

# Survey of Tuberculosis Prevalence in Japan, 1954\*

## Trends in Tuberculosis from 1953 to 1954

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*A survey of the prevalence of tuberculosis in Japan conducted in 1953 showed that the unexpectedly high proportion of 3.4% of the total population stood in need of medical treatment for that disease and provided much-needed basic information on a variety of aspects of the tuberculosis situation in the country. In 1954, 70 of the 210 survey areas of the previous year were re-surveyed in order to assess the trends in types and extent of tuberculosis and in reactions to tuberculin-testing during the year and to determine the tuberculosis incidence. This paper reports on the findings made on re-survey. It is considered, however, that in view of the brief interval between the two surveys no final conclusions can be drawn and that a further survey is needed at some later date.*

### OUTLINE OF 1954 SURVEY

#### Aims

In 1953, the Ministry of Health and Welfare of the Japanese Government conducted a survey of the prevalence of tuberculosis throughout Japan, based on a stratified sampling method. The results of this survey showed that there were 2 920 000 persons (3.4% of whole population) in need of medical treatment for tuberculosis—a much higher figure than had been expected. Of this total, 1 370 000 persons needed hospitalization, 800 000 discharged tubercle bacilli and 2 040 000 had definite cavity or suspicion of cavity. Moreover, 80% of those requiring medical treatment were not aware of having the disease. It also became apparent from the survey that control measures had not been sufficiently directed at the younger children and at persons in the older age-groups. The survey thus provided reliable information on the type of disease, the extent of disease, the medical treatment necessary and the number of patients requiring hospitalization—information invaluable for the better conduct of the tuberculosis control programme in Japan.

However, as this was a sectional survey, and as no other information was available with which the data obtained could be compared, it was not possible

\* From the Ministry of Health and Welfare, Japan; to be published also, in Spanish, in the *Boletín de la Oficina Sanitaria Panamericana*

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to assess the trends in reactions to tuberculin-testing, type of disease, extent of disease, incidence of tuberculosis, etc.

In 1954, the Ministry of Health and Welfare therefore conducted a second survey in order to obtain the information necessary for assessing such trends for further intensifying tuberculosis control measures.<sup>2</sup> The results presented here provide much invaluable information; however, since one of the main characteristics of tuberculosis is its chronic nature, it is realized that the interval between surveys was too short to allow of any final conclusions as to the course of the disease, and it is considered important that a further survey should be conducted at some future date.

#### Statistical sampling

The object of the survey in 1953 was to estimate the number of tuberculous patients in Japan. In 1954, however, the aim was to obtain information about the transition of the disease in tuberculous patients, the incidence of tuberculosis, etc. Generally

<sup>2</sup> The survey was carried out under the auspices of the Ministry of Health and Welfare (Director of Public Health Bureau, Dr Masayoshi Yamaguchi), the practical work being done by the prefectural health departments and health centres in the sampling areas, and the planning, supervision, assessment and evaluation by the Council on the Survey of Tuberculosis Prevalence. This Council is made up of expert phthysiologists, statisticians and administrative officers of the central and local government agencies concerned and is headed by Dr Harumiti Oka, Chairman, and Dr Hideo Kumabe and Dr Hikaru Yosano, Vice-chairmen.

speaking, there are two methods by which to estimate the changes in the variate by sampling: one is to take two independent random samples at two time points and estimate the trend from the results at each time point and the other is to take a random sample at the first point, to re-survey the same population at the second point and to estimate the trend by comparing the results. For the 1954 survey, the second method was chosen in order that the transition of tuberculin-testing, type of disease, extent of disease, status of tuberculosis, incidence of tuberculosis, etc., might be estimated.

From 210 survey areas in 1953, 70 areas were taken by the stratified sampling method, and all persons living in those areas and examined in 1953 were re-surveyed in 1954.

Stratification was made according to the number of tuberculous patients and the population in each area. Ten strata were set up. In deciding upon the range of the prevalence rate in areas to be included in each stratum, the following formula was used so that the value of the quantity represented by this formula would be made minimum by a trial and error method:

$$\frac{\sigma x^2}{\bar{X}^2} + \frac{\sigma y^2}{\bar{Y}^2} - 2\rho \frac{\sigma x \sigma y}{\bar{X} \bar{Y}}$$

where  $\bar{X}$  is the mean of tuberculous patients in the areas,  $\bar{Y}$  is the mean of the population in the areas,  $\sigma x^2$  is the variance of tuberculous patients in the areas,  $\sigma y^2$  is the variance of the population in the areas and  $\rho$  is the correlation coefficient of the tuberculous patients and the population. Strictly speaking, while the above procedure provides a most satisfactory set of strata for the estimation of the prevalence rate, it is not necessarily the best for estimating the transition rates.

#### *Organization and execution*

The Council on the Survey of Tuberculosis Prevalence (abbreviated to Tuberculosis Survey Council) was formed at the Ministry of Health and Welfare in the same way as in 1953<sup>1</sup> and was again responsible for the planning of the survey, interpretation of X-ray films, analysis and evaluation of data collected, etc. The prefectures and cities in which the sampling areas were located organized local survey teams responsible for the conduct of the survey on the spot.

As in the previous year, all inhabitants in the sampling areas were examined by tuberculin-testing,

photofluorography, inspection, palpation, percussion and auscultation. Those who showed pathological findings on photofluorography were subjected to X-ray photography, and those who had had tuberculous lesions in the previous year were directly examined by X-ray photography. Bacteriological examination of the sputum was carried out on those who showed tuberculous lesions on X-ray photography.

The Committee on Technical Supervision and Assistance of the Tuberculosis Survey Council met in April 1954 for the preliminary planning of the survey, and at the end of May a pilot survey was carried out in Kashiwa-machi, Chiba prefecture.

In June a preliminary survey was carried out in all sampling areas in order to obtain accurate information on the movement of the population. At the same time, a health education programme directed at all the inhabitants of the sampling areas was put into operation.

At the beginning of July, a general meeting of the Tuberculosis Survey Council was held, and the final plans and methods were laid down. The local authorities and the chiefs of the local survey teams met in Tokyo in the same month to receive their instructions.

The actual survey in the sampling areas was carried out early in July to the middle of November; and at the end of November all X-ray films and cards were collected by the Ministry of Health and Welfare. The X-ray films were interpreted and the final diagnoses made at the beginning of December.

Tabulation and computation of the data collected were done by the Statistical and Research Division of the Ministry of Health and Welfare from the middle of December to the end of February 1955, and in the beginning of March 1955 the Committee on Analysis and Evaluation met to discuss the data collected.

At the end of March, a general meeting of the Tuberculosis Survey Council was held, at which the results of the survey were presented and the final decisions—agreed to by the Council for Tuberculosis Prevention—were reached.

