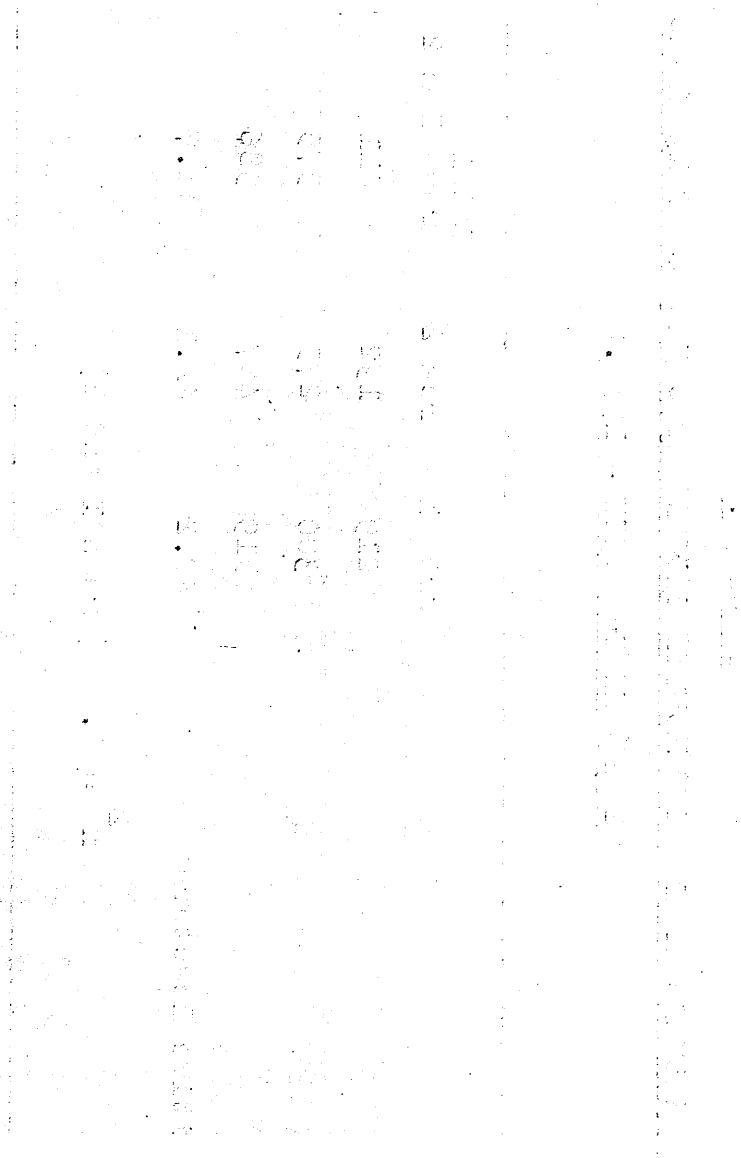


TABLE 38.

COMPARISON OF THE RESULTS OF THE TUBERCULIN TESTING OF CHILDREN OF 13 YEARS IN AREAS I AND 2 AND IN THE CITY - 1953.

	Area I	Area 2	Total Areas I & 2	City
Positive Reactors	219	192	411	4,558
Negative Reactors	300	275	575	6,648
Total Tested	519	467	986	11,206
Percentage of Positive Reactors	42.2	41.1	41.7	40.7

$x^2 = 0.08$ (Areas I and 2)

possible to test only 11,206, 68.4 per cent, and it was impossible to determine the number not tested in Areas I and 2. As an approximation to the number of children of 13 years in the respective areas, one-fifth of the corresponding Census population of children of ages 10-14 years was taken and the number of children tested expressed as a percentage of this figure, Table 36.

Perhaps it may be well at this stage to compare briefly the notifications of respiratory tuberculosis in the areas in 1951 and 1953. Between 1951 and 1953, notifications of respiratory tuberculosis in Area I fell from 161 to 147, a fall of 14, while notifications in Area 2 rose from 88 to 105, a rise of 17. This rise in notifications in Area 2 is largely accounted for by the new Cadder Housing Scheme in Ward 18. At 31st December, 1951, 104 houses in this scheme were occupied and at 31st December, 1953, 628 houses; while in 1953 the notifications of respiratory tuberculosis in the scheme were thirteen.

While about 50 per cent of the children were tested in Wards 10 and 14 of Area I, some 60 per cent were tested in Wards 17 and 18 of Area 2. Table 37 gives the results of the tuberculin testing of the children of 13 years in the Wards of Area I and Area 2.

In Table 38 the results of the tuberculin testing in the two areas have been compared by the x^2 test and no significant difference between the areas has been found.

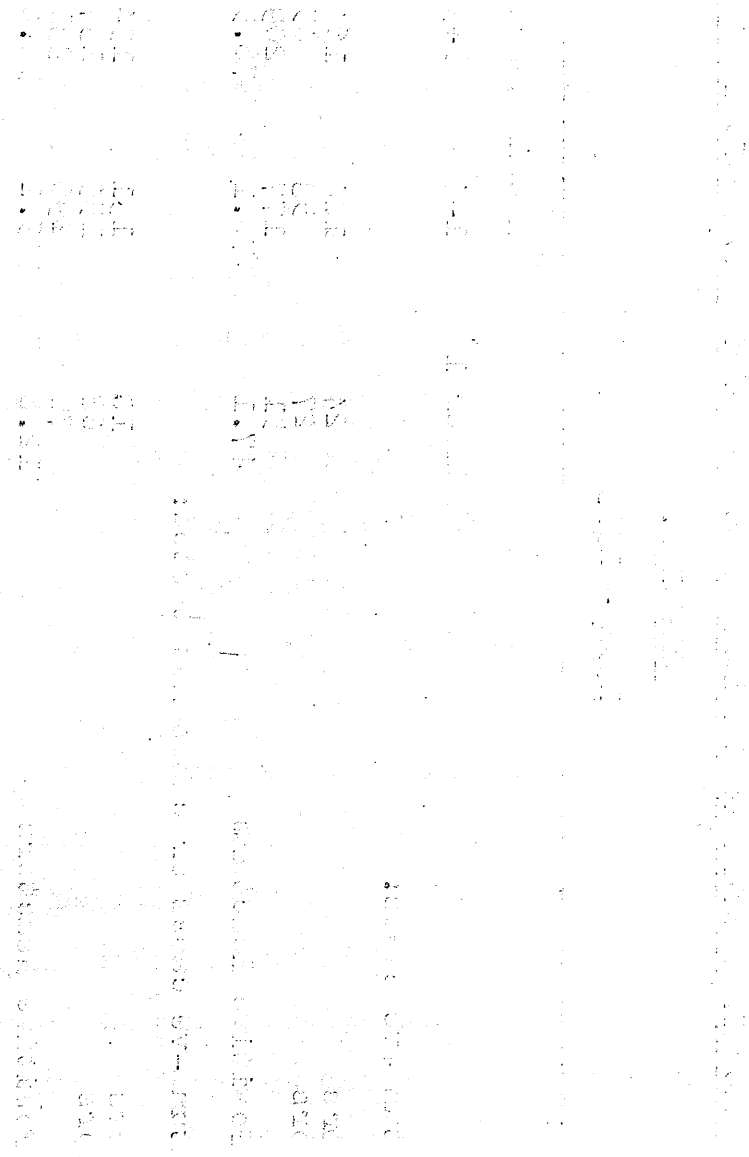


TABLE 39.

RESULTS OF THE TUBERCULIN TESTING OF CONTACTS OF CASES OF TUBERCULOSIS IN THE NORTHERN DIVISION.

1951 - 1953

	Age in Years			
	Under 1	1-4	5-9	10-14
Contacts with Sputum +ve cases:				
Positive Reactors	24	124	164	149
Negative Reactors	27	53	45	29
Total Tested	51	177	209	178
Percentage of Positive Reactors	47.1	70.1	78.5	83.7
Contacts with Sputum -ve cases or cases not tested:				
Positive Reactors	10	131	194	227
Negative Reactors	68	159	137	93
Total Tested	78	290	331	320
Percentage of Positive Reactors	12.8	45.2	58.6	70.9

Thus while only a part of the 13-year-old population has been tested, there is no evidence that infection in the child population is more widespread in one area than in the other, and, prior to the campaign, some 60 per cent. of those tested would have entered adolescence, with its low natural resistance, unprotected by acquired resistance.

Comparing these two areas, the one with a relatively high incidence of respiratory tuberculosis, the other with a relatively low incidence; the former more congested and overcrowded, there is no evidence that congestion and overcrowding have influenced the extent of infection in the child population.

In passing, it may be of interest to note the results of tuberculin testing in children of school age and under in tuberculous households.* Of 106 children of 13 years in the Northern Division, family contacts of tuberculosis, 71.7 per cent. were tuberculin positive, 80.6 per cent. of the 36 known contacts of sputum positive cases and 67.1 per cent. of the 70 who were contacts of other cases of tuberculosis. (* Table 39).

The Ministry of Health Circular H.M. (54) 82 - commends a report of the Medical Research Council's Sub-Committee on Mass Miniature Radiography. Paragraphs (9) to (12) deal with the 'Population Studied by M.M.R. 'In the opinion of the Sub-Committee the low incidence of pulmonary tuberculosis found by examining school leavers, 0.15 per cent., does not make the procedure worth while in this group, except in a research project or where there is evidence of a high incidence.'

A review of the results of the tuberculin testing of children of 13 years, and a consideration of the conclusion of the Medical Research Council's Sub-Committee on Mass Miniature Radiography in the examination of school leavers, suggests that the factors which influence the rate of incidence of the disease between one area and another become operative after school life and direct attention to conditions of employment and the use of leisure with the social contacts involved.

The writer believes that the investigations which will bear most fruit are - (1) The study of the tuberculous family and (2) the study of the social aspects of adolescent and young adult life.

Maurice Davidson expressed the view that "The key to the problem lies in the study of tuberculosis in the child." The writer would prefer to say that the keys of the problem are in the study of the tuberculous family and in the study of the social aspects of adolescent and young adult life. The study of the tuberculous family, of which the major problem is the protection of the family, of necessity includes the problem of tuberculosis in the child.

* * * * * * *

CHAPTER 11.

THE SOCIAL ASPECT.

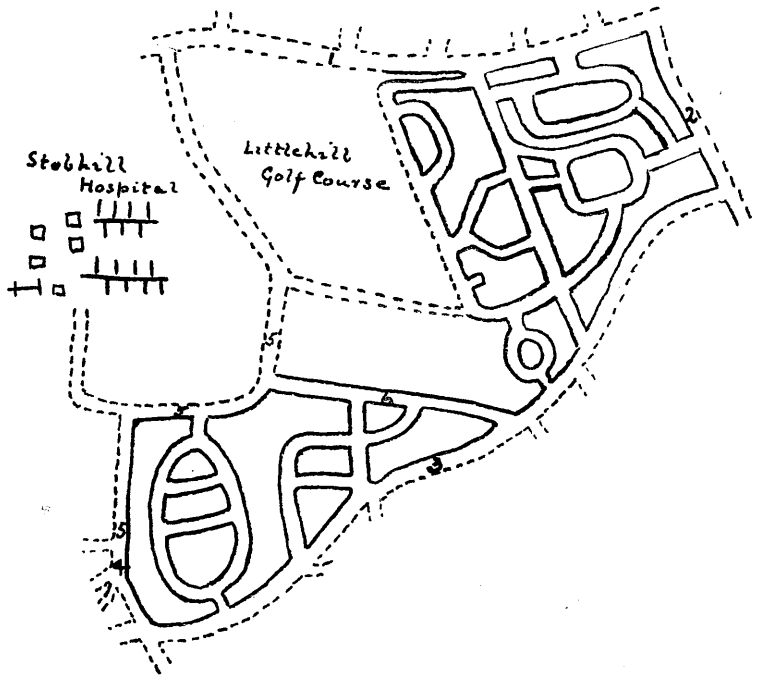
In considering the social aspect the most satisfactory approach appeared by way of the Registrar General's five social classes.

The Registrar General's Decennial Supplement, England and Wales, 1951, Occupational Mortality Part I contains, in the introduction, an extract from the 1950 Classification of Occupations, from which the following has been taken:

"The Social Class grouping is not a classification of individuals, nor is there an assessment of individual position in the light of personal circumstances apart from the details of occupation. Assignment to an occupational group on the basis of the statement of occupation automatically attracts the Social Class grading appropriate to that occupational group. Since the unit of assignment is the occupation group, and not the individual occupation nor individual circumstances, it may happen that an assignment based on the group as a whole would not necessarily be appropriate for a particular occupation considered in isolation, had that particular occupation been judged worthy of separate identification in the Occupational Classification.

