

Estimate of Tuberculosis Prevalence in the United States, 1956

STANLEY GLASER, DONALD A. TRAUGER, and
ARTHUR H. WYMAN

THE PREVALENCE of tuberculosis is the total number of cases on any one day. At the beginning of 1956, there were an estimated 250,000 active cases of tuberculosis in the continental United States. Of this number, 150,000, or 60 percent, were known to State and local health departments. The rest of the estimated number comprised unknown cases, that is, currently unreported cases and a small number previously reported but since lost to supervision (table 1).

The estimates show that there also were 550,000 inactive cases. Of these, 250,000 were known to the health departments. The total number of active and inactive cases was estimated at 800,000.

In addition, there were an estimated 1,200,000 persons who once had tuberculosis but who do not now require supervision according to State and local health department standards. Although these persons do not now require public health supervision, they constitute a reservoir of potential cases susceptible to reactivation.

Change From 1952

The last estimates of prevalence of tuberculosis in the United States were made in 1952 (1). Because subsequent data indicated that

Mr. Glaser serves as chief statistician, and Mr. Wyman, statistician, with the Program Services Section, Tuberculosis Program, Division of Special Health Services, Public Health Service. Mr. Trauger is director of the social research division, National Tuberculosis Association.

the figures for 1952 had been overstated, it was necessary to adjust some of the 1952 estimates downward. Both original and adjusted figures are shown in table 2. In calculating the percent change between 1952 and 1956, the adjusted estimates were used.

In 1956, the estimated total number of active cases shows a drop of about 30 percent from 350,000 in 1952; the known cases in this category decreasing by 20 percent, and the number of unknown cases by 35 percent.

In 1952, the total of estimated inactive cases was 600,000. This number had decreased to 550,000 by 1956, a change of nearly 10 percent. While the figure for the known inactive cases remained at 250,000, the estimated number of unknown inactive cases dropped from 350,000 to 300,000.

Although there has been a sizable decline in active tuberculosis cases in the United States, and a small decline in the inactive cases, the number of persons who once had active tuberculosis shows a 15 percent increase, from 1,050,000 in 1952 to 1,200,000 in 1956. The total number of cases of tuberculosis plus the persons who once had the disease has apparently remained at about 2,000,000.

Active cases are declining more rapidly than inactive cases, and unknown active cases, those not known to the health departments, are declining most rapidly.

The proportion of active cases hospitalized is increasing. Of the active cases known to health departments in 1952, 55 percent were hospitalized. In 1956, 60 percent were hospitalized (fig. 1).

Although active cases are becoming inactive at a more rapid rate than in the past, an increasing proportion of the patients remain on drug

Table 1. Number and rate of tuberculosis cases and persons who once had tuberculosis, 1956¹

Category	Number	Rate per 100,000 population ²
Total cases.....	800,000	480
Known.....	400,000	240
Unknown.....	400,000	240
Active cases.....	250,000	150
Known.....	150,000	90
Unknown.....	100,000	60
Inactive cases.....	550,000	330
Known.....	250,000	150
Unknown.....	300,000	180
Persons who once had tuberculosis.....	1,200,000	720
Total cases plus persons who once had tuberculosis.....	2,000,000	1,200

¹ All estimates rounded to the nearest 50,000. Rates are rounded to the nearest 10 per 100,000 population.

² Based on population of the continental United States for July 1, 1956, as published in Bureau of Census Current Population Reports, series P-25, No. 146.

therapy for substantial periods of time after they have ceased to be active. The revised 1952 estimates of known cases indicate that of the total cases known to health departments at that time, 45 percent were active. In 1956 the proportion of these cases known to health departments was somewhat less, about 40 percent. Although the proportion of inactive cases was larger in 1956 than in 1952 (fig. 2), the actual number of inactive cases known to health departments was about the same in 1956 as in 1952 (table 2).

Basis of 1956 Estimates

Source data on which these estimates were based varied greatly in reliability. The following sections of this report describe the source materials and methods used in a way to permit evaluation of the soundness of the separate estimates derived.