#### DIAGNOSTIC STANDARDS

##### *Classification of pulmonary findings by pathological type*

Classification in accordance with the morphological findings from the chest X-ray photographs was made as follows:

<sup>1</sup> Yamaguchi, M. (1955) *Bull. Wld Hlth Org.*, 13, 1041

- I. Primary tuberculosis
  - A. bipolar primary complex
  - B. unipolar primary complex
    - (a) hilar lymph-node enlargement
    - (b) primary pulmonary lesion
  - C. infiltrative tuberculosis with primary complex
- II. Disseminated tuberculosis
  - A. miliary tuberculosis
  - B. disseminative acinous tuberculosis
- III. Pneumonic-type tuberculosis
  - A. bronchopneumonic-type tuberculosis
  - B. lobar-pneumonic-type tuberculosis
- IV. Infiltrative tuberculosis
  - A. with cavity      B. without cavity

(a) with drainage	(b) without drainage

  - 1. with dissemination    2. without dissemination
- V. Nodular tuberculosis
- VI. Indurative tuberculosis
  - A. circumscribed induration
  - B. lobar induration
- VII. Mixed-type tuberculosis
- VIII. Pleurisy
  - A. with effusion
  - B. with adhesion
    - (a) without thickening
    - (b) with thickening
- IX. Displacement of organs
  - A. mediastinum
  - B. diaphragm
  - C. rib
- X. Calcification
  - A. in lung
  - B. in hilar lymph-nodes
  - C. in pleura
- XI. Deformation by treatment
  - A. pneumothorax
  - B. thoracoplasty
  - C. extrapleural plombage
  - D. phrenic nerve paralysis
  - E. pneumoperitoneum
  - F. pulmonary resection

In the following discussion, this classification is used as follows:

- Primary tuberculosis type . . . I
- Pleurisy type . . . . . VIII A
- Miliary type . . . . . II A
- Infiltrative or mixed type . . . IIB, III, IV, VIB, VII
- Nodular or indurative type . . V, VIA
- Calcification and adhesion type VIII B, IX, X
- Deformation type . . . . . XI

*Classification of pulmonary findings by status or degree of severity*

The classification of pulmonary tuberculosis proposed by the WHO Expert Committee on Tuberculosis<sup>1</sup> was adopted for classification according to radiological status:

- 0. No pathology
- 1. Pulmonary pathology on one side only, no suspicion of cavity
- 2. Pulmonary pathology on both sides, no suspicion of cavity
- 3. Pulmonary pathology on one side only, suspicion of cavity
- 4. Pulmonary pathology on one side only, definite cavity
- 5. Pulmonary pathology on both sides, suspicion of cavity on one side
- 6. Pulmonary pathology on both sides, definite cavity on one side
- 7. Pulmonary pathology on both sides, suspicion of cavity on both sides
- 8. Pulmonary pathology on both sides, definite cavity on one side
- 9. Pulmonary pathology on both sides, definite cavity on both sides

*Classification of pulmonary X-ray findings by course of disease*

The course of pulmonary tuberculosis was evaluated exclusively in those who were examined both in 1953 and in 1954 and had a tuberculous lesion in at least one of the examinations.

The following terms were used:

*Apparently healed.* Those who were classified as "cases" in 1953<sup>2</sup> and in whom no pathological

<sup>1</sup> World Health Organization, Expert Committee on Tuberculosis (1950) *Wld Hlth Org. techn. Rep. Ser.*, 7, 10

<sup>2</sup> In both the 1953 and the 1954 surveys "case" is used to refer to unhealed pathology and does not necessarily have the same connotation as the term "patient".

findings or only healed pathology—i.e., calcification, pleural adhesion, or smaller nodular or indurative lesions—were found in 1954.

*Improvement.* Cases where there was improvement in the principal lesion or marked improvement in other lesions.

*No significant change.* No significant change in the principal lesion, although slight improvement in other lesions might be seen.

*Deterioration.* Deterioration of the lesion, even very slight, or appearance of a new lesion.

*Incidence of tuberculosis.* This expresses the number of persons who had no pathological findings or only healed findings in 1953 but who showed unhealed pathology in 1954 and cases in children born between the surveys.

#### *Classification of pulmonary X-ray findings by extent*

The classification of the United States National Tuberculosis Association was used:

1. Minimal tuberculosis
2. Moderately advanced tuberculosis
3. Far advanced tuberculosis

#### *Classification of extrapulmonary tuberculosis*

For this purpose a somewhat modified version of that used in the International Classification of Diseases was followed:

1. Tuberculosis of meninges and central nervous system
2. Tuberculosis of intestines, peritoneum and mesenteric glands
3. Tuberculosis of vertebrae
4. Tuberculosis of bones and joints
5. Tuberculosis of lymphatic system
6. Tuberculosis of genito-urinary system
7. Tuberculosis of adrenal glands
8. Tuberculosis of other organs
9. Healed tuberculosis of the above-mentioned organs

#### *Classification of management required*

*Medical treatment required.* Those in need of medical treatment by a physician (chemotherapy, surgical treatment, etc.). Far advanced cavitory cases, in which only rest therapy and symptomatic therapy are possible, are included in this category.

*Rest required.* Those who do not need direct medical treatment by a physician but do require rest; for instance, those with slight hilar lymph-node enlargement, slight pulmonary infiltration or slight pleurisy. Patients undergoing rehabilitation are also included in this category.

*Caution required.* Those who are able to work as healthy persons but who need to exercise caution and should be kept under medical surveillance; for instance, patients with fibrotic lesions or recently recovered from pleurisy.

#### *Classification and interpretation of tuberculin-testing*

<i>Reading</i>	<i>Interpretation</i>
Erythema of less than 5 mm in diameter	negative (—)
Erythema of 5-9 mm in diameter	doubtful positive (±)
Erythema of 10 mm and over, with no induration and no double erythema	weak positive (+)
Erythema of 10 mm and over, with induration	medium positive (++)
Erythema of 10 mm and over, with induration and double erythema	strong positive (++++)

A dose of 0.1 ml Old Tuberculin in 1/2000 dilution was injected intradermally into the flexor surface of the left forearm, and the reaction was read 48 hours later.

#### *Tuberculosis death*

Death from tuberculosis was decided according to the criteria used in vital statistical recording on the basis of death certificates. In Japan, List B of the International Classification of Diseases is used for tuberculosis mortality.

#### POPULATION SURVEYED

The number of persons living in the sampling areas at the time of the survey in 1954 was 16 947; of these, a total of 15 336 had been examined in the previous year, and this figure therefore represents the number of persons theoretically to be covered by the 1954 survey. However, of this number, 149 were not examined in the 1953 survey and 17 were only incompletely examined; the remaining 15 170 were examined completely, and the rate of response amounted to 98.9%.

Among the 15 170 fully examined in 1953, 110 died before the 1954 survey, of whom 7 from tuberculosis (pulmonary tuberculosis, 6; tuberculous meningitis, 1).

The number of those born after the survey in 1953 was 284, of whom 3 had died before the 1954 survey. Between the two survey periods, 1745 persons moved out of the sampling areas and another 1330 moved into them from other parts of the country.

The 1745 persons who moved out of the sampling areas were known to include 129 cases, of whom 82 were in the category requiring treatment. The distribution by roentgenological status and by type of lesion was roughly the same for these 129 cases and for the total examined in the first and second surveys. The results of the 1954 survey are therefore considered not to be affected by the absence of 1745 persons from the sample. The 1330 persons who entered the sampling areas are, of course, excluded from the present study.

The final number of persons tuberculin-tested in 1954 was 14 857, all persons with high fever or serious skin disease being excluded from this test. All 15 060 persons for whom a comparison could be made with 1953 (i.e., excluding the 110 deaths between surveys) were given X-ray examinations; 6701 were examined by photofluorography only, 1460 at first by photofluorography and then by X-ray photography, and 6899 by X-ray photography only. Ten requiring X-ray photography but not actually examined were included in the incompletely examined group, but are excluded from the 15 060 persons mentioned above. Bacteriological examinations of sputum were carried out on 2787 persons (18.5% of the total examined), and among them 133 were examined by direct smear only, 2205 both by direct smear and cultivation, and 449 by cultivation only.