There are five Classes in the Social Class grouping, whose nature will be generally understood from the following broad descriptions:-

Surveyed Area,
Ward 9,
Northern Division



1. Auchinairn Road
2. Standburn Road
3. Wallacewell Road
4. Broomfield Road
5. Balornock Road.
6. Lamont Road

Class I Professional, etc., Occupations.
Class II Intermediate Occupations.
Class III Skilled Occupations.
Class IV Partly Skilled Occupations.
Class V Unskilled Occupations. "

For the purposes of the investigation, the social class of a family has been determined by the occupation of its head on the basis of the Registrar General's classification.

An area in Ward 9 of the Northern Division, and situated in the North Eastern region of the City, was selected and the incidence of respiratory tuberculosis in 1951 and 1952 in the area was studied. The area is bounded by Auchinairn Road, Standburn Road, Wallacewell Road, Broomfield Road and Balornock Road.

Within the area are 1,386 houses all of 'standard' type and factored by the Corporation. While about one quarter of the houses in the area became occupied during the 'war' years, the majority became occupied since 1946, about 34 per cent. in 1948 and rather less than 10 per cent. in the early part of 1950, by which time house building in the area had been completed.

As it was not possible to consider every house in the area, a random sample of 400 houses was taken as representative of the area and analysed. In taking this sample the roads in the area were arranged in alphabetical

order and the houses in the individual roads in order of magnitude of their number. The houses so arranged were given a running number and from these numbers a sample of 400 was taken using random numbers. The houses were surveyed in 1950 and where changes of tenancy had occurred between the survey date and 31st December, 1952, were resurveyed. As the notifications of respiratory tuberculosis in the area in 1951 and 1952 were being investigated, the circumstances of the tenants in occupation at 31st December, 1951, have been taken as representative of the area.

Because of the labour involved it has not been possible to consider changes, due to births and deaths, in the number of persons in a house and it has been necessary, therefore, to disregard the possibility of such changes in the analysis. Information was obtained as to the age and sex of the occupants, the employment, and social class, determined by the employment of the head of the family, and housekeeping, but consideration has been mainly confined to social class, number of occupants and age.

One house has been excluded from the sample 400 because at the time of the survey a death had occurred in the family and later in 1953, outwith the period under review, a change of tenancy occurred before a resurvey was made.

Preliminary Consideration of Cases notified in 1951 and 1952.

During the two years, 39 cases of respiratory tuberculosis

were notified, involving 34 households.

It was decided to include, as having contracted infection after taking up residence in the area, all cases under 35 years who had resided in the area for more than one year before the presumed date of sickening. One exception to this rule was made by the inclusion of a girl, aged 19 years, who, notified in July, 1951, gave a history of illness dating from May 1950 and who had resided in the Area since December, 1949.

This led to an initial exclusion from the analysis of six cases and four households.

The following are some details of the six cases initially excluded:-

(1) Male, 32 years. Sputum positive. X-ray bilateral disease with gross cavitation. Married into a family living in area during the survey period. Contact of his father, a notified case of respiratory tuberculosis (sputum negative) and living outwith the area.

(2) Female, 2 years. X-ray at onset consistent with broncho-pneumonia tuberculosis. After sanatorium treatment lung fields clear. Was resident, temporarily, with a family in the area; both her parents, outwith

the area, being notified cases, one with a positive sputum.

(3) Male, 47 years. Notified 30.8.1951.

History (1.8.1951). History of shivering and of pain in right side within the past three weeks.

Sputum negative 5.9.1951.

X-ray 14.9.1951. Fibrous tuberculosis both apices. No activity.

Diagnosis: Fibrous tuberculosis both apices with generalised chronic bronchitic changes and emphysema.

Duration of Residence at Notification:- Three years 7 months (Date of entry 5.1.1948).

(4) Female, 52 years. Notified 14.11.1951.

History (22.10.1951). History of only one month's duration.

Sputum positive 23.10.1951.

X-ray 29.10.1951. Tuberculous infiltration of considerable standing in left lung and right upper zone. Large cavity in left upper zone.

Duration of Residence at Notification: Two years 6 months. (Date of entry 20.5.1949).

(5) Male, 63 years. Notified 23.11.1951.
History (7.11.1951). Cough, staining of sputum, and loss of weight over one year.
Sputum positive 8.11.1951.
X-ray, 23.11.1951. Low grade tuberculosis, right upper and lower zones and left upper zone.
Duration of Residence at Notification: One year 7 months (Date of Entry: 4.4.1950).

(6) Male, 54 years. Notified 12.8.1952.
History (30.7.1952). Duration 3 months. Cough, spit, shortness of breath, haemoptysis, hoarseness.
Sputum negative 7.8.1952; 23.10.1952.
X-ray 31.7.1952. Tuberculous infiltration of considerable standing, both upper lobes, more extensive on left. The disease appears active.
Duration of Residence at Notification: Two years 10 months. (Date of Entry: 28.10.1949).

With the exclusion of the above six cases, and four households there remain for consideration 33 cases and 29

households.

Of these 33 cases, seven cases lie without the age period 15-24 years, and 26 within. For the purpose of analysis the advantages of confining attention to the age period 15-24 years outweigh the disadvantages of excluding seven cases from the analysis.

The seven cases excluded comprise six females aged 1.4/12, 14, 25, 25 27 and 32 years respectively, and one male aged 12 years.

With the exclusion of these seven cases, there remain 26 cases between 15-24 years, involving 25 households.

The Survey:

For the survey, the assistance of four sanitary inspectors was obtained.

Of the sample of 399 'households' taken as representative of the households of the area, it will be recalled that for one house of the original 400 random sample, data were not available for the years 1951 and 1952, consideration was first given to the presence of relative and lodger families, to the housekeeping, and to the employment or otherwise of the head of the family.

In 58 of the 399 houses, a relative family, usually the family of a married son and daughter, resided with the tenant family; in a further three houses a single lodger resided

with the family, and in three houses a lodger family (three persons in each lodger family) was accommodated. For simplicity, the occupants of these 'shared' houses have been taken as one household, and the term 'household' has been used with reference to all occupants in the house.

The social class of these combined households has been determined by the occupation of the head of the tenant family.

TABLE 40.

Type of Occupancy.

Social Class	Tenant Occupier	Tenant having Relatives lodging.	Tenant with Lodgers.	All 'Households'.
II	21	2	0	23
III	124	24	1*	149
IV	126	19	4*	149
V	64	13	1	78
All Classes	335	58	6*	399

* (In three instances a single lodger resided with the household; in the other three instances the lodger family consisted of three persons in each case.)

Housekeeping was assessed on the following basis:-

Good: House clean and well cared for.
Children clean and well cared for.

Clothing clean and in reasonable repair.
Mother clean in her person and obviously using method in her housekeeping.

Fair: Housekeeping neither good nor bad.

Bad: House - Food left on table - butter or margarine still in its paper, grate dirty, dishes unwashed, empty milk bottles unwashed.
Children - Dirty, hair unkempt, clothing dirty and torn and little effort at repair. Generally negelected.

The housekeeping in the majority of cases was assessed as good.

TABLE 41.

Housekeeping.

Social Class.	Good.	Fair.	Bad.	All Houses.
II	23	0	0	23
III	141	6	2	149
IV	147 *	2	0	149
V	73	5	0	78
All Classes	384	13	2	399

* (In one instance while the housekeeping of the tenant family was considered good, that of the lodger family was regarded as only fair.)

With regard to employment, in only a few instances was

the head of the family unemployed over a long period or incapacitated by a long term illness.

TABLE 42.

Condition of Employment of Tenant.

Social Class.	Employed. Unemployed - short term. Short term illness.	Unemployed - long term. Incapacitated with long term illness.	Other Conditions. (Retired, living apart, dead, etc.)	All Tenants.
II	22	0	1	23
III	134	5	10	149
IV	126	4	19	149
V	64	8	6	78
All Classes	346	17	36	399

Long term unemployment or incapacity was most prominent in Social Class V.

The Analysis:

Since the 26 cases of respiratory tuberculosis under consideration belong to the age group 15-24 years, it was necessary in investigating the influence of social class to deal with the same age group in the control sample. The distributions of the age group 15-24 years in the control sample population and of the cases of respiratory tuberculosis, according to social class, are given in Table 43, together with the 'expected' number of cases of

TABLE 43.

Social Class Distribution

Social Class.	Sample Population 15-24 years		Tuberculous Cases 15-24 years			Tuberculous Cases. Other Ages.
	Number	Per Cent of Total.	Observed Number	Per Cent of Total	Expected* Number	Number.
II	32	4.3	2	7.7	1.1	1
III	241	32.3	6	23.1	8.4	5
IV	298	39.9	13	50.0	10.4	4
V	175	23.5	5	19.2	6.1	1
All Classes	746	100.0	26	100.0	26.0	11

* Expected number based on the social class distribution of the age group 15-24 years in the 'control sample' population.

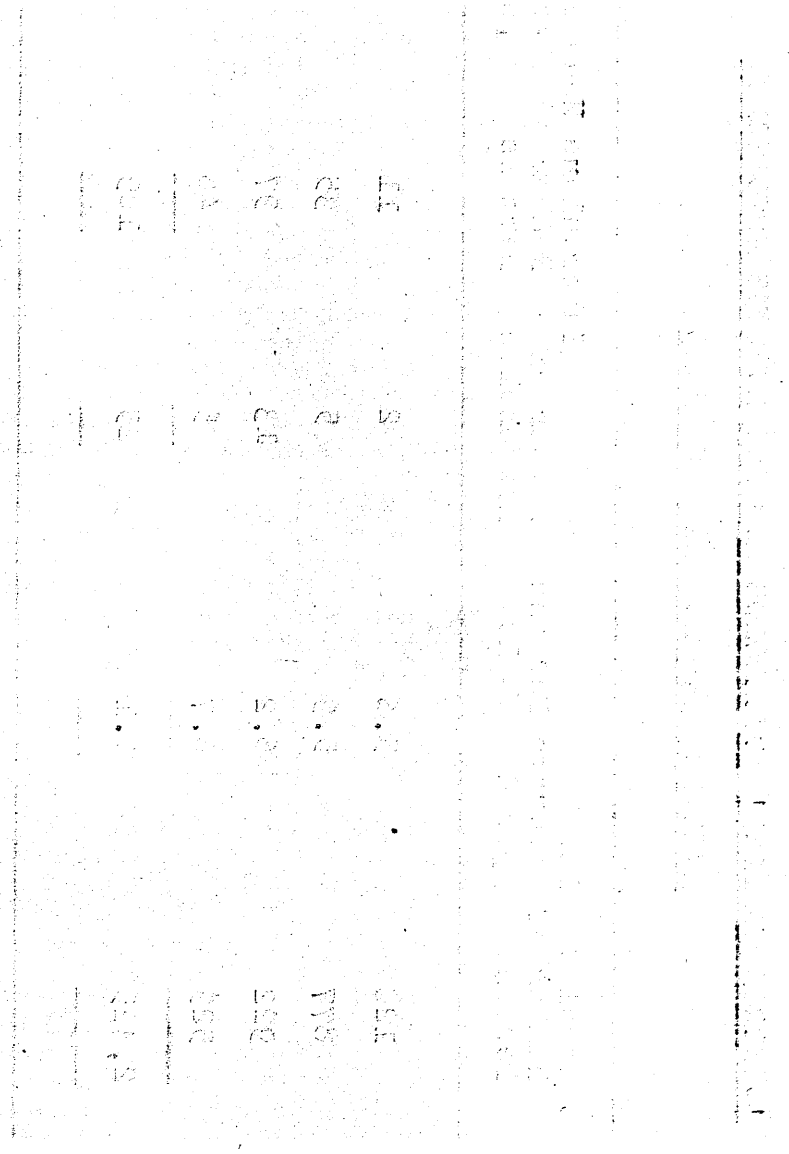


TABLE 44.