Known Active Cases

The known active cases include: (a) all diagnosed cases of tuberculosis in tuberculosis hospitals (including a small number of cases diagnosed other than active, but excluding suspects or persons under observation for tuber-

Table 2. Tuberculosis cases and persons who once had tuberculosis, 1952 and 1956, showing number and percent change¹

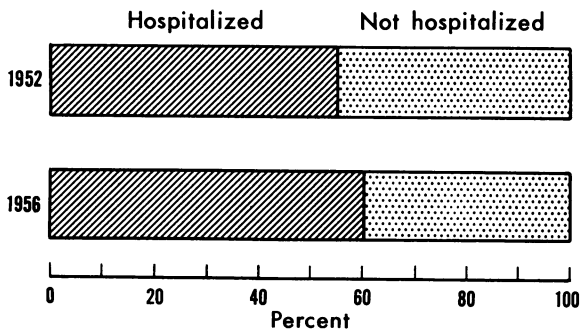
Category	1952 estimates		1956 estimates	Percent change 1952-56 ³
	Published	Adjusted ²		
Total cases.....	1,200,000	950,000	800,000	-15
Known.....	500,000	450,000	400,000	-10
Unknown.....	700,000	500,000	400,000	-20
Active cases.....	400,000	350,000	250,000	-30
Known.....	250,000	200,000	150,000	-20
Unknown.....	150,000	150,000	100,000	-35
Inactive cases.....	800,000	600,000	550,000	-10
Known.....	250,000	250,000	250,000	0
Unknown.....	550,000	350,000	300,000	-15
Persons who once had tuberculosis.....		1,050,000	1,200,000	+15
Total cases plus persons who once had tuberculosis.....		2,000,000	2,000,000	0

¹ All estimates rounded to the nearest 50,000.

² Adjusted according to information available since publication of the 1952 estimates.

³ Percent changes were computed from the 1952 adjusted estimates and the 1956 estimates before any rounding. Percentages rounded to the nearest 5 percent. The basic data available for arriving at these estimates are not precise enough to lend confidence to small differences resulting from further manipulation of these figures.

Figure 1. Hospitalization status of known active cases, 1952 and 1956



culosis); (b) clinically active cases in mental and penal institutions; and (c) all cases clinically active at home and known to health departments.

The sources of the data for known cases were:

- The Public Health Service tuberculosis bed census of April 1, 1956, giving the number of tuberculosis beds occupied in all Federal and non-Federal hospitals, except mental and penal institutions, having facilities for treating tuberculosis.

- The Tuberculosis Hospital and Sanatorium Directory published in 1954 by the National Tuberculosis Association showing the number of tuberculosis beds in mental and penal institutions in 1953.

- Annual tuberculosis reports prepared by State health departments and submitted to the Public Health Service, showing the number of cases hospitalized and active cases at home.

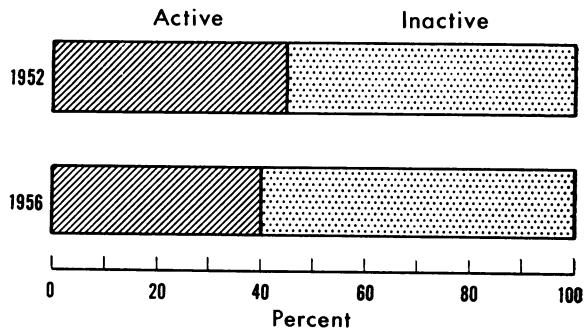
- Tuberculosis case register summary reports received by the Public Health Service from State and local health departments, showing cases known to health departments (2).

- The nationwide nonhospitalized tuberculosis patient study conducted by the Tuberculosis Program of the Public Health Service in 1954 and 1955 (3, 4).

- Additional supplementary data, such as published reports of health departments.

The tuberculosis bed census includes data on all tuberculosis beds in the Nation, except those in mental and penal institutions. The 80,000 tuberculosis beds occupied as reported by the bed census may be taken as the total number of cases in all hospitals except mental and penal institutions. These data were substan-

Figure 2. Clinical status of all cases known to health departments, 1952 and 1956



tiated by other sources, including the Public Health Service annual tuberculosis reports. The number of tuberculosis beds in mental and penal institutions, shown in the National Tuberculosis Association Hospital and Sanatorium Directory for 1953, was 20,000. On the basis of information available, about 10,000 of these beds were estimated to be occupied by clinically active cases, raising the total active cases hospitalized to 90,000.

The estimate of known active cases at home was based on several sources which complement each other. Public Health Service annual tuberculosis reports from about three-quarters of the States provide material for apparently reliable estimates. The figures from these reports were substantiated by data from case register summary reports and other similar sources of information. The State reports were the source of about 70 percent of the new clinically active cases reported in 1954 and 1955, and about 73 percent of the deaths. The total active cases at home for the continental United States was obtained by projecting the total for the reporting States to a total for the United States. The basis for the projection was the assumption that the ratio of known active cases at home in these States to the national total of known active cases at home would be the same as the ratio of the new active cases reported in these States to the total reported for the United States.