Of the 166 who were not examined or only incompletely examined in 1953, 22 had pulmonary pathology at that date, and for 12 of those medical treatment had been recommended. Of the 1745 who were examined in 1953 and later moved to other areas, 129 had pulmonary pathology when examined, and for 82 of those medical treatment was indicated. As the distribution among the above-mentioned cases of type, status and extent of disease in 1953 was almost equal to that of the whole group examined, it is reasonable to assume that the results of the 1954 survey were not influenced by their exclusion.

#### TUBERCULIN-TESTING

Of the 14 793 persons tuberculin-tested both in 1953 and 1954,<sup>1</sup> 6864 (46.4%) had been vaccinated

<sup>1</sup> Of the 14 857 persons tuberculin-tested in 1954, 64 had not been tuberculin-tested in 1953 and are therefore omitted from this comparison.

with BCG in the past, and 2512 (43.2%) of the 5819 persons who showed negative or doubtful positive tuberculin reactions in 1953 were vaccinated with BCG between the two surveys.

The tuberculin positive rate for all persons tested during both surveys was 60.7% in 1953 and 75.4% in 1954, and the rate of induration was 29.4% in 1953 and 39.2% in 1954. Also, among those who had never been vaccinated with BCG the tuberculin positive rate was much higher in 1954 (77.8%) than in 1953 (68.1%); the same was the case with the rate of induration (+, +, +++), which was 50.5% in 1954 against 38.6% in 1953.

Since there is no simple technical means available for differentiating between tuberculin positive conversion caused by natural infection and that caused by BCG vaccination, all persons vaccinated with BCG should be omitted from the sample population in order to obtain information on the tuberculin positive conversion rate. But even then it is very difficult to analyse the results because of the uncertainty connected with the tuberculin test itself. However, the prevalence of positive tuberculin reactions in the sample population was considerably higher in 1954 than in 1953, and though further analysis is not possible we feel that heavy infection took place during the year between the two surveys.

#### INCIDENCE OF TUBERCULOSIS

As stated earlier, the incidence of tuberculosis represents the new cases of tuberculosis found in 1954 among persons who in 1953 had had healed lesions or no tuberculosis pathology or among newborn children.

It will be seen from Table 1 that the incidence rate of pulmonary tuberculosis in one year was 0.4% for both males and females; no new cases occurred in males over 50 years of age or in females over 60 years.

Type, status and extent of disease in the cases detected in 1954 are given in Table 2. No cavity cases were found, but approximately 15% had doubtful cavity. As to the extent of disease, 85% were minimal cases; however, in all of them medical treatment was indicated, except in one who required rest only.

Ten of the cases noted in 1954 had been found between the two surveys to suffer from the disease and had been receiving treatment up to the time of the survey in 1954.

It should be mentioned here that owing to differences in the methods of diagnosing pulmonary and

TABLE 1  
INCIDENCE OF PULMONARY TUBERCULOSIS BY AGE AND SEX, 1954<sup>a</sup>

Age (years)	Males				Females			
	Healed or no pathological finding in 1953	Cases detected in 1954	Incidence (%)	Distribution (%)	Healed or no pathological finding in 1953	Cases detected in 1954	Incidence (%)	Distribution (%)
0-6	1 391	8	0.6	33.3	1 371	8	0.6	27.6
7-14	1 441	3	0.2	12.5	1 354	5	0.4	17.2
15-29	1 610	6	0.4	25.0	1 687	5	0.3	17.2
30-49	1 373	7	0.5	29.2	1 865	9	0.5	31.0
50 and over	1 007	—	—	—	1 148	2	0.2	6.9
Unknown	1	—	—	—	1	—	—	—
Total	6 823	24	0.4	100.0	7 426	29	0.4	100.0
Newborn	138	1	0.7	—	146	—	—	—

<sup>a</sup> In this table, "healed" means all cases belonging to categories VIII B, IX and X, and the part of V and VI A which were defined as "healed" by the Committee on Analysis and Evaluation for each individual case, taking into consideration all other available data of relevance with regard to size of focus, area affected, and bacteriological findings. "No pathological finding" means those in whom no radiological pathology was found.

extrapulmonary tuberculosis, the results for the latter type of disease may not be as accurate as those for the former.

The incidence rate of extrapulmonary tuberculosis was 0.1% and, as shown in Table 3, nearly half the cases were found in the age-group 15-29 years. Of the 13 new cases of extrapulmonary tuberculosis, 2 had tuberculosis of the intestines, peritoneum or mesenteric glands, 2 had tuberculosis of bones and joints, and 9 (almost 70%) had tuberculosis of the lymphatic system.

One out of 53 cases of pulmonary tuberculosis detected in 1954 (i.e., excluding the one case in a newborn child) had been found to have extrapulmonary tuberculosis in 1953, and 4 out of 13 cases

of extrapulmonary tuberculosis detected in 1954 had been found to have pulmonary tuberculosis in 1953.

Thus altogether 61 cases were found in 1954 among the 14 222 who were without tuberculosis in 1953—an annual incidence rate of 0.4% for all forms of tuberculosis. (The total of 14 222 is obtained by subtracting the 921 pulmonary and 27 extrapulmonary cases in 1953 from the 15 170 persons fully examined in that year.)

#### PULMONARY TUBERCULOSIS

Of the 921 pulmonary cases in 1953, 214 (23.2%) received medical treatment during the year. Of 515 persons for whom medical treatment had been

TABLE 2  
TYPE, STATUS AND EXTENT OF PULMONARY TUBERCULOSIS IN CASES DETECTED IN 1954

Type	No. of cases	%	Status	No. of cases	%	Extent	No. of cases	%
Primary tuberculosis	16	29.6	With cavity	—	—	Far advanced	4	7.4
Pleurisy	3	5.6	Suspicion of cavity	8	14.8	Moderately advanced	4	7.4
Infiltrative or mixed type	35	64.8	Without cavity	46	85.2	Minimal	46	85.2
Total	54	100.0	Total	54	100.0	Total	54	100.0

TABLE 3  
INCIDENCE OF EXTRAPULMONARY TUBERCULOSIS, 1954<sup>a</sup>

Age (years)	Healed or no pathological finding	Cases detected in 1954	Incidence (%)	Distribution (%)
0-6	2 796	3	0.1	23.1
7-14	2 818	—	—	—
15-29	3 486	6	0.2	46.2
30-49	3 579	3	0.1	23.1
50 and over	2 443	1	0.0	7.7
Unknown	2	—	—	—
Total	15 124	13	0.1	100.0
Newborn	284	—	—	—

<sup>a</sup> In this table, "healed" means cases who were found with healed extrapulmonary tuberculosis in 1953. "No pathological finding" means those who were found without extrapulmonary tuberculosis in 1953.

indicated in 1953, 187 (36.3%) had in fact received some form of treatment during the year. In classifying by age-group, the highest figure was obtained in the group 15-29 years of age (48.2%), while among schoolchildren and persons over 50 years of age, the percentage was rather low. No significant difference was observed in classifying by sex.

The most prevalent form of treatment was chemotherapy, which was given to 80.5% of all those needing treatment (9.0% combined with other treatment and 71.5% chemotherapy alone). Medical collapse therapy was given in 4.7%, surgical treatment in 1.9%, medical collapse therapy with chemotherapy in 5.1%, surgical treatment with chemotherapy in 3.9% and other treatment in 12.8%. Classified by sex, chemotherapy was given more frequently in females, whereas surgical treatment and medical collapse therapy were given more frequently in males.

Of 207 persons given chemotherapy between the 1953 and 1954 surveys, detailed information was obtained on 175, and among them, only 78 (44.6%) were given combination therapy with streptomycin 30 g and *p*-aminosalicylic acid 1000 g or more.