'CONTROL SAMPLE ' HOUSEHOLDS AND TUBERCULOUS HOUSEHOLDS

AVERAGE PERSONS PER HOUSEHOLD

Social Class	Control Sample. Number of Households	Number of Persons	Average Persons per Household	Tuberculous Households. Number of Households	Number of Persons	Average Persons per Household
II	23	128	5.6	2	11	5.5
III	149	877	5.9	5	35	7.0
IV	149	922	6.2	13	97	7.5
V	78	525	6.7	5	46	9.2
All Classes	399	2,425	6.1	25	189	7.6

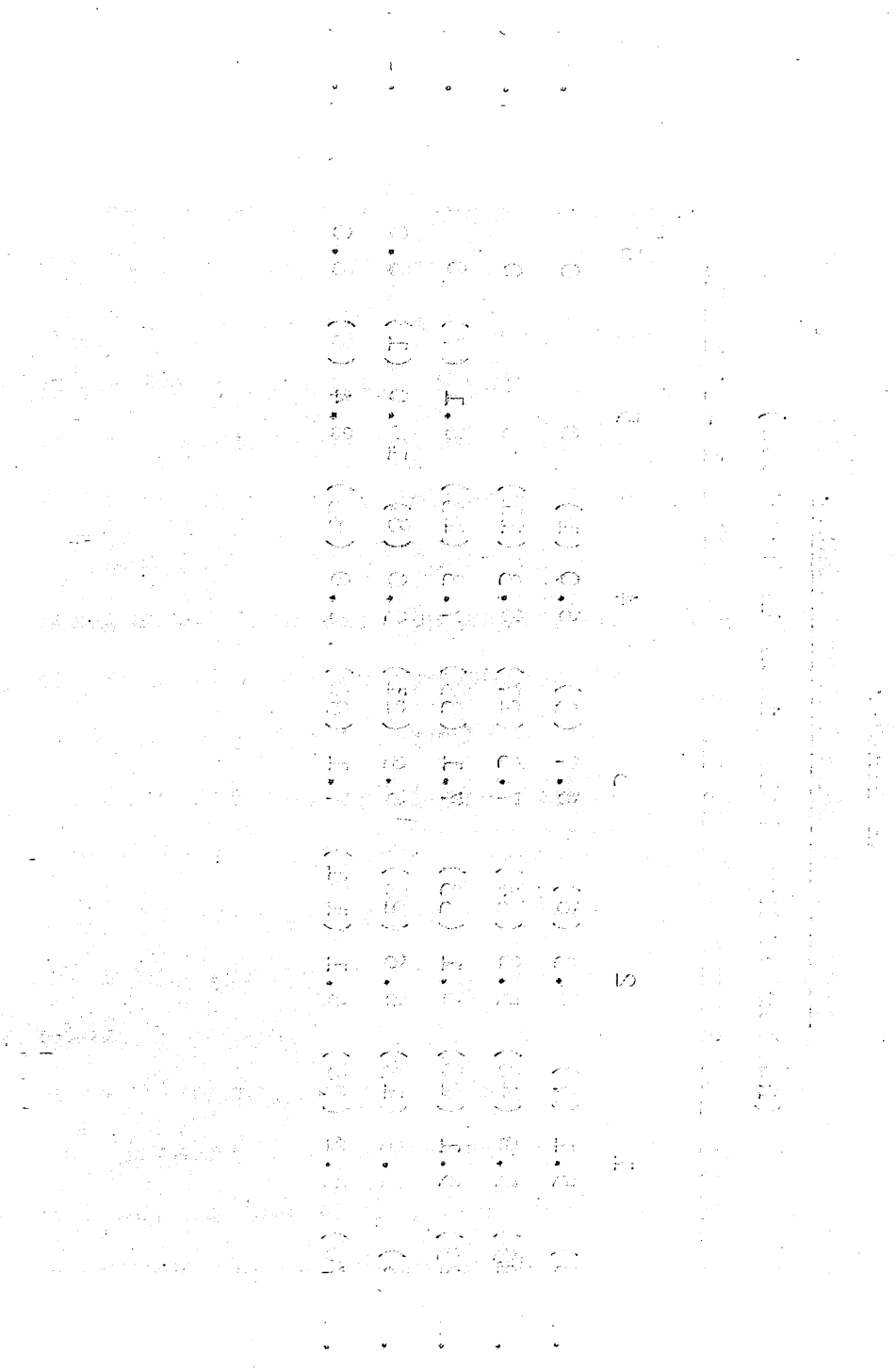


TABLE 45.

AVERAGE PERSONS PER HOUSEHOLD

(Number of Household given in brackets)

HOUSEHOLDS HAVING PERSONS IN THE AGE GROUP 15-24 YEARS

Social Class.	0	1	2	3	4	5	6	All Households.
II	4.7 (6)	5.1 (7)	6.3 (6)	6.7 (3)	6.0 (1)	0	0	5.5 (23)
III	5.3 (29)	5.0 (48)	5.8 (34)	7.3 (27)	8.3 (11)	0	0	7.0 (149)
IV	5.1 (29)	5.1 (28)	6.1 (33)	7.1 (39)	7.3 (13)	8.1 (7)	0	7.5 (149)
V	5.0 (6)	5.9 (13)	6.6 (28)	6.9 (21)	9.0 (8)	10.0 (1)	8.0 (1)	9.2 (78)
All Classes	5.1 (70)	5.2 (96)	6.1 (101)	7.1 (90)	8.0 (33)	8.4 (8)	8.0 (1)	7.6 (399)

respiratory tuberculosis based on the population distribution in the sample. The social class distribution of the excluded cases of tuberculosis is also given, with the exception of the two cases, one in social class III and the other in social class IV, known beyond doubt to have contracted their infection outwith the area.

A consideration of Table 43 shows that the data are inadequate to draw any conclusion as to the effect of social class on the incidence of tuberculosis, and a further accumulation of data will be required.

In Table 44 the average persons per household (all persons in house) for tuberculous households and for the corresponding households of the 'control sample' are given.

From this Table it can be seen that, excluding social class II, the average number of persons in the tuberculous households was greater than in the 'control sample' households.

Table 45 shows, as would be expected, that as the number of persons between 15 and 24 years in a household increases so, on the whole, does the average number of persons in the household; and, taken as a whole, the average number of persons varies with the social class.

In Table 46, the total number of persons in tuberculous households has been compared with an expected number obtained by multiplying the number of households having in the household 1, 2, 3, 4 and 5 persons in the

age group 15-24 years respectively in each of the social classes by the average number of persons in the corresponding household of the 'control sample'.

TABLE 46.

Comparison of the 'Observed' Persons in the Tuberculous Households with an 'Expected' number based on the Average Number of Persons in Households of the 'Control Sample' according to Social Class and to the Number of Persons in the Age Group 15-24 years.

Social Class.	Tuberculous Households. Number.	Persons in Tuberculous Households. Observed Number.	Observed Per Cent of Total.	Expected Number.	Expected Per Cent of Total.
II	2	11	5.8	13.0	7.6
III	5	35	18.5	35.8*	21.0
IV	13	97	51.3	85.3	50.1
V	5	46	24.3	36.1	21.2
All Classes	25	189	100.0	170.2	100.0

* In social class III the size of a tuberculous household with five persons at ages 15-24 years has been taken as the expected figure. The size of the household was nine. In the 'simple population' the average size of a household with four persons at ages 15-24 years was 8.3.

The differences between the observed and the expected numbers varies little in social classes II and III. For

social classes IV and V, the observed and the expected figures have been compared by the x^2 test, but the differences are not significant.

TABLE 47.

Persons in Tuberculous Households.

Social Class.	Number. Observed	Expected	Difference ± 0.5	Difference^2	x^2 = Difference^2 / Expected
IV	97	85.3	11.2	125.44	1.47
V	46	36.1	9.4	88.36	2.45
All Classes	189	170.2	18.3	334.89	1.97

For significance x^2 would require to equal or exceed 3.84.

Contact Cases:

Again the data are inadequate for the drawing of any conclusion as to the prevalence of 'contact' cases in any one social class, a problem complicated by the varying size of the household with social class.

TABLE 48./

TABLE 48.

Incidence of 'Contact' Cases of Respiratory Tuberculosis. (Contact Cases - Tuberculous Cases living or having lived within five years in the same house as a case of Respiratory Tuberculosis).

Social Class.	Respiratory Tuberculosis. All Cases.	'Contact' Cases.
II	2	0
III	6	2*
IV	13	3
V	5	1
All Classes	26	6

* Both cases occurred in one family.

Extension of the Survey:

To answer questions relating to the influence of social class on the incidence of respiratory tuberculosis and on the occurrence of 'contact' cases, an extension of the survey will be required over a number of years to obtain adequate data. The area consisting of modern houses of standard design will not be subject to the housing activities of the local authority as will be the wards of the City. Changes of tenancy can be obtained from the City Factor's department. It will be necessary

to obtain the mid-year population of the age group 15-24 years in each successive year and by summation to obtain the distribution of the population at risk, that is in the age group 15-24 years, according to social class, as a control for the cases of respiratory tuberculosis between 15 and 24 years notified over the period of extended survey. A visit to each house of the random sample will be necessary each year because of changes in the 'population' under review, due to marriage and death and unemployment. Marriage, while affecting persons between 15 and 19 years but little, affects some 20 per cent of males and some 38 per cent of females between 20 and 24 years.

While the visiting of some 400 houses annually may seem a considerable task, the proximity of the houses and the previous knowledge of the composition and employment of the household and of the social class assessment will require only a brief call in the majority of instances. The people concerned have been very co-operative.

In the survey area, nine changes of tenancy occurred in 1951 and ten in 1952. The distribution of the households and the persons in the households, with the corresponding distribution at 31st December, 1951, are shown in Table 49.

TABLE 49./

TABLE 49.

Comparison of the Household and Persons distribution in 19 houses in which a change of tenancy occurred in 1951 and 1952 with the corresponding figures for the 19 Households in occupation at 31.12.1951.

	Households in Occupancy at 31.12.1951.		Households in Occupancy at some time in 1951 and 1952 other than at 31.12.51.	
Social Class	Number of Households	Number of Persons	Number of Households	Number of Persons.
II	1	6	1	6
III	7	34	10	51
IV	7	38	7	36
V	4	24	1	9
All Classes	19	102	19	102

It appears, therefore, desirable to consider the notifications of respiratory tuberculosis in the age group 15-24 years and to consider them in relation to the corresponding population in the control sample, but to obtain adequate data the survey will require to be extended over a number of years. At present the data are inadequate for the drawing of any conclusion.

* * * * * * *

CHAPTER 12.

IN CONCLUSION.

The rapid fall in the mortality of tuberculosis with modern chemotherapy and the influence on Ward death rates of the rehousing of tuberculous families has emphasized the importance of the study within the City of the notifications of Respiratory Tuberculosis.

In two areas of the City selected for the study of the influence of housing, one in which the case rate was relatively high and in the other low, while housing conditions were unsatisfactory in the former as compared with the latter, in the latter, there was evidence of an association between the tuberculous household and over-crowding. This association was very possibly merely a reflection of the larger average size of the tuberculous household, for overcrowding, more than two persons per room, very readily occurs in one and two roomed houses as the family increases in number. Certainly, in both areas, the average size of the tuberculous family was significantly larger than the average size of other families, and no association was found between the occurrence of respiratory tuberculous and the other aspects of housing considered; the fitness of a house for habitation, the number of rooms in the house, and the

number of rooms occupied by the household. Again, the average size of a family tends to vary as the number of persons in the age group 15-24 years, the age of special susceptibility.

These results are more consistent with the incidence of respiratory tuberculosis in localised areas being one of general prevalence rather than of any close association with housing conditions. It might have been expected from the congested and bad arrangement of houses, that the extent of infection would be much more widespread in the one area as compared with the other, but a consideration of the results of the tuberculin testing of the 13-year-old child population produced no evidence in confirmation of this, though a large number of children remained untested. As almost 60 per cent. of the children tested were tuberculin negative and, therefore, would have gone forward into adolescence without the protection of acquired resistance and having regard to the opinion expressed by the Medical Research Council's Sub-Committee on Mass Miniature Radiography, "In the opinion of the Sub-Committee the low incidence of pulmonary tuberculosis found by examining school leavers, 0.15 per cent., does not make the procedure worth while in this group....." (Ministry of Health Circular H.M. (54) 82, 7.9.1954), it seems not unreasonable to conclude that the factors determining the

incidence of manifest tuberculosis begin to operate after school life, in adolescence and in young adult life. Unemployment, poverty and overwork are not special features of modern life. Regarding the use of public transport, the bus queues at peak periods make it difficult to believe that this, as a factor, will operate mainly on any one section of the community.