The resulting estimate was adjusted for overstatement on the basis of the experience of case review in the nonhospitalized tuberculosis patient study. From 35 to 40 percent of the cases originally listed as active and at home

were found to be dead, hospitalized, moved away, lost, or no longer active, and therefore were removed from the list of active cases. A check of the cases classified as activity undetermined and a search of other records for more cases resulted in the addition of almost 10 percent to the active cases at home which remained after the review of the original list (4). The resulting net reduction was about 30 percent. When this adjustment was applied to the estimated figure for the national total, an estimate of 60,000 active cases at home was obtained.

When added to the 90,000 cases hospitalized, these 60,000 nonhospitalized active cases gave an estimated total of 150,000 known active tuberculosis cases in 1956. This estimate was substantiated by other data. For example, the proportion of known active cases hospitalized, approximately 60 percent, was the same proportion as was found independently in the nonhospitalized patient study.

The experience of the nonhospitalized patient study conducted in 1954 and 1955, showing that case registers overstated the number of active cases at home, is as applicable to 1952 data as to 1956 data. Accordingly, the same adjustment that was made in the 1956 estimate of known active cases at home was applied to the 1952 estimate. This resulted in a revised 1952 estimate of 200,000 known active cases in the continental United States. This figure is comparable to the 1956 figure.

Unknown Active Cases

To estimate the number of unknown cases of tuberculosis in the population in 1952, the results of communitywide chest X-ray surveys were used. Since the chest X-ray survey still seemed to be the best yardstick for measuring unknown prevalence, the Public Health Service regional offices were asked in 1956 to gather results of recent chest X-ray surveys in their jurisdictions. Survey reports were received from 42 States and the District of Columbia, covering almost 14½ million X-ray examinations taken primarily during the years 1953, 1954, and 1955, in all kinds of screening programs. From these, reports were selected which gave information on the yield of com-

munitywide X-ray programs in cities, counties, and sometimes in entire States.

Added information was provided by data from the Veterans Administration, where it was the policy to give X-ray examinations routinely to all patients admitted to veterans hospitals and clinics as well as to hospital personnel caring for these patients. This program screened 5,250,000 persons from 1950 to 1955.

Summary and analysis of pertinent data from all sources indicated that the discovery rate of unknown active tuberculosis was nearly 0.7 cases per 1,000 X-ray examinations in community surveys in 1956. Since the equivalent rate was 1 per 1,000 in 1952, the prevalence of unknown active tuberculosis appears to have decreased between 30 and 40 percent from 1952 to 1956.

In 1956, there were about 117 million persons 15 years of age and over in the United States. Using the rate of 0.7 cases per 1,000 X-rays taken, there would be 80,000 unknown cases of active tuberculosis among the adult population in the country in 1956. Additional consideration must be given to other factors. First, community X-ray surveys tend to miss certain groups with high tuberculosis prevalence. One of the more sizable of these is the older age group. Response to the survey from persons 55 years of age and older is usually considerably less than for the age groups from 15 to 54. As response decreases with age, prevalence of active tuberculosis, particularly among males, increases with age. Second, the survey appeal is not generally directed toward children under 15 years of age. Cases of tuberculosis do occur among children but not in sufficient numbers to warrant their inclusion in communitywide programs.

In order to compensate primarily for the active tuberculosis missed in these two groups, it was determined on the basis of probable prevalence in the groups that an additional 20,000 cases should be added, resulting in an estimate of 100,000 unknown active tuberculosis cases in 1956.

Inactive Cases

Known inactive cases are defined as those cases which are clinically inactive and are currently reported to be under supervision by local

health departments. They include cases on drug therapy as well as other inactive cases significant for public health supervision, according to local health department standards. The only available sources of data are tuberculosis case register summary reports received from 1954 through 1956 from State and local health departments representing about one-sixth of the population of the continental United States.

Analysis of the case register reports indicates that on the average there are at least one and a half times as many inactive cases on the register as active. The experience of Public Health Service records consultants working with State and local health departments confirms this finding. It is therefore estimated that there were about 250,000 known inactive cases in 1956.