In 1954, 68 persons were hospitalized (26.5% of those treated). Of 230 persons for whom hospitalization was indicated in 1953, only 40 (17.4%) were in fact admitted to hospital. Classified by sex, of those who were hospitalized in 1954, 46 were male and

22 were female; thus the ratio of males to females was 2.1. The ratio of males to females for persons requiring hospitalization in 1953 was 1.8, and the proportion was thus nearly the same.

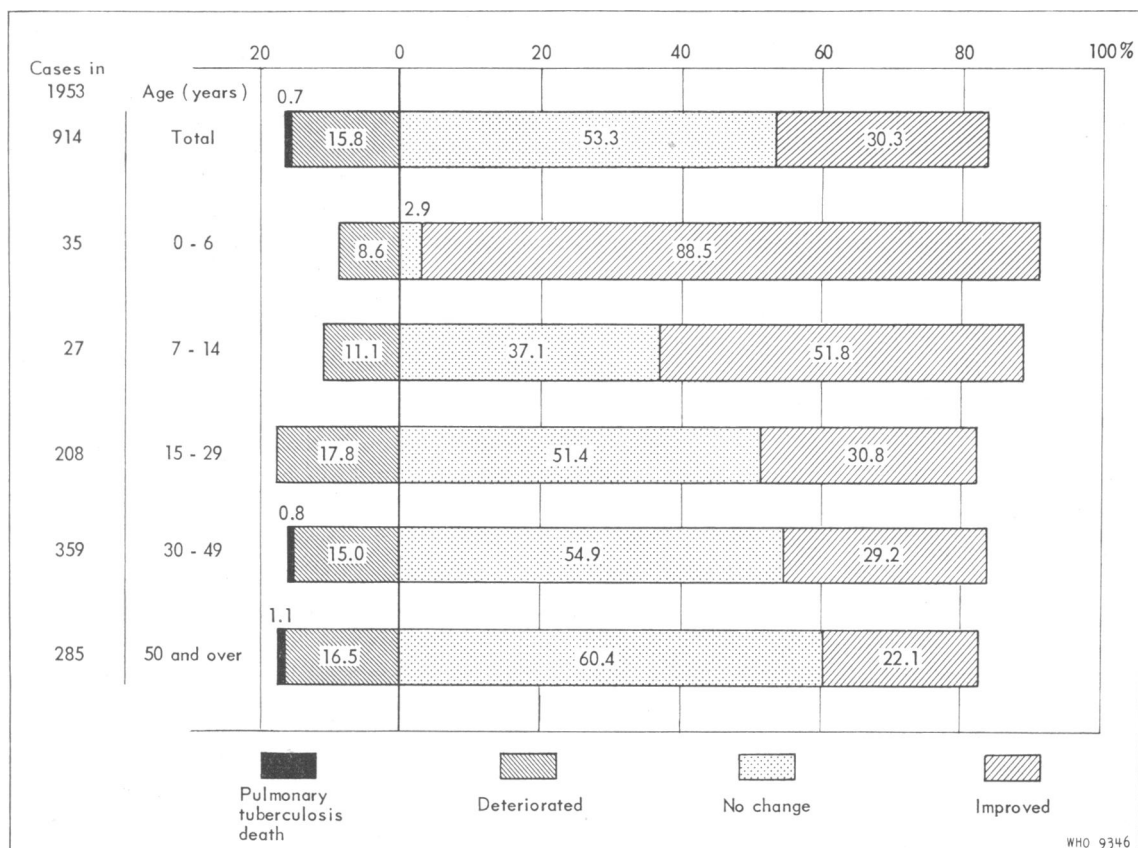
#### Course

Of the cases found in 1953, 30.3% had improved, 53.3% showed no significant change, 15.8% had deteriorated and 0.7% had died of tuberculosis by the time of the 1954 survey. No significant difference was observed by sex. By age-group, as shown in Fig. 1, the prognosis was best among children under 6 years of age; the rate of improvement decreased with increasing age.

Judged by the type of lesions observed in 1953, as shown in Fig. 2, the course of primary tuberculosis was very good, i.e., over 90% showed improvement and among these approximately 55% were healed; only one case out of 33 showed deterioration. No deaths from pulmonary tuberculosis were seen among these cases. The course was worst in persons with tuberculosis of the mixed or infiltrative type, the rate of improvement being the lowest observed and only 3.9% being healed; the rate of deterioration was the highest observed and all 6 deaths from pulmonary tuberculosis were found in this group. The group with tuberculosis of the nodular or indurative type showed the most stable course; however, the rate of improvement was higher than in the group with tuberculosis of the mixed or infiltrative type and the rate of deterioration was higher than in the group with primary tuberculosis. The course of the disease in the group with deformations lay between that of the group with primary tuberculosis and that of the group with tuberculosis of the nodular or indurative type.

Judged by the status of pulmonary tuberculosis, as shown in Fig. 3, the course of cavitory cases was most unstable: the rate of deterioration was the highest observed and 3 out of 96 died from tuberculosis within a year; the rate of improvement was not very low, but no healing was seen. The course of the doubtful cavitory cases was a little better than that of cavitory cases—the rate of improvement was lower than in the latter group, but 2.4% of the doubtful cavitory cases were healed at the time of the second survey. The rate of deterioration was lower in the doubtful cavitory cases than in the cavitory cases, and the rate of death from pulmonary tuberculosis was less than half that of cavitory cases. The course of non-cavitory cases was very good and no deaths from tuberculosis occurred in this group.

FIG. 1  
COURSE OF PULMONARY TUBERCULOSIS BY AGE



Judged by the extent of disease, as shown in Fig. 4, the course was best in minimal cases and worst in far advanced cases; i.e., the rate of improvement was seen to increase from the group of far advanced cases to the group of minimal cases while the opposite was observed in the rate of deterioration. More than 6% of the far advanced cases died from tuberculosis; no deaths occurred among the minimal cases.

The course was better in the group with negative findings at the bacteriological examination carried out at the first survey than in the group with positive findings; among 104 bacteriologically positive cases, 38 (36.5%) showed improvement, 42 (40.4%) no change, 19 (18.3%) deterioration, and 5 (4.8%) died from tuberculosis; and among 430 bacteriologically negative cases, 126 (29.3%) showed improvement, 240 (55.8%) no change, 63 (14.6%) deterioration, and 1 (0.2%) died from tuberculosis.

Judged by the type of management indicated, of a 1953 total of 513 cases requiring medical treatment 31.6% showed improvement, 50.3% no change, 17.0% deterioration, and 1.2% died of tuberculosis. Of 38 cases for whom rest was indicated, 50.0% showed improvement, 26.3% no change, and 23.7% deterioration. Of 363 persons needing to exercise caution, 26.5% showed improvement, 60.3% no change and 13.2% deterioration. (It will be noticed that whereas a total of 921 tuberculosis cases in 1953 has been mentioned earlier, the present discussion is based on a total of 914. This difference is explained by the fact that seven of the 921 cases died between the surveys of causes other than tuberculosis and are therefore omitted from the consideration of the course of pulmonary tuberculosis.)

