RESPIRATORY TUBERCULOSIS IN THE BIRMINGHAM REGION*

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With the introduction of the National Health Service in Great Britain in 1948, the Birmingham Regional Hospital Board was formed with responsibility for diagnostic and treatment services for a population of almost four and a half million distributed over five administrative counties and ten county boroughs in the West Midland area of England. With regard to tuberculosis, the Regional Hospital Board became responsible for specialist and hospital services, while prevention and after-care remained the responsibility of the fifteen local health authorities (the counties and county boroughs). The medical care of the patient at home was the responsibility of the third branch of the Service, the general practitioner. The object of this report is to review the changes that have occurred in all aspects of tuberculosis in the 10 years since the introduction of the National Health Service.

METHODS IN USE IN THE POST-WAR PERIOD

In 1948 the standard method of treatment of pulmonary tuberculosis was a period of rest and graduated exercise in a sanatorium. For cavitated disease that was not extensive, collapse measures were an important part of treatment: collapse might be either temporary, in the form of artificial pneumothorax or pneumoperitoneum requiring air refills at weekly or fortnightly intervals for 2-3 years, or permanent, by major surgery in the form of thoracoplasty or some modification of this procedure.

On the preventive side, the main emphasis lay in the improvement of living conditions, both generally and for the household contacts of known cases of tuberculosis. Intensive and repeated examinations of contacts were necessary to find cases in the earliest possible stages, and mass radiography had been

introduced a few years earlier in a further attempt to find cases with disease of limited extent, and to identify unknown sources of infection in the community.

METHODS INTRODUCED IN PAST 10 YEARS

The most important change in treatment has been the introduction of drugs effective against tubercle bacilli. Streptomycin was first made available on an experimental basis in 1947, and was followed shortly by para-amino-salicylic acid (P.A.S.). These remained standard treatment until the introduction of the probably even more effective drug isoniazid in the early part of 1952. The efficacy of these drugs in the treatment of tuberculosis led to demonstrable improvements in some aspects of tuberculosis control, and also made possible other methods of treatment for some patients, including surgical removal of diseased portions of lung. It is largely the influence of this new method of treatment by drugs on other aspects of tuberculosis work that is reviewed here.

On the preventive side, vaccination with B.C.G. was introduced into this region in 1949 for those exposed to special risk of infection, *e.g.* household contacts and hospital workers, and from 1954 local health authorities have been empowered to introduce schemes of vaccination for schoolchildren between their thirteenth and fourteenth birthdays.

EPIDEMIOLOGY AND PREVENTION

MORTALITY.—It is well known that deaths from pulmonary tuberculosis have decreased dramatically in recent years. The trends in this Region in death rates per million population for each of five age groups are shown in Fig. 1 (opposite) for men and women respectively, and these rates are also given in Table I (opposite).

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FIG. 1.—Deaths per million population, by sex and age group.

TABLE I
RESPIRATORY TUBERCULOSIS MORTALITY IN THE BIRMINGHAM REGION (1948-57), BY SEX AND AGE
ANNUAL NUMBER OF DEATHS PER MILLION POPULATION

Year	Age (years)												No. of Deaths (all ages)	
	Under 15		15-24		25-44		45-64		65 and Over		All Ages			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1948	44	52	411	391	530	521	1,058	220	647	126	522	288	1,325	776
1949	19	18	345	418	522	533	965	185	606	179	482	284	1,136	770
1950	17	20	226	358	468	418	1,097	261	785	201	490	260	1,067	585
1951	22	18	139	220	406	306	952	242	791	169	429	199	929	450
1952	11	19	72	163	259	188	688	161	739	169	310	138	675	312
1953	9	17	56	105	191	175	700	146	711	130	287	118	630	269
1954	7	4	42	58	172	115	686	140	689	122	276	89	607	204
1955	0	11	7	34	162	100	521	110	625	78	224	71	496	164
1956	4	0	25	51	101	81	417	78	672	81	189	58	422	134
1957	2	0	14	10	64	55	380	54	645	79	167	39	374	92

A rapidly decreasing trend is evident for each age group and each sex, with the exception of men aged 65 years and over; the 1956 rate for this age group is greater than those for 1948 and 1949, although a gradual decrease has taken place since 1951.