Unknown inactive cases are defined as those cases which are clinically inactive and currently need public health supervision, but are not known to the local health agency. A number of these cases may have been previously reported and later lost to supervision. The chest X-ray survey reports received from States and local areas were, to a great extent, inadequate in the reporting of inactive tuberculosis discovered in X-ray case-finding programs. The most complete data in the discovery of inactive tuberculosis were those from the Veterans Administration case-finding program.

From an analysis of all data available, it was estimated that tuberculosis case-finding programs yield between 3 and 4 unknown cases of inactive tuberculosis for every unknown active case discovered. An estimate of 300,000 unknown inactive cases significant for public health supervision in 1956 was made on the basis of this observation.

The present definition of unknown inactive tuberculosis is not strictly comparable with the definition used in arriving at the 1952 prevalence estimate. The 1952 estimate included some inactive cases that were not, at that time, significant for public health supervision. In 1952 it was estimated that there were 550,000 "important" undiscovered inactive cases. Of these it is estimated that 350,000 would have been classified as unknown inactive cases significant for public health supervision according to the 1956 definition.

Persons Who Once Had Active Tuberculosis

The data for the estimate of once active cases were more limited than the data for the other categories. As described above, estimates of known active and inactive cases were based largely on actual counts of cases hospitalized or known to health departments. Estimates of unknown active and inactive cases were based chiefly on yields of X-ray surveys. However, the estimate of persons not now requiring public health supervision was obtained by estimating the total number of persons who have or have had tuberculosis and then subtracting the estimate of all known and unknown active and inactive cases.

The estimated number of persons who have or have had tuberculosis for 1952 consisted of the 1,200,000 "important" cases estimated at that time (1) plus an additional 800,000 persons. This estimate of 800,000 is based on X-ray survey findings of cases classified as "tuberculosis—no followup necessary." The number of these persons not now requiring public health supervision was obtained by subtracting the revised estimate of 950,000 known and unknown, active and inactive cases in 1952 from the 2,000,000 total living persons who had ever had tuberculosis. The resulting figure was 1,050,000 persons not requiring public health supervision in 1952.

The 1956 estimate of the total number of cases plus the number of persons who once had tuberculosis was calculated by starting with the 1952 estimate and adding estimated tuberculosis incidence and subtracting estimated deaths from all causes in the tuberculous population between 1952 and 1956. Since the number of persons leaving the tuberculous population because of deaths from all causes was about the same as the number of new cases, the number of living persons who have or ever have had tuberculosis has remained approximately the same. Subtracting the 250,000 active cases and the 550,000 inactive cases from the estimate of 2,000,000 yields the estimate of 1,200,000 persons who once had tuberculosis but did not require public health supervision in 1956.

Conclusion

If present trends persist, the number of active and inactive tuberculosis cases will continue to

decline. This decline will be the consequence of the continuing decrease in incidence and the increasing recovery rate.

The number of persons who have once had tuberculosis will probably begin to decline in the years immediately ahead. This group of persons who once had tuberculosis is composed largely of older persons, and it can be expected that deaths from all causes will deplete this group more rapidly than the rate of entry of newly recovered cases will enlarge it.

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Porterfield Appointed Deputy Surgeon General



Dr. John D. Porterfield has been named Deputy Surgeon General of the Public Health Service, succeeding Dr. W. Palmer Dearing, who is now assistant director for health in the Office of Defense Mobilization.

Dr. Porterfield, a career officer of the Public Health Service, has been an Assistant Surgeon General since March 1957. His previous post of assistant to the Surgeon General was assumed in October 1956, following service as director of the Ohio Department of Mental Hygiene and Correction since 1954, and before that, as director of the Ohio Department of Health since 1947.

Dr. Porterfield entered the Service's Commissioned Corps in 1939, and in 1946 he took part in the early development of the Research Grants Program at the National Institutes of Health.

Dr. Porterfield is a fellow of the American

Medical Association and of the American Public Health Association, in which he has held a number of posts including current membership on the executive board. President of the Middle States Public Health Association in 1956-57 and formerly secretary and vice president of the Association of State and Territorial Health Officers, Dr. Porterfield is a past regent of the American College of Preventive Medicine.

Dr. Porterfield has been on the faculties of Ohio State University College of Medicine, the University of Michigan School of Public Health, and the Cincinnati College of Medicine.

The new Deputy Surgeon General, who is the fifth generation of physicians in the Porterfield family, is a graduate of the University of Notre Dame. He received his medical degree from Rush Medical College of the University of Chicago, and his master's degree in public health from the Johns Hopkins University School of Hygiene and Public Health.