Attention, therefore, is naturally directed to conditions of employment and the use or abuse of leisure. It was considered that the Registrar General's Social Classification according to occupation might give a broad indication of differences in the influence of these factors in the social structure, but the survey carried out has not provided sufficient data for any conclusion to be drawn and an extended period of the survey will be required to allow for the accumulation of more data.

Obviously the wider a person's contact with the general public and, especially, under conditions entailing close contact, the greater are the opportunities for the passage of infection. The great danger to the tuberculous family emphasizes the importance of the magnitude of the infecting dose and of the possible duration of exposure, and of the tracing of contacts among relatives, friends and at work, as for any serious epidemic illness, with their examination by x-rays and the early treatment of those with manifest

disease and the protection of others by all available means, especially, the immediate family of the patient. It is better, in the first instance, that infection in cases of respiratory tuberculosis under 35 years should be regarded as of 'recent' origin and not the result of infection at some remote date favoured by a present lowering of resistance on the part of the individual.

McKinlay (Health Bulletin, May 1947) drew attention to a dissimilarity, he found, in the trends of mortality from tuberculosis and housing over the 20 year period 1911-1931. While there was a progressive improvement in the mortality throughout the period, the improvement in housing was mainly confined to the second half. He found, for the Counties inclusive of large Burghs, a very high correlation, almost complete agreement, between the housing conditions of 1911 and 1931. "The black spots of 1911 remained black in 1931." On the other hand, while there was a high correlation in the distribution of pulmonary tuberculosis between 1911 and 1931, the correlation was of a significantly lower order and 'clearly the rate of decline in individual counties has by no means been similar. For non-pulmonary tuberculosis there is no correspondence whatever between its geographical distribution at the two periods.' From a study of the degree of correlation between mortality and housing conditions he concluded, 'so far as these units are

concerned, one is justified in concluding that the geography of pulmonary tuberculosis mortality in Scotland is not at all, far less principally, determined by conditions of housing, and that, if adverse housing is in anyway approaching the importance generally believed in determining the level of mortality from this disease, other factors must be operative - factors, moreoever, which must be negatively correlated with the housing status (i.e. worst where housing is best) and of sufficient importance completely to obliterate in these data any evidence of a housing influence good or bad. .....the unavoidable feeling of being 'odd man out' was to some extent dispelled when my attention was drawn to a paper read by R. J. Peters ("Environment and Tuberculosis: Housing") at the 19th Annual Conference of the National Association for the Prevention of Tuberculosis, Cardiff 1933. On the basis of the figures he analysed for Glasgow for notifications of pulmonary tuberculosis he concluded that "the specific influence of overcrowding is much less evident than one would expect....." These Scottish mortality data do not support the view that overcrowding is a factor of importance in determining the variations of pulmonary tuberculosis, and, while there was some relation for non-pulmonary forms thirty years ago, this too seems to have largely disappeared.'

In their paper on a survey of pulmonary tuberculosis

in the Rhondda Fach, (a coal-mining community in the Little Rhondda valley), Cochrane, Glyn Cox and Francis Jarman (British Medical Journal, February 12, 1955) have provided much interesting information.

In 1950-51 89.0 per cent. of the inhabitants of the Rhondda Fach over the age of 15 were x-rayed and with the co-operation of the Welsh Regional Hospital Board it was possible to offer immediate admission to hospital of all 'active' cases. B.C.G. vaccine, for the reasons given, was confined to tuberculin negative children under five years and to older 'contacts', if their parents so wished.

The results of the Mantoux testing of the school children is summarized in Figure 6 of the paper and it is of interest to note that the sharp rise in the percentage of tuberculin positive reactors at ages 17 and 18 at the original survey in 1950/1951 when all those thought to be suffering from active tuberculosis were hospitalised, with two exceptions, was not found in 1953. This suggests a reduction in the spread of infection in adolescence.

In discussing the attack rate of tuberculosis and comparing their figures with the measurement of the attack rate made by Springett (1951, B.M.J., 2, 144) they came to the tentative conclusion that 'there was probably a reduction in the attack rate of tuberculosis.' They found, as they expected, that it was not possible to keep all the

infectious cases in hospital and after the first few months there were nearly always 40 known infectious cases in the valley (Estimated population 26,184). "Of the 112 infectious cases known to us at the time of the first survey, all but two had had treatment and many had had surgical treatment. In 1953, 14 were dead and 35 were still sputum positive. This is a rude reminder that the therapeutic battle is only half won."

From the paper two facts seem of special importance, a probable reduction in the spread of infection in the adolescent community and a probable reduction in the attack rate from tuberculosis following early hospitalisation of the infectious case.

From the preventive aspect and especially for the protection of the immediate family of the patient, the admission to hospital within the first two weeks of all newly diagnosed cases of respiratory tuberculosis is most important, and probably most beneficial to the community, even if it should mean the reduction in the overall length of stay of the patient, and 'second best' arrangements should be assessed at their true value. With the great advances in therapy and with the knowledge of how much can be done for the patient, there is a quite serious danger of hospital staffs not sufficiently comprehending the wider aspects of prevention which, unlike treatment, is

not dramatic, but will add up to more in human happiness. To the score of tuberculosis must be added not only actual deaths, but the years occupied in treatment and the anxiety and danger to the patient and his family.

Macgregor (1955, Health Bulletin XIII,I) "In recent years the introduction of chemotherapy has led to a considerable extension of out-patient or home treatment when domestic conditions are favourable ..... In many cases the first demand for hospitalisation occurs when surgical intervention is deemed necessary after a period of medical treatment.....

There can be no doubt that recent advances in medical treatment, earlier case recognition and improved housing have brought an increasing number of the tuberculous within the range of effective cure without hospitalisation."

Immediate hospitalisation of all new cases would result in many cases being rendered non-infectious under conditions of isolation, the patient would be placed under the best possible conditions for the early weeks of treatment, the immediate danger of further infection to the household would be removed while steps were being taken for their protection and adjustment to their altered circumstances. The situation, for the moment, is eased for the household who have more freedom for attendance at centres for clinical and x-ray examination, tuberculin testing and

B.C.G. vaccination where indicated. If effective cure is possible without recourse to hospital, more benefit to patient and community would result from the immediate removal to hospital and earlier return home, to continue treatment and make way for others, of those who were or had become non-infectious and whose condition had become stabilised. Obviously all patients cannot be kept under isolation in hospital while infectious, but many can, and those that can and are, will be removed as potential sources of infection from the community, and even a curtailed period of treatment in hospital would allow of preventive action being taken on behalf of the family in the absence of immediate danger. Provision for more rapid preventive action is required and for this, the immediate removal to hospital of the patient, say within two weeks, seems essential.

To account for the present high level of notifications it has been suggested that we may be 'delving more and more into the reservoir of active cases that would hitherto have gone undetected.....' (Leading Article, Brit.Med.Journal, August 14, 1954). This, however, can be only partially true as shown in Table 50, and obviously, unless the mortality rate had, with the passage of time, changed for the worse, the increased number of deaths in the years immediately preceding the introduction of 'chemotherapy'

must have been associated with an increased number of cases.

TABLE 50.

Respiratory Tuberculosis.

Period	Average Annual Deaths	Average Annual Notifications	Actual Notifications Expressed as a Percentage of the * Expected	Expected Notifications as a Percentage of the Expected Number in 1930-1934
1930-34	915	1,674	77.3	100.0
1935-39	968	1,676	73.1	105.8
1940-44	1,126	2,367	88.7	123.2
1945-49	1,166	2,764	100.0	127.5
1950-54	619	2,297	-	-

* Expected number estimated from the number of deaths and based on the ratio of cases to deaths in the period 1945-1949, the quinquennium immediately preceding the introduction of the new drugs, streptomycin, P.A.S., and the derivatives of Isonicotinic Acid.

The danger to the household contacts of a tuberculous patient is grave. There is no evidence of more overcrowding in the households of 'contact' cases than in other cases of tuberculosis, though the rehousing of the overcrowded family in which there is an actively infectious case must be taken into account. Hope lies with the early hospitalisation of

the active case and B.C.G. vaccination of the tuberculin negative reactors, together with the new drugs. The importance of the acquired resistance from vaccination should be capable of accurate assessment within the next few years. From the social aspect we must look beyond housing to other problems of adolescent and young adult life, such as conditions of employment and the use of leisure. Contacts should be traced as in other serious infections, x-rayed, and the tuberculin negative reactors vaccinated. Control of employment of the 'open' case under conditions of segregation from susceptible contacts is necessary, with assistance to minimise economic loss. The protection of the community, if to be successful, cannot be wholly at the expense of the individual. Dissipation of effort is bad, and while the follow up of contacts in employment is necessary, in the first instance effort could be concentrated on the examination of the contacts in employment of young adult female cases. Respiratory tuberculosis should be dealt with as an infectious disease of 'recent' origin when occurring in the young members of the community.

* * * * * * *

In 1954, the notifications of respiratory tuberculosis in Glasgow fell to 2,199, 169 less than in 1953, a reduction of 7.1 per cent on the 1953 figure and 8 or 0.4 per cent less than the notifications in 1951, previously the lowest since 1942.

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APPENDIX.

INDEX TO TABLES.

INDEX TO TABLES (Continued).

Table 1.

Annual Incidence of Notifications and Deaths from Respiratory Tuberculosis.

Glasgow, 1931-1953.

	CASES			DEATHS		
	Male	Female	Both Sexes	Male	Female	Both Sexes
1931	935	767	1,702	503	438	941
1932	968	754	1,722	533	441	974
1933	926	690	1,616	539	370	909
1934	868	778	1,646	482	391	873
1935	936	821	1,757	522	450	972
1936	910	737	1,647	542	437	979
1937	878	776	1,654	540	415	955
1938	975	773	1,748	534	426	960
1939	852	722	1,574	537	435	972
1940	996	910	1,908	664	518	1,182
1941	1,094	972	2,066	615	540	1,155
1942	1,220	1,104	2,324	549	553	1,102
1943	1,429	1,349	2,778	561	498	1,059
1944	1,434	1,324	2,758	606	528	1,134
1945	1,326	1,315	2,641	586	499	1,085
1946	1,506	1,303	2,809	613	572	1,185
1947	1,454	1,311	2,765	605	568	1,173
1948	1,399	1,376	2,775	692	575	1,267
1949	1,455	1,374	2,829	580	541	1,121
1950	1,276	1,170	2,446	507	446	953
1951	1,167	1,040	2,207	429	265	694
1952	1,193	1,071	2,264	341	230	571
1953	1,281	1,087	2,368	307	164	471

Table 2.

Notifications of Respiratory Tuberculosis.

Rates per 100,000 for Age and Sex.

Glasgow - 1931 and 1951.

Age in Years	1931					
	MALE			FEMALE		
	Population	Cases of Pulmonary Tuberculosis	Rate per 100,000	Population	Cases of Pulmonary Tuberculosis	Rate per 100,000
-5	49,809	25	50.20	49,168	35	71.18
-15	99,776	79	79.18	98,843	92	93.08
-25	94,959	246	259.06	103,714	274	264.19
-35	81,385	195	239.60	92,610	184	198.68
-45	66,647	172	258.08	76,391	83	108.65
-55	59,831	119	198.89	64,065	61	95.22
-65	45,595	84	184.23	45,078	29	64.33
65 & over	26,467	15	56.67	34,113	9	26.71
Age not stated:	6	-	-	4	-	-
All Persons:	524,475	935	178.27	563,986	767	136.00
	1951					
-5	50,833	51	100.33	48,515	54	111.31
-15	86,271	76	88.09	84,728	99	116.84
-25	75,063	307	408.99	86,886	494	568.56
-35	77,021	189	245.39	82,228	238	289.44
-45	76,923	187	243.10	82,930	107	129.02
-55	66,783	166	248.57	75,199	48	63.83
-65	45,586	126	276.40	57,100	35	61.30
65 & over	40,337	65	161.14	53,245	15	28.17
Age not stated:	54	-	-	65	-	-
All Persons:	518,871	1,167	224.91	570,896	1,040	182.17

Table 3.

Deaths from Respiratory Tuberculosis.

Rates per 100,000 for Age and Sex.