Some deaths from tuberculosis occur in persons

not notified before death. Figures for the Region as a whole are not available, but the number of such cases each year in the City of Birmingham (pop. 1,110,000) has shown no tendency to fall, and the position in the Region as a whole is probably little different. Such deaths have amounted to about 4 per cent. of notifications in Birmingham.

FIG. 2.—Notifications per 100,000 population, by sex and age group.

TABLE II
RESPIRATORY TUBERCULOSIS NOTIFICATION RATES PER 100,000 POPULATION IN THE BIRMINGHAM REGION (1948-57),
BY SEX AND AGE

Year	Age (years)												Number of Notifications (all ages)	
	Under 15		15-24		25-44		45-64		65 and Over		All Ages			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1948	51.8	52.5	178.9	215.1	143.5	102.3	164.0	36.6	74.9	16.7	124.6	81.5	2,635	1,793
1949	51.1	52.4	181.0	222.3	138.3	108.9	164.4	41.5	81.0	21.3	123.6	86.0	2,662	1,926
1950	54.5	45.0	126.0	211.1	123.0	108.5	147.2	33.3	68.0	18.0	112.1	80.4	2,440	1,808
1951	56.0	55.3	170.8	221.4	139.5	99.9	158.1	38.4	61.6	17.7	120.6	82.4	2,613	1,859
1952	66.5	65.4	168.3	218.0	134.9	106.1	146.8	35.0	75.6	14.5	120.0	84.5	2,612	1,915
1953	59.1	65.4	155.1	209.5	129.1	112.4	161.8	39.9	87.8	15.4	119.2	86.3	2,614	1,964
1954	57.4	50.9	173.9	196.6	129.7	93.2	145.8	34.3	80.3	16.0	117.3	74.1	2,578	1,699
1955	58.2	55.5	135.7	181.2	115.6	88.0	151.4	39.7	78.3	20.5	109.5	73.2	2,422	1,685
1956	43.8	45.4	137.5	152.4	99.7	76.6	132.2	29.3	86.0	17.9	97.2	60.6	2,167	1,403
1957	31.1	41.5	108.5	123.8	95.0	65.6	113.4	22.3	68.8	17.5	83.0	51.0	1,863	1,190

NOTIFICATIONS.—The regional trends over the years 1948-57 in the notification rates per 100,000 population in each age group are shown in Fig. 2 for men and women respectively, and the rates are also given in Table II. The male and female rates for all ages showed little change until 1954 when a slow decline began, accelerating in 1957. These findings contrast very strikingly with the trends in death rates. The graphs for age groups show considerable variations within this general pattern.

SOURCES OF NEW CASES.—The relative contributions of the various means of detecting new cases to

the total notifications vary from area to area within the Region. However, in most areas referrals from general practitioners, either to mass radiography units or direct to the clinics, account for about half the total notifications. In the Region as a whole, the mean annual proportions in the years 1955-57 inclusive for each source of reference were as follows:

General practitioners 54 per cent. (including 18 per cent. referred to M.M.R. units);
Hospitals 19 per cent.;
M.M.R. (excluding G.P. referrals) 7 per cent.;
Contact service 10 per cent.;
Other sources 10 per cent.