Judged by whether medical treatment was in fact received, the group given such treatment showed



FIG. 2  
COURSE OF PULMONARY TUBERCULOSIS BY TYPE OF DISEASE

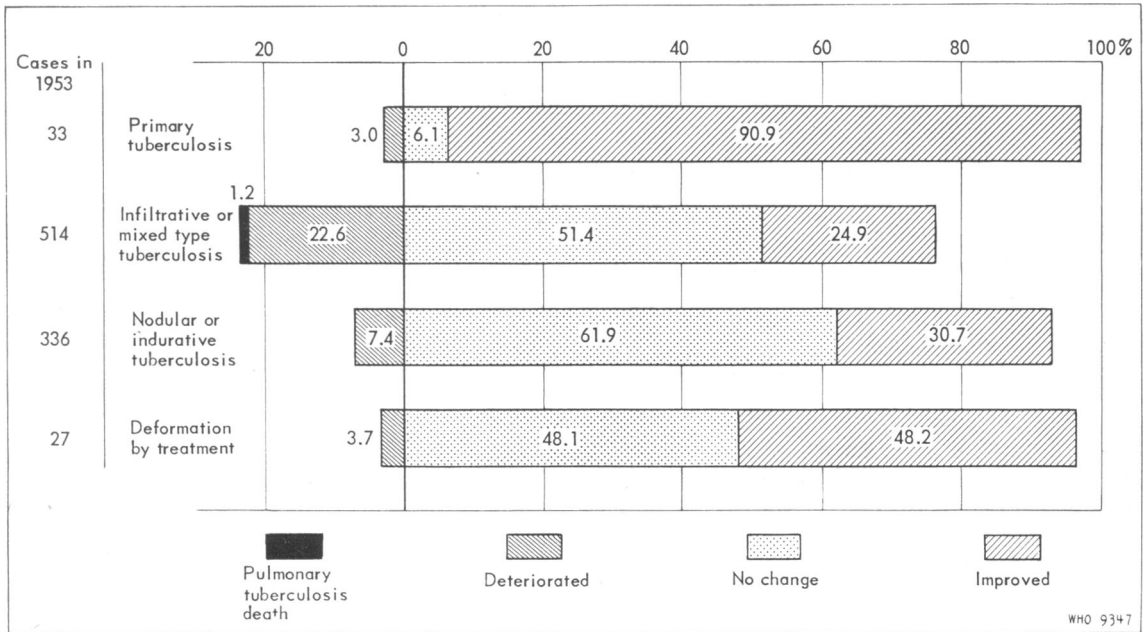
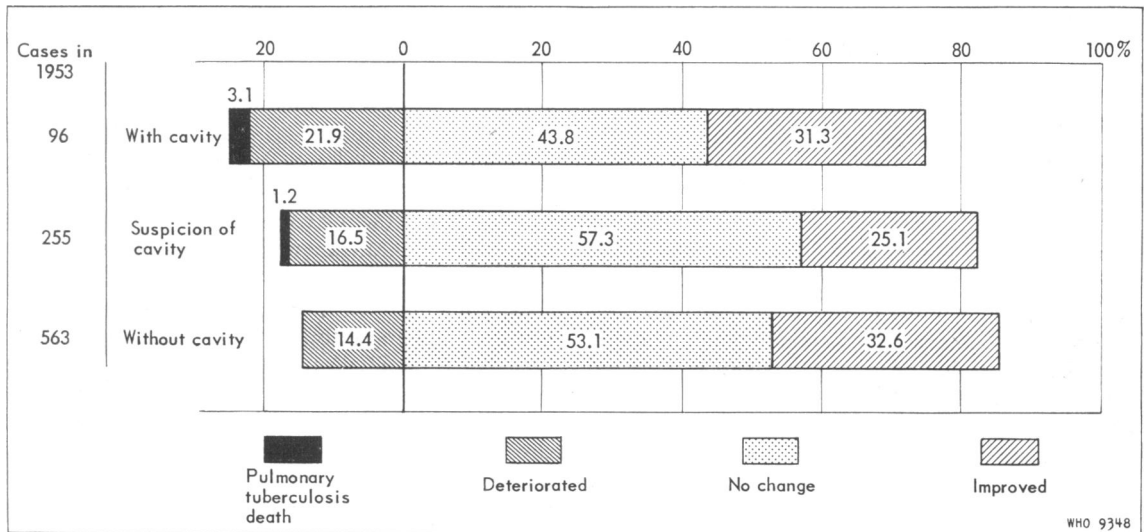


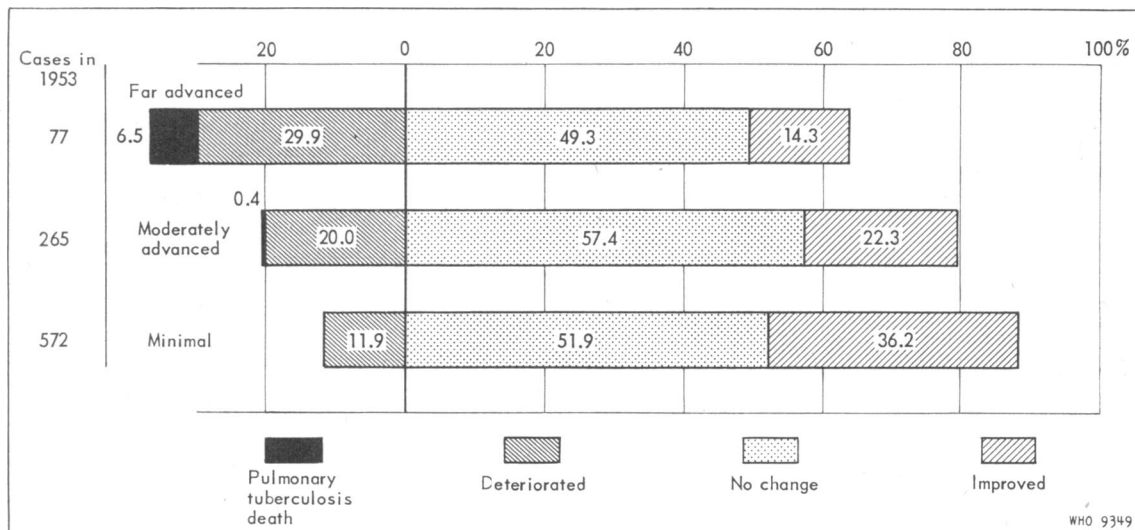
FIG. 3  
COURSE OF PULMONARY TUBERCULOSIS BY STATUS OF DISEASE



improvement in 35.0%, no change in 42.0%, deterioration in 21.0% and death from tuberculosis in 1.9%; whereas among the 700 cases not treated, 28.8% showed improvement, 56.7% no change, 14.1% deterioration, and 0.3% died of tuberculosis.

These results might give the impression that the course of tuberculosis with medical treatment is worse than that without treatment; comparing the course of tuberculosis with and without treatment in the groups with cavity and with suspicion of

FIG. 4  
COURSE OF PULMONARY TUBERCULOSIS BY EXTENT OF DISEASE



cavity and with far advanced and moderately advanced tuberculosis (Fig. 5), improvement was observed more frequently among the treated cases. However, deterioration was also observed more frequently among the treated cases in the cavitation group and the far advanced cases. This may be explained by the fact that relatively severe cases were included in treated cases, and that some cases were given treatment because of deterioration of the disease.

#### Transition

Of the 921 cases in 1953, 85.0% continued to show unhealed pathology, 13.6% were healed, 0.6% died of tuberculosis, and 0.8% died of causes other than tuberculosis. Of 1664 persons with healed pathology in 1953, 0.4% showed unhealed pathology, 6.1% showed no pathological changes, 1.0% died of causes other than tuberculosis, and 92.6% remained healed. Of 12 585 persons who had not shown pathological findings in 1953, 0.4% showed unhealed pathology, 1.9% showed healed lesions, 0.7% died of non-tuberculous disease, and the remaining 97.1% continued to show no pathological findings in 1954. No significant difference was observed by sex in the transition of pulmonary tuberculosis.