Glasgow - 1931 and 1951

Age in Years	1931 MALE Population	1931 MALE Deaths from Pulmonary Tuberculosis	1931 MALE Rate per 100,000	1931 FEMALE Population	1931 FEMALE Deaths from Pulmonary Tuberculosis	1931 FEMALE Rate per 100,000
-5	49,809	7	14.05	49,168	18	36.61
-15	99,776	8	8.02	98,843	24	24.28
-25	94,959	119	125.32	103,714	156	150.41
-35	81,385	100	122.87	92,610	99	106.90
-45	66,647	101	151.54	76,391	68	89.02
-55	59,831	92	153.77	64,065	39	60.88
-65	45,595	60	131.59	45,078	27	59.90
65 & over	26,467	16	60.45	34,113	7	20.52
Age not stated:	6	-	-	4	-	-
All Persons:	524,475	503	95.91	563,986	438	77.66
			1951			
-5	50,833	7	13.77	48,515	11	22.67
-15	86,271	2	2.32	84,728	4	4.72
-25	75,063	37	49.29	86,886	72	82.87
-35	77,021	56	72.71	82,228	61	74.18
-45	76,923	69	89.70	82,930	49	59.09
-55	66,783	89	133.27	75,199	24	31.92
-65	45,586	107	234.72	57,100	23	40.28
65 & over	40,337	62	153.71	53,245	21	39.44
Age not stated:	54	-	-	65	-	-
All Persons	518,871	429	82.68	570,896	265	46.42

Table 4.

Notifications and Deaths from Respiratory Tuberculosis.

Glasgow - 1953.

Age in Years	MALE		FEMALE	
	Cases	Deaths	Cases	Deaths
-5	60	2	46	5
-15	91	2	104	1
-25	349	14	475	31
-35	210	37	242	41
-45	154	40	128	37
-55	190	70	48	20
-65	157	89	27	17
65 & over	70	53	17	12
All Persons	1,281	307	1,087	164

Table 5.

Population of Glasgow and of Northern Division.

Age and Sex Constitution - Census Report, 1951.

Includes Institutional Population.

Sex	Age	City	Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	50,833	1,357	1,421	1,868	1,611	1,575	2,148	1,298	1,204	12,482
	5-14	86,271	2,146	3,283	2,811	2,490	2.071	3,951	1,946	2.098	20,796
	15-24	75,063	1,798	3,203	2,029	1,733	1,580	4,224	1,314	2,058	17,939
	25-34	77,021	2,058	2,295	2,682	2,118	2,077	3,301	1,981	1,823	18,335
	35-44	76,923	2,010	2,248	2,567	2,016	2,055	2,618	1,994	1,769	17,277
	45-54	66,783	1,661	2,302	1,979	1,496	1,510	2,691	1,540	1,490	14,669
	55-64	45,586	1,132	1,310	1,347	967	963	2,013	978	974	9,684
	65-74	29,271	942	710	1,066	744	692	1,043	665	677	6,539
	75 & over	11,066	460	233	467	269	271	306	238	251	2,495
Female	0-4	48,515	1,368	1,411	1,864	1,619	1,466	1,935	1,169	1,207	12,039
	5-14	84,728	2,215	3,181	2,739	2,465	2,142	3,844	1,968	1,997	20,551
	15-24	86,886	2,048	3,980	2,733	1,991	1,892	4,794	1,679	2,090	21,207
	25-34	82,228	2,221	2,461	2,859	2,196	2,290	3,254	2,132	1,915	19,328
	35-44	82,930	2,092	2,680	2,661	1,945	2,150	2,829	2,229	1,870	18,456
	45-54	75,199	1,783	2,387	2,081	1,519	1,592	3,153	1,853	1,755	16,123
	55-64	57,100	1,297	1,450	1,634	1,075	1,299	2,363	1,386	1,201	11,705
	65-74	37,107	935	778	1,113	705	949	1,093	980	792	7,345
	75 & over	16,138	474	316	499	269	369	369	464	340	3,100
Total:		1,089,648	27,997	35,649	34,999	27,228	26,943	45,929	25,814	25,511	250,070
Male: Not stated		54	0	0	3	0	2	0	2	3	10
Female: Not stated		65	1	0	3	1	1	0	1	1	8
Total Male		518,871	13,564	17,005	16,819	13,444	12,796	22,295	11,956	12,347	120,226
Total Female		570,896	14,434	18,644	18,186	13,785	14,150	23,634	13,861	13,168	129,862
Total Both Sexes		1,089,767	27,998	35,649	35,005	27,229	26,946	45,929	25,817	25,515	250,088
Male	65 and over	40,337	1,402	943	1,533	1,013	963	1,349	903	928	9,034
Female	65 and over	53,245	1,409	1,094	1,612	974	1,318	1,462	1,444	1,132	10,445

Table 6 (1)

Deaths for the City from Various Causes - 1950-52.

Age and Sex Grouping

		Deaths from all Causes					Deaths from Cardiovascular Disease					Deaths from Malignant Neoplasms				
		1950	1951	1952	3 yrs.	⅓ 3yrs.	1950	1951	1952	3yrs.	⅓3yrs.	1950	1951	1952	3yrs.	⅓ 3yrs.
Male	0-4	613	599	533	1,745	582	1	0	1	2	1	4	3	3	10	3
	5-14	70	82	56	208	69	4	1	0	5	2	5	9	3	17	6
	15-24	141	115	90	346	115	10	12	10	32	11	9	9	6	24	8
	25-34	191	182	144	517	172	18	22	21	61	20	22	27	17	66	22
	35-44	370	345	281	996	332	64	76	44	184	61	59	57	51	167	56
	45-54	863	844	830	2,537	846	227	217	224	668	223	175	188	197	560	187
	55-64	1,475	1,493	1,421	4,389	1,463	414	469	457	1,340	447	336	304	336	976	325
	65-74	1,906	2,000	2,003	5,909	1,970	632	699	687	2,018	673	367	343	374	1,084	361
	75 & over	1,700	1,869	1,850	5,419	1,806	647	720	648	2,015	672	199	215	234	648	216
Female	0-4	456	494	437	1,387	462	1	0	0	1	0	3	3	3	9	3
	5-14	53	46	40	139	46	8	4	5	17	6	3	1	2	6	2
	15-24	211	120	136	467	156	17	11	13	41	14	2	6	8	16	5
	25-34	267	173	175	615	205	32	21	29	82	27	15	24	16	55	18
	35-44	310	298	275	883	294	57	57	56	170	57	65	70	66	201	67
	45-54	544	553	548	1,645	548	134	121	133	388	129	153	145	147	445	148
	55-64	1,055	1,077	1,029	3,161	1,054	300	295	301	896	299	268	274	249	791	264
	65-74	1,742	1,797	1,738	5,277	1,759	629	625	592	1,846	615	295	311	310	916	305
	75 & over	2,122	2,225	2,254	6,601	2,200	811	942	910	2,663	888	207	192	211	610	203
Total:		14,089	14,312	13,840	42,241	14,079	4,006	4,292	4,131	12,429	4,145	2,187	2,181	2,233	6,601	2,199

Table 6 (11)

Deaths for the City from Various Causes - 1950-1952.

Age and Sex Grouping

Sex and Age		Deaths from Vascular Lesions affecting C.N.S.					Deaths from Respiratory Disease other than T.B.				
		1950	1951	1952	3yrs.	⅓ 3yrs.	1950	1951	1952	3 yrs.	⅓ 3yrs.
Male	0-4	0	2	2	4	1	86	82	70	238	79
	5-14	2	0	0	2	1	3	1	1	5	2
	15-24	3	2	0	5	2	5	6	2	13	4
	25-34	3	4	5	12	4	7	10	8	25	8
	35-44	11	12	8	31	10	34	27	26	87	29
	45-54	45	40	37	122	41	95	112	123	330	110
	55-64	114	136	121	371	124	224	226	202	652	217
	65-74	284	315	326	925	308	203	257	210	670	223
	75 & over	283	325	386	994	331	189	220	208	617	206
Female	0-4	0	0	2	2	1	69	64	53	186	62
	5-14	1	3	2	6	2	2	3	3	8	3
	15-24	2	0	5	7	2	5	4	6	15	5
	25-34	3	3	1	7	2	10	9	9	28	9
	35-44	10	11	13	34	11	22	19	26	67	22
	45-54	63	68	65	196	65	42	43	44	129	43
	55-64	167	167	145	479	160	77	88	101	266	89
	65-74	376	331	336	1,043	348	123	175	168	466	155
	75 & over	410	414	450	1,274	425	203	223	215	641	214
Total:		1,777	1,833	1,904	5,514	1,838	1,399	1,569	1,475	4,443	1,480

Table 6 (111)

Deaths for the City from Various Causes - 1950-1952.

Age and Sex Grouping

Sex and Age		Deaths from Tuberculosis - All Forms					Deaths from Other Causes				
		1950	1951	1952	3yrs.	⅓ 3yrs.	1950	1951	1952	3yrs.	⅓ 3 yrs.
Male	0-4	43	25	15	83	28	479	487	442	1,408	469
	5-14	9	15	8	32	11	47	56	44	147	49
	15-24	70	46	20	136	45	44	40	52	136	45
	25-34	82	57	44	183	61	59	62	49	170	57
	35-44	97	70	59	226	75	105	103	93	301	100
	45-54	114	91	77	282	94	207	196	172	575	192
	55-64	95	111	78	284	95	292	247	227	766	255
	65-74	50	55	51	156	52	370	331	355	1,056	352
	75 & over	10	11	16	37	12	372	378	358	1,108	369
Female	0-4	31	27	22	80	27	352	400	357	1,109	370
	5-14	16	10	9	35	12	23	25	19	67	22
	15-24	152	78	66	296	99	33	21	38	92	31
	25-34	152	66	66	284	95	55	50	54	159	53
	35-44	78	53	48	179	60	78	88	66	232	77
	45-54	39	28	24	91	30	113	148	135	396	132
	55-64	27	26	23	76	25	216	227	210	653	218
	65-74	12	18	10	40	13	307	337	322	966	322
	75 & over	5	5	7	17	6	486	449	461	1,396	465
Total:		1,082	792	643	2,517	841	3,638	3,645	3,454	10,737	3,578

Table 7(1)

Index Deaths from Various Causes - 1951.

Wards of Northern Division

Sex and Age		Mean Deaths 1950-52 per 1,000 Gl. 1951.	Index Deaths from All Causes								
			Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	11.45	15.5	16.3	21.4	18.4	18.0	24.6	14.9	13.8	143.5
	5-14	0.80	1.7	2.6	2.2	2.0	1.7	3.2	1.6	1.7	16.6
	15-24	1.53	2.8	4.9	3.1	2.7	2.4	6.5	2.0	3.1	27.4
	25-34	2.23	4.6	5.1	6.0	4.7	4.6	7.4	4.4	4.1	40.9
	35-44	4.31	8.7	9.7	11.1	8.7	8.9	11.3	8.6	7.6	74.5
	45-54	12.67	21.0	29.2	25.1	19.0	19.1	34.1	19.5	18.9	185.9
	55-64	32.09	36.3	42.0	43.2	31.0	30.9	64.6	31.4	31.3	310.8
	65-74	67.31	63.4	47.8	71.8	50.1	46.6	70.2	44.8	45.6	440.1
	75 & over	163.20	75.1	38.0	76.2	43.9	44.2	49.9	38.8	41.0	407.2
Female	0-4	9.52	13.0	13.0	17.7	15.4	14.0	18.4	11.1	11.5	114.6
	5-14	0.54	1.2	1.7	1.5	1.3	1.2	2.1	1.1	1.1	11.1
	15-24	1.80	3.7	7.2	4.9	3.6	3.4	8.6	3.0	3.8	38.2
	25-34	2.49	5.5	6.1	7.1	5.5	5.7	8.1	5.3	4.8	48.1
	35-44	3.55	7.4	9.5	9.4	6.9	7.6	10.0	7.9	6.6	65.5
	45-54	7.29	13.0	17.4	15.1	11.1	11.6	23.0	13.5	12.8	117.5
	55-64	18.46	24.0	26.8	30.2	19.8	24.0	43.6	25.6	22.2	216.1
	65-74	47.40	44.3	36.9	52.8	33.4	45.0	51.8	46.5	37.5	348.2
	75 & over	136.32	64.6	43.1	68.0	36.7	50.3	50.3	63.3	46.3	422.6
			405.8	355.7	466.8	314.2	339.2	487.7	343.3	313.7	3,028.8

Table 7 (11)

Index Deaths from Various Causes - 1951.
Wards of Northern Division.