TABLE III
PULMONARY TUBERCULOSIS NOTIFICATIONS IN THE COUNTY OF WARWICKSHIRE (1951-57), BY SEX AND STAGE OF DISEASE

Sex		Male					Female				
Stage of Disease ..		Minimal	Inter-mediate	Extensive	Un-classified	Total	Minimal	Inter-mediate	Extensive	Un-classified	Total
Year ..	1951	89	68	45	37	239	65	53	18	45	181
	1952	83	128	34	18	263	89	72	21	15	197
	1953	83	117	49	3	352	104	85	29	3	221
	1954	119	117	34	44	314	82	68	22	11	183
	1955	95	91	44	29	259	83	61	15	12	171
	1956	100	99	45	10	254	102	36	16	7	161
	1957	78	73	28	2	181	72	38	12	1	123

The mass radiography service therefore accounts for one-quarter of the new notified cases.

In considering these trends it is pertinent to examine the changing picture over the years as regards the stage of disease of newly-diagnosed cases. Such information is not available centrally for the Region as a whole, but in Table III details are given for the county of Warwickshire (pop. 550,000) for 1951-57. As regards men, the number of cases in 1956 at each stage was as high as, or higher than, in 1951, although the number of extensive cases during 1957 was much lower. With regard to women, the number of minimal cases in 1956 was much greater

than in 1951, although that for 1957 was about the same; the number of "intermediate" cases decreased from 1955 to 1956 and the number of extensive cases in 1957 did not decrease noticeably.

CLINIC REGISTERS.—The number of cases on the registers of all chest clinics in the Region at the end of each year from 1948 to 1957 is shown graphically in Fig. 3. A considerable increase has taken place since 1951, and the 1957 figure exceeds that for 1951 by more than 50 per cent. However, the 1957 figure is almost the same as that for the previous year, so that this increasing trend has possibly been terminated.

FIG. 3.—Notified cases of pulmonary tuberculosis on clinic registers.

The continuing increase from 1951 to 1957 is undoubtedly due to the improved survival of tuberculous patients arising from new methods of treatment. The statutory follow-up period for new cases is 5 years from attaining quiescence, and in many cases it is necessary to continue supervision for even longer.

PATIENTS WITH POSITIVE SPUTUM.—The number of patients on the registers at the end of each year known to have had positive sputum during the preceding 6 months (1 year as from December 31, 1955) is shown in Fig. 4.

FIG.—Number of cases on clinic registers with positive sputum (during preceding 6 months).

A dramatic decrease has taken place since 1952; at the end of 1956 the total number of such patients was half that for the peak year 1950.

It is of interest to follow up such patients to find out the numbers still infectious after a given lapse of time. Such studies have not been made on a regional basis, but the following details have been supplied by Dr. J. Aspin, consultant chest physician at Wolverhampton (pop. 150,000).

“Of 282 patients infectious in 1955, 41 were alive and sputum positive in 1957, 192 being non-infectious after treatment, 42 dead, and seven lost sight of. Of the 41 cases still sputum positive

in 1957, 26 were producing bacilli resistant to one or more of the major anti-tuberculous drugs, while fifteen were still producing fully-sensitive organisms. Of these 41 infectious cases, three were known to be at work and two of these were in the drug-resistant group.”

Thus, if the experience in Wolverhampton is typical, 14 per cent. of infectious patients remain so classified 2 years later and almost two-thirds of these are drug-resistant. Different results may be obtained for different years, and it is important to find out whether these proportions are likely to change in the future, especially the proportion with drug-resistant organisms.

B.C.G. VACCINATION.—An important aspect of the preventive measures against pulmonary tuberculosis is the B.C.G. programme. It is the policy of all local authorities in the Region to vaccinate contacts, and all authorities except two have begun the vaccination of school-leavers. In the thirteen areas with schemes operating, the percentage of children for whom skin testing and vaccination is accepted varies between 41 and 93 per cent. Most authorities with an established programme obtained an acceptance rate of at least 70 per cent. in 1957. The proportion of those tested who were negative and vaccinated during 1957 varied between 36 and 86 per cent., and in most areas the proportion was about 80 per cent.