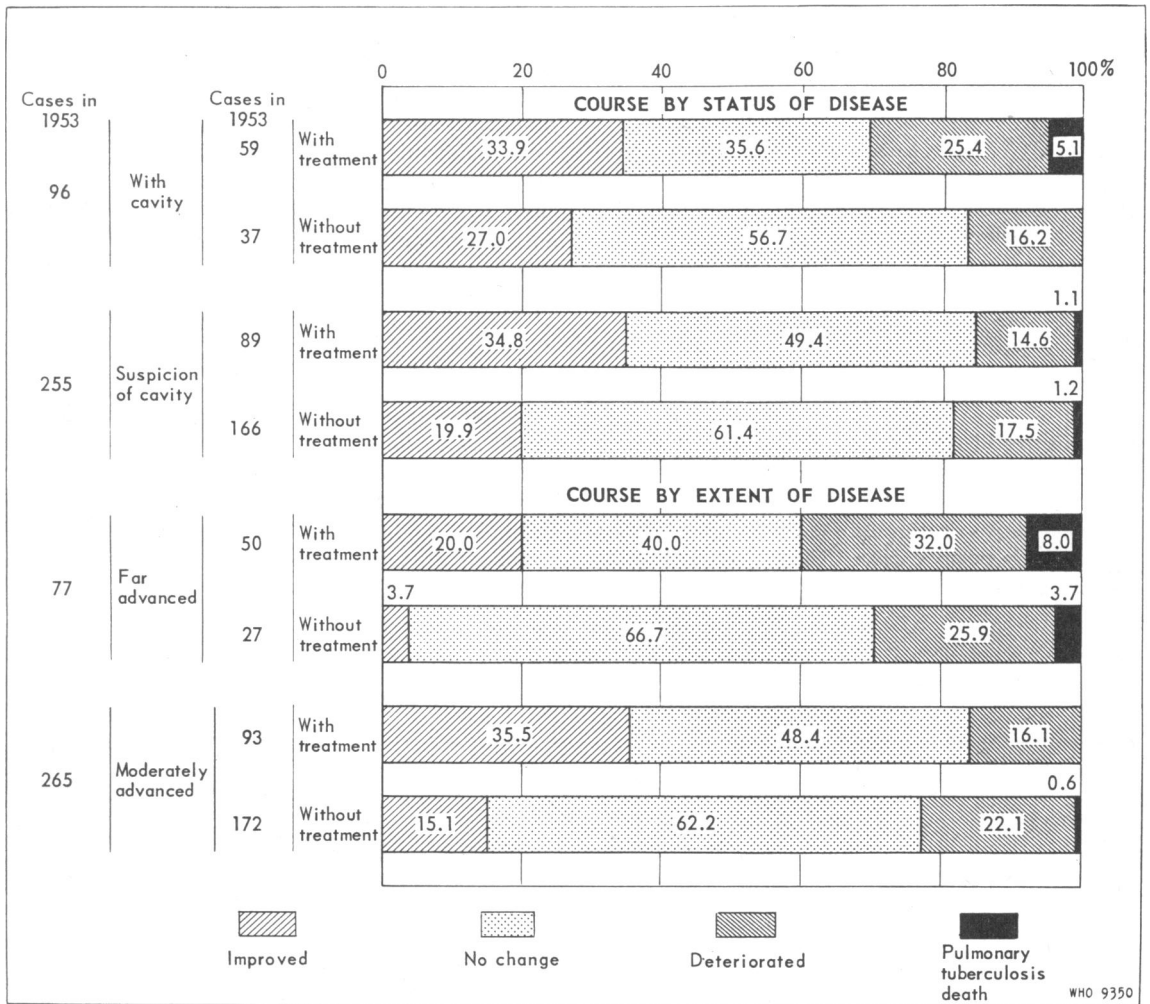
A transition from unhealed to healed pathology was observed most frequently among children under 6 years of age (18 out of 35 cases, or 51.4%), and

next from 7 to 14 years of age (11 out of 27 cases, or 40.7%); over 15 years of age the rate was 11.2% (96 out of 859 cases).

Fig. 6 shows the transition of pulmonary tuberculosis by type of disease (pleurisy and miliary tuberculosis excepted). Nearly 40% of the cases of primary tuberculosis remained unchanged, but over half the cases healed within a year, and one primary case out of 33 changed to a case of the mixed or infiltrative type. The rate of cases remaining in the same group was much higher for the groups with tuberculosis of the mixed or infiltrative type and the nodular or indurative type; 5% of the former group changed to the latter and approximately 4% of the latter to the former. In the group with deformations, 6 out of 27 changed to the mixed or infiltrative type. The two cases of pleurisy changed to cases of the calcification or adhesion type, and the only case with miliary tuberculosis found during the first survey in the sample population followed up changed to the mixed or infiltrative type. These three cases are not included in Fig. 6. Among 1442 cases with calcification and adhesion at the first survey (not included in Fig. 6), 6 cases (0.4%) changed to the mixed or infiltrative type and 5 cases (0.3%) to the nodular or indurative type.

Fig. 7 shows the transition of pulmonary tuberculosis by status of disease. In the cases with cavity, the rate of transition is rather higher than expected;

FIG. 5  
COURSE OF PULMONARY TUBERCULOSIS ACCORDING TO TREATMENT



36.1% changed to cases with doubtful cavity or without cavity. More than a quarter of the cases with doubtful cavity were found to have no cavity during the second survey. The rate of transition to cavity was much higher in the cases with doubtful cavity than in those without cavity.

Transition of pulmonary tuberculosis by extent of disease is shown in Fig. 8. The rate of transition is smaller in the groups of far advanced and moderately advanced cases than in the group of minimal cases. In the latter group, over 20% of the cases were healed, but only 3 out of 265 among the moderately advanced cases and none among the far advanced

cases were healed at the time of the second survey. The tuberculosis death-rate was much higher among the far advanced cases than among the moderately advanced cases; no deaths occurred from tuberculosis among the minimal cases.

Table 4 gives the transition of bacteriological findings among 1369 persons with pulmonary tuberculosis (including those with healed pathology in 1953) in whom bacteriological examinations were carried out during both surveys. Approximately half the cases that were positive at the first examination proved negative at the second examination, while 2.3% of those negative at the first examination

**TABLE 4**  
**TRANSITION OF BACTERIOLOGICAL FINDINGS**

		1953	
		Positive	Negative
1954	Total	92	1 277
	Positive	39	29
	Negative	46	1 223
	Deaths	7	25
	Tuberculosis death	5	1
Other death	2	14	

were positive at the second. This means that over 40% of the cases found positive at the bacteriological examination in 1954 were negative the previous year. The tuberculosis death-rate was much higher among the originally positive cases (5.4%) than among the negative cases (0.1%). Five out of 6 deaths from