Age and Sex	Mean Deaths 1950-52 per 100,000. Gl. 1951.	Index Deaths from Cardiovascular Disease								
		Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male 0-4	1.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
5-14	2.32	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.5
15-24	14.65	0.3	0.5	0.3	0.3	0.2	0.6	0.2	0.3	2.6
25-34	25.97	0.5	0.6	0.7	0.6	0.5	0.9	0.5	0.5	4.8
35-44	79.30	1.6	1.8	2.0	1.6	1.6	2.1	1.6	1.4	13.7
45-54	333.92	5.5	7.7	6.6	5.0	5.0	9.0	5.1	5.0	49.0
55-64	980.56	11.1	12.8	13.2	9.5	9.4	19.7	9.6	9.6	95.0
65-74	2,299.20	21.7	16.3	24.5	17.1	15.9	24.0	15.3	15.6	150.3
75 & over	6,072.65	27.9	14.1	28.4	16.3	16.5	18.6	14.5	15.2	151.5
Female 0-4	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-14	7.08	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1	1.5
15-24	16.11	0.3	0.6	0.4	0.3	0.3	0.8	0.3	0.3	3.4
25-34	32.84	0.7	0.8	0.9	0.7	0.8	1.1	0.7	0.6	6.3
35-44	68.73	1.4	1.8	1.8	1.3	1.5	1.9	1.5	1.3	12.7
45-54	171.54	3.1	4.1	3.6	2.6	2.7	5.4	3.2	3.0	27.7
55-64	523.64	6.8	7.6	8.6	5.6	6.8	12.4	7.3	6.3	61.3
65-74	1,657.37	15.5	12.9	18.4	11.7	15.7	18.1	16.2	13.1	121.7
75 & over	5,502.54	26.1	17.4	27.5	14.8	20.3	20.3	25.5	18.7	170.6
		122.7	99.3	157.2	87.7	97.4	135.3	101.6	91.0	872.8

Table 7 (111)

Index Deaths from Various Causes - 1951.

Wards of Northern Division

Age and Sex		Mean Deaths 1950-52 per 100,000 Gl. 1951	Index Deaths from Malignant Neoplasms								
			Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	5.90	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7
	5-14	6.95	0.1	0.2	0.2	0.2	0.1	0.3	0.1	0.1	1.4
	15-24	10.66	0.2	0.3	0.2	0.2	0.2	0.5	0.1	0.2	1.9
	25-34	28.56	0.6	0.7	0.8	0.6	0.6	0.9	0.6	0.5	5.2
	35-44	72.80	1.5	1.6	1.9	1.5	1.5	1.9	1.5	1.3	12.6
	45-54	280.01	4.7	6.4	5.5	4.2	4.2	7.5	4.3	4.2	41.1
	55-64	712.94	8.1	9.3	9.6	6.9	6.9	14.4	7.0	6.9	69.0
	65-74	1,233.30	11.6	8.8	13.1	9.2	8.5	12.9	8.2	8.3	80.6
	75 & over	1,951.92	9.0	4.5	9.1	5.3	5.3	6.0	4.6	4.9	48.7
Female	0-4	6.18	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7
	5-14	2.36	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.5
	15-24	5.75	0.1	0.2	0.2	0.1	0.1	0.3	0.1	0.1	1.2
	25-34	21.89	0.5	0.5	0.6	0.5	0.5	0.7	0.5	0.4	4.2
	35-44	80.79	1.7	2.2	2.1	1.6	1.7	2.3	1.8	1.5	14.9
	45-54	196.81	3.5	4.7	4.1	3.0	3.1	6.2	3.6	3.5	31.7
	55-64	462.35	6.0	6.7	7.6	5.0	6.0	10.9	6.4	5.6	54.1
	65-74	821.95	7.7	6.4	9.1	5.8	7.8	9.0	8.1	6.5	60.4
	75 & over	1,257.90	6.0	4.0	6.3	3.4	4.6	4.6	5.8	4.3	39.0
			61.6	56.8	70.7	47.8	51.4	78.7	52.9	48.5	467.9

Table 7 (IV)

Index Deaths from Various Causes - 1951.

Wards of Northern Division.

Age and Sex		Mean Deaths 1950-52 per 100,000. Gl. 1951.	Index Deaths from Vascular Lesions affecting C.N.S.								
			Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	1.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	5-14	1.16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	15-24	2.66	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.5
	25-34	5.19	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	1.0
	35-44	13.00	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	2.2
	45-54	61.39	1.0	1.4	1.2	0.9	0.9	1.7	0.9	0.9	9.0
	55-64	272.01	3.1	3.6	3.7	2.6	2.6	5.5	2.7	2.6	26.3
	65-74	1,052.24	9.9	7.5	11.2	7.8	7.3	11.0	7.0	7.1	68.8
	75 & over	2,991,14	13.8	7.0	14.0	8.0	8.1	9.2	7.1	7.5	74.6
Female	0-4	2.06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	5-14	2.36	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.5
	15-24	2.30	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.5
	25-34	2.43	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.5
	35-44	13.26	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.2	2.4
	45-54	86.44	1.5	2.1	1.8	1.3	1.4	2.7	1.6	1.5	13.9
	55-64	280.21	3.6	4.1	4.6	3.0	3.6	6.6	3.9	3.4	32.8
	65-74	937.83	8.8	7.3	10.4	6.6	8.9	10.3	9.2	7.4	68.9
	75 & over	2,633.54	12.5	8.3	13.1	7.1	9.7	9.7	12.2	9.0	81.6
			55.1	42.5	61.2	38.2	43.4	58.0	45.4	40.0	384.1

Table 7 (V)

Index Deaths from Various Causes - 1951.

Wards of Northern Division.

Age and Sex		Mean Deaths 1950-52 per 100,000. G1. 1951.	Index Deaths from Respiratory Disease other than Tuberculosis								
			Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	155.41	2.1	2.2	2.9	2.5	2.4	3.3	2.0	1.9	19.4
	5-14	2.32	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.5
	15-24	5.33	0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.1	1.0
	25-34	10.39	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	1.9
	35-44	37.70	0.8	0.8	1.0	0.8	0.8	1.0	0.8	0.7	6.5
	45-54	164.71	2.7	3.8	3.3	2.5	2.5	4.4	2.5	2.5	24.2
	55-64	476.02	5.4	6.2	6.4	4.6	4.6	9.6	4.7	4.6	46.1
	65-74	761.84	7.2	5.4	8.1	5.7	5.3	7.9	5.1	5.2	49.8
	75 & over	1,861.56	8.6	4.3	8.7	5.0	5.0	5.7	4.4	4.7	46.4
Female	0-4	127.80	1.7	1.8	2.4	2.1	1.9	2.5	1.5	1.5	15.4
	5-14	3.54	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7
	15-24	5.75	0.1	0.2	0.2	0.1	0.1	0.3	0.1	0.1	1.2
	25-34	10.95	0.2	0.3	0.3	0.2	0.3	0.4	0.2	0.2	2.1
	35-44	26.53	0.6	0.7	0.7	0.5	0.6	0.8	0.6	0.5	4.9
	45-54	57.18	1.0	1.4	1.2	0.9	0.9	1.8	1.1	1.0	9.2
	55-64	155.87	2.0	2.3	2.5	1.7	2.0	3.7	2.2	1.9	18.2
	65-74	417.71	3.9	3.2	4.6	2.9	4.0	4.6	4.1	3.3	30.7
	75 & over	1,326.06	6.3	4.2	6.6	3.6	4.9	4.9	6.2	4.5	41.1
			43.0	37.4	49.5	33.6	35.7	51.6	35.9	33.0	319.3

Table 7 (V1)

Index Deaths from Various Causes - 1951.

Wards of Northern Division.

Age and Sex		Mean Deaths 1950-52 per 100,000 living. Gl. 1951.	Index Deaths from Tuberculosis - All Forms								
			Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	55.08	0.7	0.8	1.0	0.9	0.9	1.2	0.7	0.7	6.9
	5-14	12.75	0.3	0.4	0.4	0.3	0.3	0.5	0.2	0.3	2.7
	15-24	59.95	1.1	1.9	1.2	1.0	0.9	2.5	0.8	1.2	10.8
	25-34	79.20	1.2	1.4	1.6	1.3	1.2	2.0	1.2	1.1	11.0
	35-44	97.50	2.0	2.2	2.5	2.0	2.0	2.6	1.9	1.7	16.8
	45-54	140.75	2.3	3.2	2.8	2.1	2.1	3.8	2.2	2.1	20.6
	55-64	208.40	2.4	2.7	2.8	2.0	2.0	4.2	2.0	2.0	20.2
	65-74	177.65	1.8	1.3	1.9	1.3	1.2	1.9	1.2	1.2	11.6
	75 & over	108.44	0.5	0.2	0.5	0.3	0.3	0.3	0.2	0.3	2.7
Female	0-4	55.65	0.8	0.9	1.0	0.9	0.8	1.1	0.7	0.7	6.7
	5-14	14.16	0.3	0.6	0.4	0.3	0.3	0.5	0.3	0.3	2.9
	15-24	113.94	2.3	4.5	3.1	2.3	2.2	5.5	1.9	2.4	24.2
	25-34	115.53	2.6	2.8	3.3	2.5	2.6	3.8	2.5	2.2	22.3
	35-44	72.35	1.5	1.9	1.9	1.4	1.6	2.0	1.6	1.4	13.4
	45-54	39.89	0.7	1.0	0.8	0.6	0.6	1.3	0.7	0.7	6.4
	55-64	43.78	0.6	0.6	0.7	0.5	0.6	1.0	0.6	0.5	5.1
	65-74	35.03	0.3	0.3	0.4	0.2	0.3	0.4	0.3	0.3	2.6
	75 & over	43.38	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.1	1.3
			21.6	26.8	26.5	20.0	20.1	34.8	19.2	19.2	188.2

Table 7 (V11)

Index Deaths from various Causes - 1951.

Wards in Northern Division

Age and Sex		Mean Deaths 1950-52 per 100,000 living Gl. 1951	Index Deaths from 'Other Causes'								
			Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
Male	0-4	922.63	12.5	13.1	17.2	14.9	14.5	19.8	11.9	11.1	115.2
	5-14	49.84	1.1	1.6	1.4	1.2	1.0	2.0	1.0	1.0	10.4
	15-24	59.95	1.1	1.9	1.2	1.0	0.9	2.5	0.8	1.2	10.8
	25-34	74.01	1.5	1.7	2.0	1.6	1.5	2.4	1.5	1.3	13.6
	35-44	130.00	2.6	2.9	3.3	2.6	2.7	3.4	2.6	2.3	22.5
	45-54	287.50	4.8	6.6	5.7	4.3	4.3	7.7	4.4	4.3	42.2
	55-64	559.38	6.3	7.3	7.5	5.4	5.4	11.3	5.5	5.4	54.2
	65-74	1,202.56	11.3	8.5	12.8	8.9	8.3	12.5	8.0	8.1	78.6
	75 & over	3,334.45	15.3	7.8	15.6	9.0	9.0	10.2	7.9	8.4	83.2
Female	0-4	762.65	10.4	10.8	14.2	12.3	11.2	14.8	8.9	9.2	91.8
	5-14	25.97	0.6	0.8	0.7	0.6	0.6	0.1	0.5	0.5	5.3
	15-24	35.68	0.7	1.4	1.0	0.7	0.7	1.7	0.6	0.7	7.6
	25-34	64.45	1.4	1.6	1.8	1.4	1.5	2.1	1.4	1.2	12.5
	35-44	92.85	1.9	2.5	2.5	1.8	2.0	2.6	2.1	1.7	17.1
	45-54	175.53	3.1	4.2	3.7	2.7	2.8	5.5	3.3	3.1	28.3
	55-64	381.79	5.0	5.5	6.2	4.1	5.0	9.0	5.3	4.6	44.7
	65-74	867.76	8.1	6.8	9.7	6.1	8.2	9.5	8.5	6.9	63.7
	75 & over	2,881.40	13.7	9.1	14.4	7.8	10.6	10.6	13.4	9.8	89.3
			101.4	94.1	120.9	86.4	90.2	128.6	87.6	80.8	791.0

Table 8.