OUT-PATIENT SERVICES

CHEST CLINIC ATTENDANCES.—Table IV shows that between 1949 and 1953 the number of new patients seen annually at the chest clinics more than doubled from 20,861 to 43,860; since 1953 the number of new attendances has fluctuated somewhat below the 1953 peak. The pattern for re-attendance

TABLE IV
CHEST CLINIC ATTENDANCES IN THE BIRMINGHAM REGION (1949–58)

Year	Out-patient Attendances		
	First Attendances	Re-attendances	Total
1949	20,861	122,011	142,872
1950	29,982	103,603	133,585
1951	33,543	110,262	143,805
1952	37,679	135,333	173,012
1953	43,860	167,319	211,179
1954	41,075	172,455	213,530
1955	35,919	168,350	204,269
1956	39,918	171,606	211,524
1957	39,859	153,035	192,894
1958	38,295	145,666	183,961

is rather similar, with an increase from 122,011 in 1949 to a maximum of 172,455 in 1954, and numbers well below this level in 1957 and 1958.

Fig. 5 shows the total attendances at chest clinics each year, with a substantial increase between 1949 and 1954 and very little decline since. These figures are for all attendances and include contact and other routine examinations and attendances for refills. Detailed breakdown by categories is not available.

The number of new patients attending general medical out-patient clinics (including the teaching hospitals) in the Region was 57,000 a year for the years 1953–57. The total attendances (new and old) of medical out-patients was 205,000 a year over the same period, virtually the same total as for chest clinics.

In 1948 facilities for chest x-ray examination at the request of a general practitioner were rare or non-existent. Such services are now available throughout the Region, in some areas at the chest

clinic or x-ray department of a hospital, in others at regular sessions by a mobile mass radiography unit, and in the City of Birmingham at a static mass radiography unit.

MASS RADIOGRAPHY SERVICE.—Table V and Fig. 5 show, as for clinic attendances, a progressive increase

TABLE V
MASS RADIOGRAPHY EXAMINATIONS IN THE
BIRMINGHAM REGION (1949–57)

Year	No. of Persons Examined	Cases of Active Tuberculosis*	Prevalence per 1,000 Examined
1949	110,532	385	3.5
1950	98,412	502	5.1
1951	113,319	621	5.5
1952	195,677	1,125	5.7
1953	323,319	1,387	4.3
1954	395,327	1,357	3.4
1955	366,126	1,229	3.4
1956	351,314	1,220	3.5
1957	355,342	1,116	3.1

* Requiring immediate treatment or close supervision at a hospital or clinic.

FIG. 5.—Total attendances at chest clinics and at mass miniature radiography units.

in the annual number of mass radiography examinations from about 100,000 in 1949 to just under 400,000 in 1954, after which the figure settles at just over 350,000. The yield of cases per 1,000 examined also increased at first, from 3.5 per 1,000 in 1949 to 5.7 per 1,000 in 1952, with a subsequent decline to 3.1 per 1,000 in 1957. Some of the increased yield in the earlier years was due to increasing proportions of high-yield groups such as general practitioner referrals. The subsequent decline must almost certainly represent a true decline in the prevalence of tuberculosis in the population, since the proportion of high-yield groups has been maintained.

OUT-PATIENT TREATMENT

REFILLS.—The number of refills performed at the Birmingham Chest Clinic each year is shown in Table VI. The increase in the first 5 years may be local to Birmingham and related to changes in medical staff; the steady decline since 1953 is presumably representative of the Region as a whole, though the decline was possibly more rapid in some areas.

TABLE VI
REFILLS AT BIRMINGHAM CHEST CLINIC

Year	Number of Cases
1948	5,000
1949	5,250
1950	6,000
1951	7,850
1952	11,500
1953	14,040
1954	12,000
1955	10,080
1956	6,240
1957	2,412
1958	512

DOMICILIARY CHEMOTHERAPY.—Although it has not been possible to obtain figures for the whole Region, it is known that in the county of Warwickshire visits by home nurses to tuberculous households declined steadily from 1954, and in Birmingham injections of streptomycin given to patients in their homes were reduced by two-thirds between 1955 and 1958 (Table VII). The decline occurred largely because, as the waiting time before admission to hospital was reduced, there was less need to give streptomycin by injection at home; a similar change would be shown by the rest of the Region as hospital admission became easier. Much chemotherapy is still continued at home after hospital treatment is completed, but the drugs are given mainly by mouth.