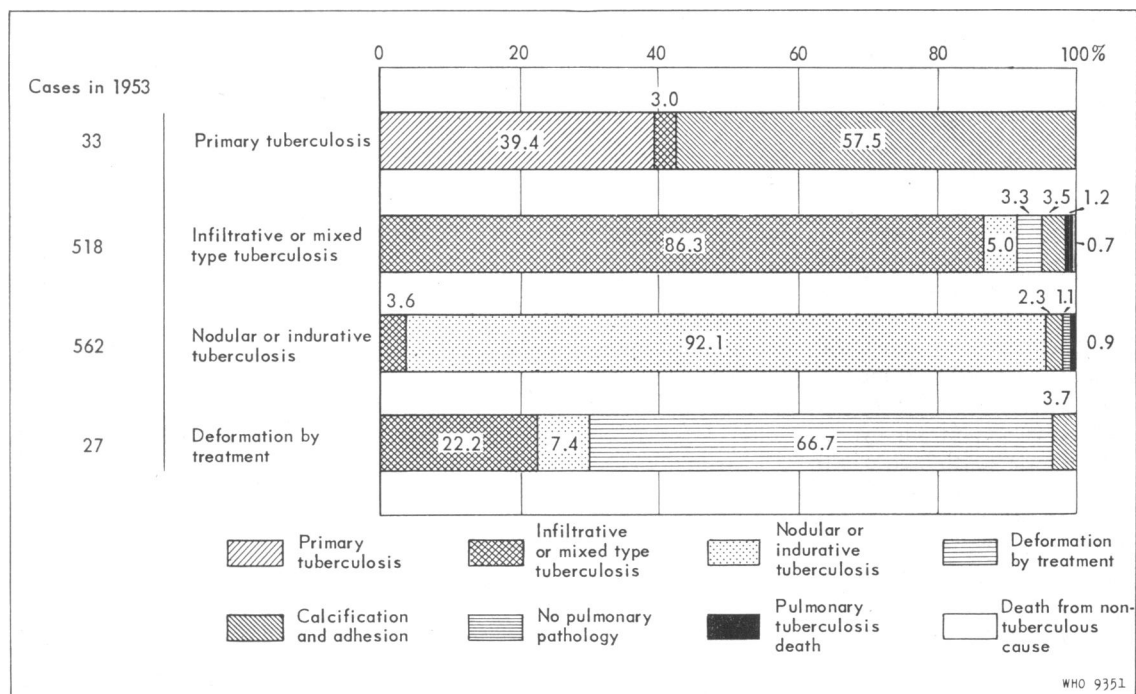
tuberculosis occurred among the bacteriologically positive cases.

Transition of pulmonary tuberculosis according to the advice given during the first survey is shown in Fig. 9. Over 80% of the cases where medical treatment and caution were required remained in the same categories. Nearly 17% of the former group were found to require no medical treatment during the second survey, while approximately 13% of the latter group were found to require medical treatment during the second survey. All deaths from tuberculosis occurred in the group requiring medical treatment according to the results of the first survey.

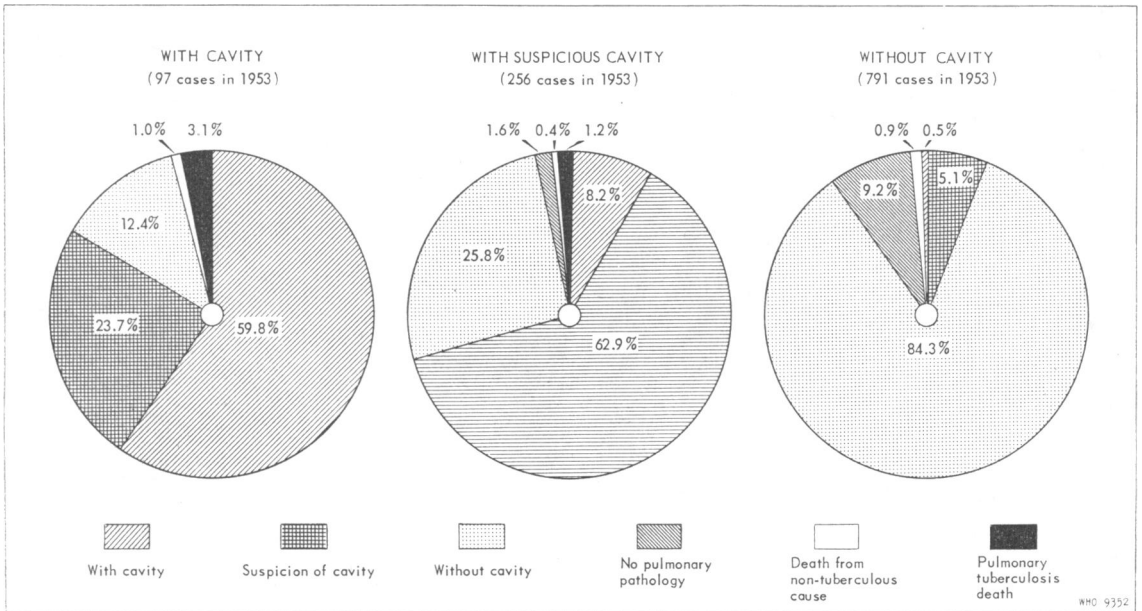
**EXTRAPULMONARY TUBERCULOSIS**

Extrapulmonary tuberculosis was diagnosed on the basis of physical examinations only, and the results are therefore somewhat less precise than those for pulmonary tuberculosis. In view of this and of the relatively small numbers involved, extrapulmonary tuberculosis may be given briefer consideration.

**FIG. 6**  
**TRANSITION OF PULMONARY TUBERCULOSIS BY TYPE OF DISEASE**



**FIG. 7**  
**TRANSITION OF PULMONARY TUBERCULOSIS BY STATUS OF DISEASE**



**FIG. 8**  
**TRANSITION OF PULMONARY TUBERCULOSIS BY EXTENT OF DISEASE**

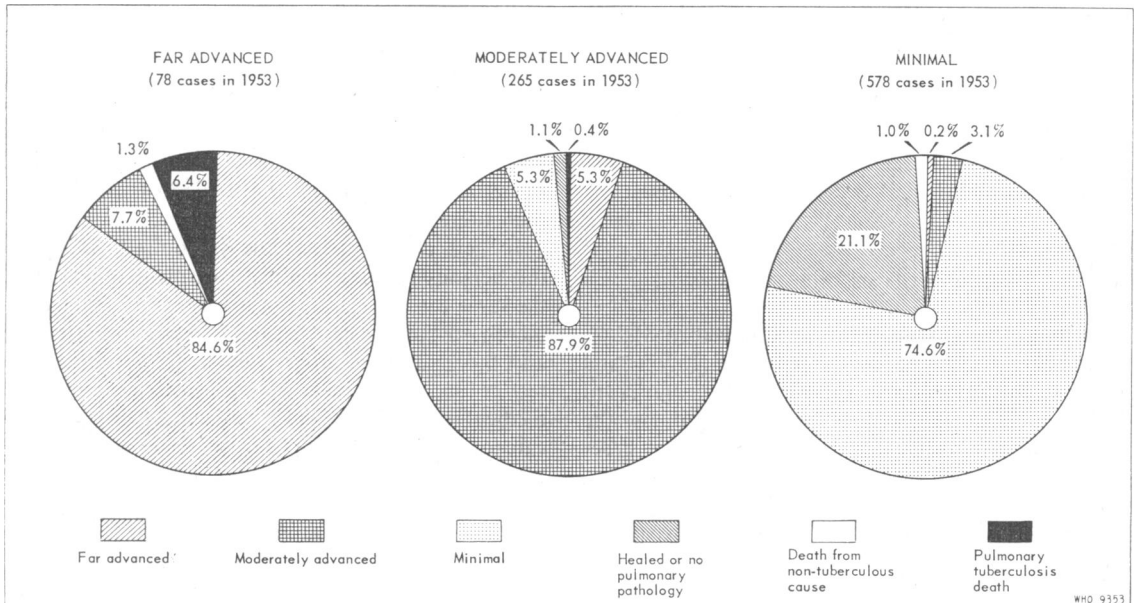
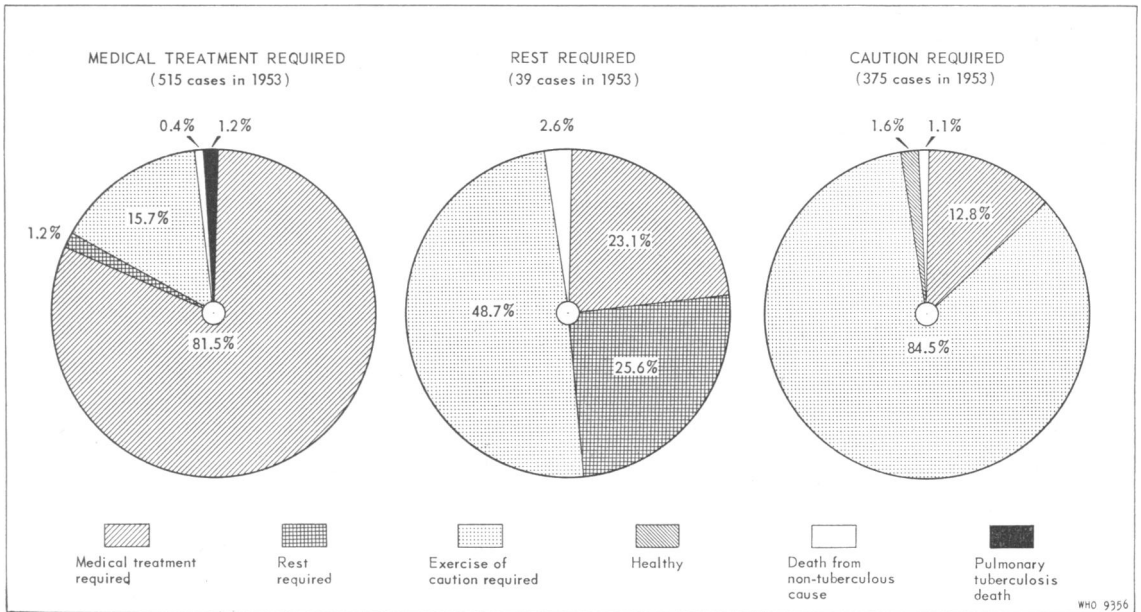