Index Deaths (All Persons), Index Death Rates per 1,000,* and Adjusting Factors.

Area	Deaths from All Causes			Deaths from Cardiovascular Disease		
	Index Deaths	Index Death Rates per 1,000	Adjusting Factors	Index Deaths	Index Death Rates per 1,000	Adjusting Factors
City	14,079	12.9207	-	4,145	3.8040	-
Ward 8	405.8	14.4944	0.891	122.7	4.3826	0.868
,, 9	355.7	10.0339	1.288	99.3	2.7855	1.366
,, 10	466.8	13.3375	0.969	137.2	3.9201	0.970
,, 14	314.2	11.5396	1.120	87.7	3.2209	1.181
,, 15	339.2	12.5895	1.026	97.4	3.6150	1.052
,, 16	487.7	10.6186	1.217	135.3	2.9459	1.291
,, 17	343.3	13.2990	0.972	101.6	3.9358	0.967
,, 18	313.7	12.2967	1.051	91.0	3.5671	1.066
Division	3,028.8	12.1118	1.067	872.8	3.4902	1.090
	Deaths from Malignant Neoplasms			Deaths from Vascular Lesions of C.N.S.		
City	2,199	2.0181	-	1,838	1.6868	-
Ward 8	61.6	2.2002	0.917	55.1	1.9681	0.857
,, 9	56.8	1.5933	1.267	42.5	1.1922	1.415
,, 10	70.7	2.0201	0.999	61.2	1.7486	0.965
,, 14	47.8	1.7555	1.150	38.2	1.4030	1.202
,, 15	51.4	1.9077	1.058	43.4	1.6109	1.047
,, 16	78.7	1.7135	1.178	58.0	1.2628	1.336
,, 17	52.9	2.1005	0.961	45.4	1.7587	0.959
,, 18	48.5	1.9011	1.062	40.0	1.5680	1.076
Division	467.9	1.8711	1.079	384.1	1.5360	1.098

* Population with stated age. Where age not given, excluded. 119 such in City.

Table 8 (Contd.)

Area	Deaths from Respiratory Disease other than Tuberculosis			Deaths from Tuberculosis - All Forms		
	Index Deaths	Index Death Rates per 1,000	Adjusting Factors	Index Deaths	Index Death Rates per 1,000	Adjusting Factors
City	1,480	1.3582	-	841	0.7718	-
Ward 8	43.0	1.5359	0.884	21.6	0.7715	1.000
Ward 9	37.4	1.0491	1.295	26.8	0.7518	1.027
,, 10	49.5	1.4143	0.960	26.5	0.7572	1.019
,, 14	33.6	1.2340	1.101	20.0	0.7345	1.051
,, 15	35.7	1.3250	1.025	20.1	0.7460	1.035
,, 16	51.6	1.1235	1.209	34.8	0.7577	1.019
,, 17	35.9	1.3907	0.977	19.2	0.7438	1.038
,, 18	33.0	1.2936	1.050	19.2	0.7526	1.026
Division	319.3	1.2768	1.064	188.2	0.7526	1.026

Area	Deaths from 'Other Causes'		
	Index Deaths	Index Death Rates per 1,000	Adjusting Factors
City	3,578	3.2781	-
Ward 8	101.4	3.6218	0.905
,, 9	94.1	2.6368	1.243
,, 10	120.9	3.4544	0.949
,, 14	86.4	3.1732	1.033
,, 15	90.2	3.3478	0.979
,, 16	128.6	2.8000	1.171
,, 17	87.6	3.3935	0.966
,, 18	80.8	3.1673	1.035
Division	791.0	3.1631	1.036

Table 9.

Notifications and Index Cases of Respiratory Tuberculosis

City, 1950-1952.

Sex and Age		1950	1951	1952	3 yrs.	1/3 3 yrs.
Male	0-4	96	51	68	215	72
	5-14	104	76	86	266	89
	15-24	352	307	287	946	315
	25-34	221	189	222	632	211
	35-44	165	187	153	505	168
	45-54	167	166	203	536	179
	55-64	107	126	119	352	117
	65 and over	64	65	55	184	61
Female	0-4	78	54	50	182	61
	5-14	130	99	113	342	114
	15-24	520	444	463	1,427	476
	25-34	251	238	244	733	244
	35-44	105	107	113	325	108
	45-54	43	48	49	140	47
	55-64	26	35	22	83	28
	65 and over	17	15	17	49	16
All Persons		2,446	2,207	2,264	6,917	2,306
Total Male		1,276	1,167	1,193	3,636	1,212
Total Female		1,170	1,040	1,071	3,281	1,094

Table 10.

Index Cases of Respiratory Tuberculosis.

Northern Division

Mean Cases 1950-52 per 100,000 living Glasgow 1951	Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
141.6	1.9	2.0	2.6	2.3	2.2	3.0	1.8	1.7	17.7
103.2	2.2	3.4	2.9	2.6	2.1	4.1	2.0	2.2	21.5
419.6	7.5	13.4	8.5	7.3	6.6	17.7	5.5	8.6	75.3
274.0	5.6	6.3	7.3	5.8	5.7	9.0	5.4	5.0	50.2
218.4	4.4	4.9	5.6	4.4	4.5	5.7	4.4	3.9	37.7
268.0	4.5	6.2	5.3	4.0	4.0	7.2	4.1	4.0	39.3
256.7	2.9	3.4	3.5	2.5	2.5	5.2	2.5	2.5	24.9
151.2	2.1	1.4	2.3	1.5	1.5	2.0	1.4	1.4	13.7
125.7	1.7	1.8	2.3	2.0	1.8	2.4	1.5	1.5	15.1
134.5	3.0	4.3	3.7	3.3	2.9	5.2	2.6	2.7	27.6
547.8	11.2	21.8	15.0	10.9	10.4	26.3	9.2	11.4	116.2
296.7	6.7	7.3	8.5	6.5	6.8	9.7	6.3	5.7	57.3
130.2	2.7	3.5	3.5	2.5	2.8	3.7	2.9	2.4	24.0
62.5	1.1	1.5	1.3	0.9	1.0	2.0	1.2	1.1	10.1
49.0	0.6	0.7	0.8	0.5	0.6	1.2	0.7	0.6	5.7
30.0	0.4	0.3	0.5	0.3	0.4	0.4	0.4	0.3	3.1
All Persons	58.5	82.2	73.6	57.3	55.8	104.8	51.9	55.0	539.4
Total Male	31.1	41.0	38.0	30.4	29.1	53.9	27.1	29.3	280.3
Total Female	27.4	41.2	35.6	26.9	26.7	50.9	24.8	25.7	259.1

Table 11.

Respiratory Tuberculosis:
Index Cases, Index Case Rates per 1,000,
and Adjusting Factors.

ALL PERSONS

Area	Index Cases	Index Case Rate per 1,000	Adjusting Factors
City	2,306	2.1163	-
Ward 8	58.5	2.0895	1.013
,, 9	82.2	2.3058	0.918
,, 10	73.6	2.1029	1.006
,, 14	57.3	2.1045	1.006
,, 15	55.8	2.0710	1.022
,, 16	104.8	2.2818	0.927
,, 17	51.9	2.0105	1.053
,, 18	55.0	2.1559	0.982
Division:	539.4	2.1570	0.981

	MALES			FEMALES		
Area	Index Cases	Index Case Rate per 1,000	Adjusting Factors	Index Cases	Index Case Rate per 1,000	Adjusting Factors
City	1,212	2.3360	-	1,094	1.9165	-
Ward 8	31.1	2.2928	1.019	27.4	1.8984	1.010
,, 9	41.0	2.4111	0.969	41.2	2.2098	0.867
,, 10	38.0	2.2599	1.034	35.6	1.9579	0.979
,, 14	30.4	2.2612	1.033	26.9	1.9515	0.982
,, 15	29.1	2.2745	1.027	26.7	1.8871	1.016
,, 16	53.9	2.4176	0.966	50.9	2.1537	0.890
,, 17	27.1	2.2670	1.030	24.8	1.7893	1.071
,, 18	29.3	2.3737	0.984	25.7	1.9518	0.982
Division:	280.3	2.3316	1.002	259.1	1.9953	0.961

Table 12.

Deaths from Various Causes and Notifications of Respiratory Tuberculosis. Glasgow and the Wards of the Northern Division.

1951 and 1952.

Causes of Death	City	8	9	10	14	15	16	17	18	Division
DEATHS -	**1951**									
All causes	14,312	361	327	431	340	362	536	320	305	2,982
Cardiovascular Disease ...	4,292	100	105	122	102	91	136	111	103	870
Malignant Neoplasms	2,181	52	41	63	52	58	92	45	48	451
Vascular Lesions affecting the C.N.S.	1,833	40	45	49	33	48	67	54	37	373
Respiratory Disease other than Tuberculosis	1,569	38	27	53	38	49	61	33	31	330
Tuberculosis - All forms .	792	15	24	19	25	24	48	11	8	174
Other Causes	3,645	116	85	125	90	92	132	66	78	784
NOTIFICATIONS OF RESPIRATORY TUBERCULOSIS -										
All Persons	2,207	55	62	91	70	66	113	36	52	545
Males	1,167	31	26	50	40	34	51	21	28	281
Females ...	1,040	24	36	41	30	32	62	15	24	264
DEATHS -	**1952**									
All Causes	13,841	349	296	460	307	338	536	308	289	2,883
Cardiovascular Disease ...	4,131	94	83	111	81	88	130	100	92	779
Malignant Neoplasms	2,233	51	57	75	47	53	85	52	53	473
Vascular Lesions affecting the C.N.S.	1,904	47	38	63	37	46	63	50	46	390
Respiratory Disease other than Tuberculosis	1,475	46	30	60	36	43	68	35	24	342
Tuberculosis - All forms .	643	16	15	21	20	10	55	7	10	154
Other Causes	3,455	95	73	130	86	98	135	64	64	745
NOTIFICATIONS OF RESPIRATORY TUBERCULOSIS -										
All Persons	2,264	49	92	97	82	52	128	37	34	571
Males	1,193	26	37	52	35	27	58	16	16	267
Females	1,071	23	55	45	47	25	70	21	18	304

Table 13.

Private House Population.

Glasgow and Wards of the Northern Division.

1951 and 1952.

Area	All Persons*	Males$^{\phi}$	Females$^{\phi}$
	1951		
City	1,089,767	518,871	570,896
Ward 8	26,757	12,950	13,807
,, 9	32,850	15,669	17,181
,, 10	32,914	15,799	17,115
,, 14	26,746	13,213	13,533
,, 15	26,322	12,503	13,819
,, 16	45,157	21,901	23,256
,, 17	25,743	11,919	13,824
,, 18	24,187	11,707	12,480
Division: ..	240,676	115,661	125,015
	1952 (Estimate)		
City	1,086,800	517,317	569,483
Ward 8	26,654	12,901	13,753
,, 9	34,724	16,563	18,161
,, 10	32,315	15,511	16,804
,, 14	25,826	12,758	13,068
,, 15	24,973	11,862	13,111
,, 16	47,881	23,222	24,659
,, 17	25,298	11,713	13,585
,, 18	23,762	11,501	12,261
Division ...	241,433	116,031	125,402

* For the City, the numbers given are the total population in the City as quoted in the Annual Reports of the Medical Officer of Health, while for the wards, they are the population, exclusive of institutions and shipping, as quoted in the reports.

$^{\phi}$ The sex distribution has been estimated from the ratio of males to females at the Census.

Table 14.

Death Rates from Various Causes and Case Rates for Respiratory Tuberculosis per 1,000 of the Population - Glasgow and Wards of Northern Division. 1951 and 1952.