TABLE VII
VISITS BY NURSES TO PATIENTS' HOUSEHOLDS,
1953–1958

Year	County of Warwickshire	City of Birmingham
	No. of Visits	No. of Injections of Streptomycin
1953	Not Available	60,635
1954	21,755	62,156
1955	16,918	63,747
1956	12,077	56,586
1957	7,418	31,822
1958	4,955	20,381

REHABILITATION.—It is impossible to obtain figures which demonstrate the changes in return to work of patients treated for tuberculosis in the past 10 years. No figures are available on a Regional basis; in the City of Birmingham the number known to have been helped in return to suitable work rose steadily from 165 in 1948 to 574 in 1956, and declined only to 501 in 1957. This reflects the increasing number becoming fit for work as the result of treatment; it does not include those who return to their former work, and this group also is increasing. With regard to the type of work recommended, increasing numbers have been helped to return to normal industry, some after a period at the Industrial Rehabilitation Unit. The number undergoing training courses for new trades has been fairly constant at about fifty per year since 1951.

Entries to the special Remploy Factory for tuberculous patients numbered more than 100 per year in 1950–52, but have since declined to fifty per year; individuals working there are increasingly of a chronic type, some with positive sputum and unsuitable for return to open industry. Facilities of this kind are not available throughout the Region, and in some areas ambulant chronic patients provide a special problem.

IN-PATIENT HOSPITAL SERVICES

ALLOCATION AND OCCUPATION OF BEDS FOR DISEASES OF THE CHEST

Staffed allocated beds for the period 1948–57 are shown in Table VIII (opposite). An expansion programme started in 1948 added 533 beds, and by 1952 had increased the total to 2,825. There were only minor variations in subsequent years and generally these reflected limitations imposed by a shortage of nurses until 1958 when it was planned to reduce allocated beds by 631 within 3 years.

TABLE VIII

ALLOCATION AND OCCUPATION OF BEDS FOR DISEASES OF THE CHEST IN THE BIRMINGHAM REGION (1948-58)

Year	Staffed Allocated Beds	Average Daily Number of Beds		
		Available	Occupied	Unoccupied
1948	2,292	—	—	—
1949	2,555	—	—	—
1950	2,581	—	—	—
1951	2,753	—	—	—
1952	2,825	—	—	—
1953	2,780	2,745	2,585	160
1954	2,795	2,725	2,587	138
1955	2,821	2,767	2,539	228
1956	2,829	2,811	2,432	379
1957	2,799	2,796	2,239	557
1958	2,496	2,538	2,070	468

The medical waiting list in 1952 was 644; it is therefore probable that the "effective" bed occupancy was 100 per cent. The average daily number of staffed unoccupied beds for the Region was first collected in 1953, when the number was 160. There

was an annual increase in this figure from 1954 and during 1957 there was an average of 557 staffed unoccupied beds each day.

RESPIRATORY TUBERCULOSIS

WAITING LISTS.—Detailed information of the size of the regional waiting list was not available until 1952, but it is probable that in the preceding quinquennium it had steadily swollen. The maximum known figure for medical and surgical cases combined was 978 in 1952. It fell by 13, 22, 43, 71 and 25 per cent. respectively, in subsequent years. The greatest percentage fall was between 1955 and 1956, and the greatest numerical fall was 279 between 1954 and 1955. On December 31, 1958, only 44 patients were awaiting admission.

Fig. 6 shows that until 1955 occupied beds plus waiting list exceeded the staffed available beds, but since 1956 staffed available beds have been adequate so that any case of pulmonary tuberculosis may now be admitted to hospital without delay.