FIG. 9  
TRANSITION OF PULMONARY TUBERCULOSIS BY MANAGEMENT REQUIRED



As to the course of this form of tuberculosis, healing or improvement was observed in 69.8% of the cases found in 1953, no change in 25.6%, deterioration in 2.3% and extrapulmonary tuberculosis death in 2.3%. No significant difference was observed by sex, and 41% of cases received treatment during the year between surveys.

In considering the transition of the disease, it was found that of 46 cases with unhealed pathology, 18 (39.1%) remained in the same category, 24 (52.2%) healed, 1 (2.2%) died of extrapulmonary tuberculosis and 3 (6.5%) died of other causes.

#### TUBERCULOSIS, ALL FORMS

Healing or improvement was observed in 31.1%, no change in 52.1%, deterioration in 15.9% and death from tuberculosis in 0.7%. No significant difference was observed by sex. Judged by the management required, the medical treatment cases improved in 32.8%, showed no change in 49.0%, deteriorated in 16.9% and died of tuberculosis in 1.3%. The case needing rest showed improvement in 47.5%, no change in 27.5% and deterioration in 25.0%. Persons needing to exercise caution im-

proved in 26.8%, showed no change in 59.8%, and deteriorated in 13.4%.

The unhealed cases remained unhealed in 84.0%, healed in 14.6%, died of tuberculosis in 0.7% and died of non-tuberculous disease in 0.7%. Of those with healed pathology, 0.5% became unhealed, 92.5% remained healed, 6.0% showed no pathological findings and 1.0% died of causes other than tuberculosis. Among persons with no pathological findings in 1953, 0.4% showed unhealed pathology, 1.9% showed healed lesions, 97.0% continued to show no pathology and 0.6% died of causes other than tuberculosis.

Judged by the management required, 79.6% of the persons needing medical treatment remained in the same category, 1.1% required rest, 17.6% needed merely to exercise caution, 1.3% died of tuberculosis and 0.4% died of other causes. Of those needing rest in 1953, 24.4% changed to the category requiring medical treatment, 24.4% remained in the same category, 48.8% needed to exercise caution, and 2.4% died of causes other than tuberculosis. Among persons needing to exercise caution in 1953, 12.9% required medical treatment, 1.1% died of causes other than tuberculosis, 84.1% remained in the same group, and 1.9% showed no pathological findings.

## RÉSUMÉ

Le Ministère de la Santé et de la Prévoyance sociale du Japon avait organisé en 1953 une vaste enquête en vue de déterminer la fréquence globale de la tuberculose dans l'ensemble du pays. Une nouvelle enquête fut menée en 1954, sur une base plus restreinte, afin d'obtenir des informations sur les tendances de la morbidité tuberculeuse. Sur les 210 secteurs couverts par l'enquête de 1953, 70 furent choisis par une méthode d'échantillonnage appropriée, et toutes les personnes vivant dans ces secteurs qui avaient été examinées en 1953 furent à nouveau soumises à un examen radiologique et à une tuberculino-réaction. Le nombre total de sujets compris dans l'une et l'autre enquête a été de 15 170; en plus, 281 enfants nés dans l'année furent également examinés.

Les auteurs procèdent à une analyse détaillée des résultats comparés fournis par les deux séries d'exams, en ce qui concerne notamment le type de lésion, la gravité et l'évolution des cas, le traitement requis, etc. On peut citer les quelques constatations suivantes:

Le taux des virages à la positivité parmi les sujets qui avaient présenté en 1953 une réaction négative ou une réaction positive douteuse, et qui n'avaient jamais encore été vaccinés au BCG, a été de 31,7%. Ces faits donnent lieu de penser que la fréquence de l'infection tuberculeuse est encore très élevée au Japon.

Le taux des virages à la négativité parmi les sujets non vaccinés réagissant positivement en 1953 a été de 2,1%; ces virages ont été observés plus fréquemment chez des sujets à réaction faible et chez des enfants âgés de moins de 6 ans.

Le taux de fréquence des cas nouveaux a été de 0,4%

pour la tuberculose pulmonaire — un cas étant décelé chez un enfant né dans l'année — et de 0,1% pour la tuberculose non pulmonaire.

Des sujets atteints de tuberculose pulmonaire en 1953, 30,3% ont présenté une amélioration de leur état, 15,8% une aggravation, 53,3% étaient stationnaires et 0,7% étaient morts entre temps. Une évolution favorable des lésions a été constatée dans la tuberculose primaire, une cicatrisation s'étant produite dans 55% des cas. C'est dans les cas avec infiltration et de type mixte que la proportion des aggravations a été la plus forte.

Parmi les sujets reconnus en 1953 justiciables d'un traitement médical, 36,3% ont été l'objet d'un traitement au cours de l'année, dans la majorité des cas la chimiothérapie. Quant à ceux qui auraient dû être hospitalisés, 17,4% seulement le furent effectivement.

Des malades nécessitant un traitement médical en 1953, 81,5% ont encore été reconnus comme tels en 1954, et 16,9% étaient passés dans l'une des deux catégories: cas nécessitant le repos ou cas à surveiller. D'autre part, 84,5% des cas à surveiller décelés en 1953 se retrouvaient dans la même catégorie en 1954, tandis que 12,8% étaient devenus justiciables d'un traitement médical et que 1,6% avaient guéri.

Pour la première fois, il a ainsi été possible d'avoir quelques éclaircissements sur l'évolution de la morbidité tuberculeuse au Japon. Toutefois, en raison du caractère chronique de la maladie et du bref intervalle qui a séparé les deux enquêtes, il sera indiqué de poursuivre les enquêtes de ce genre afin de pouvoir apprécier plus exactement cette évolution.