Causes of Death	City	Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Northern Division
DEATH RATES - 1951 -										
All Causes	13.13	13.49	9.95	13.10	12.71	13.75	11.87	12.43	12.61	12.39
Cardiovascular Disease	3.94	3.74	3.20	3.71	3.81	3.46	3.01	4.31	4.26	3.61
Malignant Neoplasms	2.00	1.94	1.25	1.91	1.94	2.20	2.04	1.75	1.98	1.87
Vascular Lesions affecting the C.N.S.	1.68	1.50	1.37	1.49	1.23	1.82	1.48	2.10	1.53	1.55
Respiratory Disease other than Tuberculosis	1.27	1.42	0.82	1.61	1.42	1.86	1.35	1.28	1.28	1.37
Tuberculosis - All Forms	0.73	0.55	0.73	0.58	0.93	0.91	1.06	0.43	0.33	0.72
Other Causes	3.34	4.34	2.59	3.80	3.36	3.50	2.92	2.56	3.22	3.26
CASE RATES - 1951 -										
Respiratory Tuberculosis - All Persons	2.03	2.06	1.89	2.76	2.62	2.51	2.50	1.40	2.15	2.26
Males	2.25	2.39	1.66	3.16	3.03	2.72	2.33	1.76	2.39	2.43
Females	1.82	1.74	2.10	2.40	2.22	2.32	2.67	1.09	1.92	2.11
DEATH RATES - 1952 -										
All Causes	12.74	13.09	8.52	14.23	11.89	13.53	11.19	12.17	12.16	11.94
Cardiovascular Disease	3.80	3.53	2.39	3.43	3.14	3.52	2.72	3.95	3.87	3.23
Malignant Neoplasms	2.05	1.91	1.64	2.32	1.82	2.12	1.78	2.06	2.23	1.96
Vascular Lesions affecting the C.N.S.	1.75	1.76	1.09	1.95	1.43	1.84	1.32	1.98	1.94	1.62
Respiratory Disease other than Tuberculosis	1.36	1.73	0.86	1.86	1.39	1.72	1.42	1.38	1.01	1.42
Tuberculosis - All Forms	0.59	0.60	0.43	0.65	0.77	0.40	1.15	0.28	0.42	0.64
Other Causes	3.18	3.56	2.10	4.02	3.33	3.92	2.82	2.53	2.69	3.09
CASE RATES - 1952 -										
Respiratory Tuberculosis - All Persons	2.08	1.84	2.65	3.00	3.18	2.08	2.67	1.46	1.43	2.37
Males	2.31	2.02	2.23	3.35	2.74	2.28	2.50	1.37	1.39	2.30
Females	1.88	1.67	3.03	2.68	3.60	1.91	2.84	1.55	1.47	2.42

Table 15.

Estimated Size of Ward Samples.

Ward Sample is that fraction of the City Population for 1951 given by the Ratio of the Index Deaths for the Ward for the Particular Cause or Causesestimated when determining the adjusting factor, to the Index Deaths for the City, the sum of the Mean Deaths over the three years 1950, 1951 and 1952 for the various Age Groups of both sexes.

1951 - Estimated Size of Ward Sample - Deaths.

Area	All Causes	Cardio-vascular Disease	Malignant Neoplasms	Vascular Lesions affecting the C.N.S.	Respiratory Disease other than Tuberculosis	Tuberculosis 'All Forms'	Other Causes
Ward 8	31,410	32,259	30,527	32,669	31,662	25,989	30,884
,, 9	27,532	26,107	28,149	25,199	27,539	34,727	28,660
,, 10	36,132	36,071	35,037	36,286	36,448	34,339	36,823
,, 14	24,320	23,057	23,688	22,649	24,741	25,916	26,315
,, 15	26,255	25,608	25,472	25,732	26,287	26,046	27,473
,, 16	37,750	35,572	39,002	34,389	37,995	45,094	39,168
,, 17	26,573	26,712	26,216	26,918	26,434	24,879	26,681
,, 18	24,282	23,925	24,035	23,716	24,299	24,879	24,610
Division	234,440	229,469	231,879	227,736	235,110	243,869	240,918

The estimated population for 1951 was 1,089,767 and for 1952, 1,086,800, a reduction from the 1951 figure of 2,967, or rather less than 0.3 per cent. Because of the small size of the reduction and the heavy arithmetic involved, the size of the ward sample has been accepted as similar for both years.

Respiratory Tuberculosis

Estimated Size of Ward Sample..

Area	All Persons	Males	Females
Ward 8	27,646	13,314	14,298
,, 9	38,846	17,553	21,500
,, 10	34,782	16,268	18,578
,, 14	27,079	13,015	14,038
,, 15	26,370	12,458	13,933
,, 16	49,526	23,075	26,562
,, 17	24,527	11,602	12,942
,, 18	25,992	12,544	13,411
Division	254,909	120,000	135,209

Table 16.

Standard Errors of the Death Rates and for Respiratory Tuberculosis, the Case Rates per 1,000.

1951 and 1952

Causes of Death	Ward 8	Ward 9	Ward 10	Ward 14	Ward 15	Ward 16	Ward 17	Ward 18	Division
	Standard Errors of the Death Rates - 1951								
All Causes	0.6422	0.6861	0.5989	0.7299	0.7026	0.5859	0.6984	0.7305	0.2351
Cardiovascular Disease	0.3488	0.3877	0.3298	0.4126	0.3915	0.3321	0.3883	0.4050	0.1308
Malignant Neoplasms	0.2557	0.2663	0.2387	0.2903	0.2799	0.2262	0.2759	0.2882	0.0928
Vascular Lesions affecting the C.N.S.	0.2266	0.2580	0.2150	0.2721	0.2553	0.2209	0.2496	0.2660	0.0858
Respiratory Disease other than Tuberculosis	0.2002	0.2146	0.1882	0.2264	0.2197	0.1827	0.2191	0.2285	0.0734
Tuberculosis - All Forms ..	0.1675	0.1449	0.1457	0.1678	0.1673	0.1272	0.1712	0.1712	0.0547
Other Causes	0.3283	0.3408	0.3007	0.3557	0.3481	0.2915	0.3532	0.3678	0.1175
	Standard Errors of Case Rates - 1951								
Respiratory Tuberculosis -									
All Persons ..	0.2707	0.2284	0.2413	0.2735	0.2772	0.2022	0.2874	0.2792	0.0892
Males	0.4106	0.3576	0.3715	0.4153	0.4245	0.3119	0.4399	0.4231	0.1368
Females	0.3565	0.2907	0.3127	0.3597	0.3611	0.2615	0.3747	0.3680	0.1159
	Standard Errors of the Death Rates - 1952.								
All Causes	0.6328	0.6759	0.5900	0.7191	0.6922	0.5772	0.6880	0.7197	0.2316
Cardiovascular Disease	0.3426	0.3808	0.3239	0.4052	0.3845	0.3262	0.3765	0.3978	0.1285
Malignant Neoplasms	0.2589	0.2696	0.2416	0.2939	0.2834	0.2290	0.2793	0.2917	0.0939
Vascular Lesions affecting the C.N.S.	0.2313	0.2633	0.2194	0.2777	0.2606	0.2254	0.2547	0.2714	0.0876
Respiratory Disease other than Tuberculosis	0.2071	0.2221	0.1930	0.2343	0.2273	0.1891	0.2267	0.2364	0.0760
Tuberculosis - All Forms ..	0.1506	0.1303	0.1310	0.1508	0.1505	0.1143	0.1540	0.1540	0.0492
Other Causes	0.3204	0.3326	0.2934	0.3471	0.3397	0.2845	0.3447	0.3589	0.1147
	Standard Errors of Case Rates - 1952								
Respiratory Tuberculosis -									
All Persons ..	0.2740	0.2312	0.2443	0.2796	0.2806	0.2047	0.2909	0.2826	0.0903
Males	0.4161	0.3624	0.3764	0.4208	0.4301	0.3160	0.4457	0.4287	0.1386
Females	0.3623	0.2954	0.3178	0.3656	0.3670	0.2658	0.3808	0.3741	0.1178

Table 17.

Housing Distribution according to the Number of Rooms and the Type of House.

Type of House	Houses of -					All Houses
	1 Room	2 Rooms	3 Rooms	4 Rooms	5 Rooms & over	
Area 1: Standard	0	264	846	417	194	1,721
Substandard A	851	4,173	1,524	164	33	6,745
,, B.i	789	3,166	1,183	182	63	5,383
,, B.ii	269	850	166	24	3	1,312
Unfit	881	1,197	88	14	2	2,182
All Houses	2,790	9,650	3,807	801	295	17,343
Ward 18 of Area 2:						
Standard	0	406	1,731	559	249	2,945
Substandard A	435	2,425	394	39	9	3,302
,, B.i	95	335	56	10	2	498
,, B.ii	41	176	12	0	0	229
Unfit	21	22	3	2	1	49
All Houses	592	3,364	2,196	610	261	7,023

Table 18.

Estimated Population based on the Average Number of Persons per House according to the Number of Rooms in House as at Census 1951.

Type of House	Houses of - 1 Room	2 Rooms	3 Rooms	4 Rooms	5 Rooms & over	All Houses
Area 1: Standard	0.0	896.6	3,361.8	2,043.5	1.132.6	7,434.5
Substandard A.	2,268.5	14,172.8	6,056.0	803.7	192.7	23,493.7
,, B.	2,820.3	13,639.6	5,360.6	1,009.5	385.3	23,215.3
Unfit	2,348.5	4,065.4	349.7	68.6	11.7	6,843.9
All Houses	7,437.3	32,774.4	15,128.1	3,925.3	1,722.3	60,987.4
Ward 18 of Area 2:						
Standard	0.0	1,301.5	6,952.6	2,741.5	964.0	11,959.6
Substandard A	1,141.5	7,773.5	1,582.5	191.3	34.8	10,723.6
,, B	356.9	1,638.0	273.1	49.0	7.7	2,324.7
Unfit	55.1	70.5	12.0	9.8	3.9	151.3
All Houses	1,553.5	10,783.5	8,820.2	2,991.6	1,010.4	25,159.2

Table 19.

Survey Area, Ward 9.

Number of Houses (Control Sample).

Social Class	Persons in Age Group, 15-24 years							All Houses
	0	1	2	3	4	5	6	
II	6	7	6	3	1	0	0	23
III	29	48	34	27	11	0	0	149
IV	29	28	33	39	13	7	0	149
V	6	13	28	21	8	1	1	78
All Classes	70	96	101	90	33	8	1	399

Table 20.

Survey Area, Ward 9.

Population in Houses (Control Sample).

Social Class	Persons in Age Group 15-24 years							All Persons
	0	1	2	3	4	5	6	
II	28	36	38	20	6	0	0	128
III	154	240	196	196	91	0	0	877
IV	147	143	202	278	95	57	0	922
V	30	77	184	144	72	10	8	525
All Classes	359	496	620	638	264	67	8	2,452

Table 21.

Survey Area, Ward 9.

Population of 15-24 years (Control Sample)

Social Class	Persons in Age-Group 15-24 years						Persons 15-24 years
	1	2	3	4	5	6	
II	7	12	9	4	0	0	32
III	48	68	81	44	0	0	241
IV	28	66	117	52	35	0	298
V	13	56	63	32	5	6	175
All Classes	96	202	270	132	40	6	746

Table 22.

Survey Area, Ward 9.

Population of 15-24 years (Control Sample).

Social Class	All Persons 15-24 years	Persons living per Room -				
		Not more than 1	1-1.5	1.5-2	2-2.5	More than 2.5
II	32	3	21	7	1	0
III	241	24	99	99	15	4
IV	298	19	116	146	14	3
V	175	5	66	80	20	4
All Classes	746	51	302	332	50	11

Table 23.

Survey Area, Ward 9.

Number of Houses according to Number of Persons in Age-Group 15-24 years, and Number of Persons living per Room.

Social Class	Persons in Age-Group 15-24 years	Persons living per Room -					
		Not More than 1	1-1.5	1.5-2	2-2.5	More than 2.5	All Houses
II	0	2	4	0	0	0	6
	1	3	3	0	1	0	7
	2	0	4	2	0	0	6
	3	0	2	1	0	0	3
	4	0	1	0	0	0	1
	All Houses:	5	14	3	1	0	23
III	0	10	12	6	0	1	29
	1	14	29	4	1	0	48
	2	5	19	8	2	0	34
	3	0	8	17	2	0	27
	4	0	2	7	1	1	11
	All Houses:	29	70	42	6	2	149
IV	0	8	16	5	0	0	29
	1	9	14	5	0	0	28
	2	5	17	10	1	0	33
	3	0	17	17	4	1	39
	4	0	3	10	0	0	13
	5	0	1	6	0	0	7
	All Houses:	22	68	53	5	1	149
V	0	3	2	1	0	0	6
	1	3	5	5	0	0	13
	2	1	17	6	4	0	28
	3	0	9	11	1	0	21
	4	0	0	6	1	1	8
	5	0	0	0	1	0	1
	6	0	0	1	0	0	1
	All Houses:	7	33	30	7	1	78