FIG. 6.—Availability and occupation of beds for diseases of the chest and waiting lists for respiratory tuberculosis.

HOSPITAL TREATMENT

(1) *Medical*.—The majority of pulmonary tuberculosis patients start treatment in hospital. The length of stay varies considerably between hospitals but the average in regional hospitals for patients who were discharged or died in 1957 was 150 days as compared with 171 days in 1949.

(2) *Surgical*.—The numbers of operations for pulmonary tuberculosis performed in the region are shown in Table IX. Surgical measures reached a peak in 1954. Thoracoplasty was painful, but safe and effective. Advances in anaesthesia enabled the development of resection, its safety being further enhanced by chemotherapeutic cover.

TABLE IX
SURGICAL TREATMENT, 1949–1957

Year	Thoracoplasty	Resection	Total
1949	389	14	403
1950	403	108	511
1951	642	147	789
1952	789	214	1,003
1953	870	300	1,170
1954	971	365	1,336
1955	812	375	1,187
1956	633	411	1,044
1957	382	265	647

SPECIAL TREATMENT UNITS.—Treatment in hospital of tuberculosis in certain classes of people presents special problems:

(1) *Children*.—The treatment of children necessitates many months in hospital and arrangements have to be made for their education. In the Birmingham Region three special units for children were developed, comprising in all 182 beds, in addition to children's units within several sanatoria.

(2) *Pregnancy*.—This posed difficult problems before the introduction of effective chemotherapy. Many pregnant patients with tuberculosis can now be managed without special facilities, but isolation accommodation for a limited number of infectious cases is necessary in maternity departments.

(3) *Diabetes*.—In patients with diabetes, tuberculosis may be extensive and at times difficult to cure. Diabetic patients need to learn the self-administration of insulin. A Regional unit of 25 beds for this type of case was established at Romsley Hill Hospital near Birmingham, but most patients in peripheral areas are treated in a general or chest hospital by the chest physician, often in collaboration with a general physician.

(4) *Patients in Mental and Mental Deficiency Hospitals*.—There is evidence of a higher tuberculosis morbidity rate in mental patients than in similar groups of normal persons. The period of treatment tends to be long, and the problems of discharge connected with the mental state are often difficult. Most mental hospitals provide isolation accommodation on a limited scale; in addition a unit of 69 beds for male patients has been developed at one mental hospital to which patients can be transferred. Similarly, a special unit of 81 beds for mental defectives was set up at one of the Birmingham mental deficiency hospitals for regional use.

DISCUSSION

The remarkable fall in tuberculosis mortality in the 10 years from 1948 has sometimes led to insufficient attention being paid to other yardsticks which may be of greater importance in planning future needs. Early in this report it was shown that the combination of rapidly declining mortality with an unchanging or slowly falling notification rate inevitably led to a substantial increase in the number of persons on the live tuberculosis register, all needing regular supervision. This in part explains the increase in the number of re-examinations at chest clinics, the other cause being the need for regular supervision at reasonably short intervals of patients who have started chemotherapy at home because of an insufficient number of beds in hospital. In the last 2 or 3 years, however, waiting lists have declined and disappeared, so that all patients who need it can now start their treatment in hospital. Regular review of bed requirements will be necessary in future, though it is essential from the public health aspect to ensure that an adequate number of beds for the prompt admission of all tuberculous patients is available.

From the epidemiological aspect the decline in the number of patients with positive sputum represents a real advance, though the proportion with resistant organisms is a feature which gives rise to anxiety. The greatly increased use of B.C.G. vaccination in the past 5 years should soon produce results by reducing the number of new cases in young adults, though this measure must be regarded as a long-term cumulative investment rather than as one which can produce rapid results.

The majority of new cases of tuberculosis are still identified through general practitioner referrals, either for "x ray only" or for normal consultative

sessions. The mass radiography service is, however, responsible for an appreciable number of new diagnoses which could be made in no other way at that stage of the disease; their work will need to continue on an undiminished scale, though it is to be hoped with a diminishing return, and the use of some units for intensive community surveys has been instituted. The increasing provision of "x ray only" sessions for general practitioners is probably responsible for the recent small decline in the number of new attendances at chest clinics.

On the hospital side the major change has been from enormous waiting lists to the existence of some empty beds and to a reduction in the number of beds allocated to tuberculosis. There has also been a great decline in the number of surgical operations for tuberculosis. It has often been difficult to find sufficient nursing staff for the available beds, and the very effectiveness of treatment has tended to increase this by tending to make the work less interesting because of its apparent simplicity, and also by reducing the number of ex-patients who have taken up nursing in sanatoria because they were not fit enough to return to their original work.

Whilst steady progress in anti-tuberculosis work is being made, the present situation of an infectious disease of which over 3,000 new cases are notified in the Region each year cannot be regarded as satisfactory. Other features which indicate that there is still much to be done are the absence of any fall in the number of deaths from tuberculosis of patients not previously notified, the number of patients sputum-positive with resistant organisms, and the fact that in 1957 at least 13 per cent. of children have been infected with tuberculosis by the age of 13 years. It has recently been said that tuberculosis will have been eliminated as a critical public health problem when no more than 1 per cent. are infected by the age of 14 years.

SUMMARY

(1) In the Birmingham Hospital Region, the mortality rate from pulmonary tuberculosis in men declined from 52 per 100,000 in 1948 to 17 in 1957; in women it declined from 29 to 4 per 100,000 in the same period.

(2) Notification rates for pulmonary tuberculosis in men declined from 125 per 100,000 in 1948 to 83 in 1957; in women they declined from 81 to 51 per 100,000 during the same period.

(3) As a result of rapidly declining mortality and slowly declining notifications, the numbers of persons on the respiratory tuberculosis registers in

the Region have increased from 19,459 in 1948 to 31,828 in 1957. The number of these patients known to have had tubercle bacilli in their sputum in the previous 6 months declined from 2,875 in 1949 to 1,516 in 1956.

(4) At least half of all new notifications were made as a result of patients reporting symptoms to their general practitioners. The contact service and mass radiography (excluding general practitioner referrals) each contributed about 10 per cent. of all notifications.

(5) B.C.G. vaccination has been introduced into the Region in the past 10 years; it is extensively used for contacts, but its use among 13 to 14-year-old schoolchildren varies from nil in some areas to a more than 80 per cent. acceptance rate in other areas.

(6) Total attendances at chest clinics in the Region rose from 142,872 in 1949 to 213,530 in 1954 and have since remained at about 200,000 per annum; the pattern has been similar for first attendances and for re-examinations, but with a rather greater proportional increase in first examinations than in re-examinations.

(7) Examination by mass radiography units increased from 110,532 in 1949 to 395,327 in 1954 and thereafter continued at over 350,000 per annum. Increasing provision has been made for x-raying patients at the request of general practitioners.

(8) Artificial pneumothorax and pneumoperitoneum have virtually disappeared as methods of treatment, and the many thousands of refills previously done each year are now no longer needed. Domiciliary chemotherapy, including streptomycin injections in the home, reached a maximum in 1954-55; the use of streptomycin in the home has since declined very considerably.

(9) Staffed hospital beds allocated for the treatment of tuberculosis and diseases of the chest increased from 2,292 in 1948 to 2,829 in 1956, and were slightly reduced in 1957. There was a further substantial reduction in 1958.

(10) The waiting list for admission to hospital for treatment of tuberculosis totalled 978 in 1952 (the earliest year for which the figure is available). The waiting lists subsequently declined substantially, and at the end of 1958 only 44 patients were awaiting admission; considerably more than this number of staffed allocated beds were then unoccupied.

(11) Major surgical operations for the treatment of pulmonary tuberculosis increased from 403 in 1949 to 1,336 in 1954, and then declined to 647 in 1957.