

Tuberculosis Cases Known To Health Departments

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HOW MANY tuberculosis cases are known to health departments in the United States? Are they receiving needed public health supervision; that is, are they receiving periodic medical examinations, laboratory services, and the instruction necessary to prevent further spread of tuberculosis?

Ideally, one of the best measures of the tuberculosis problem in the United States lies in true prevalence, that is, the total number of cases at a given time. For it is these cases which, in the aggregate, represent the actual and potential reservoir of infection and which require case-finding facilities, public health supervision, and medical care in order to prevent or alleviate disability and economic loss from the disease.

In the absence of data on true prevalence, public health workers have for many years attempted to measure the size of the tuberculosis problem and the progress made against it in terms of mortality—the number of tuberculosis deaths occurring annually. Declining tuberculosis mortality rates, however, are probably a poor index of changes in prevalence, since they partially reflect declining case fatality rates resulting from earlier and more effective case finding and treatment. Declining case fatality rates and a continuing high level of morbidity reporting tend, in turn, to maintain known prev-

alence at a high level, since cases of a type which previously terminated in early death now go on, after an extended period of treatment, to an arrested state. These cases, with the ever present opportunity for reactivation, are thus actually present in our population for longer periods than previously.

The true prevalence of tuberculosis can only be estimated. Until recent years, there have been very few counts of the number of known cases, even for large local health departments. Now, with increased use of tuberculosis case registers in various parts of the country, more information is becoming available regarding known cases and their supervision.

In the past, most data on tuberculosis morbidity have been on cases newly reported during a given year. This present study, however, deals with known prevalence—the total number of known tuberculosis cases as of a specified date—and with the public health supervision of those cases. By definition, known prevalence includes all cases which are considered by the health department at the date of tabulation to be significant for supervision, even though these cases may have been first reported as new cases many years previously. This includes not only active tuberculosis cases but also those with activity undetermined, arrested tuberculosis, or inactive tuberculosis which the health department considers significant for supervision. Known prevalence should not be confused with true prevalence, since the latter includes also estimates of the number of unknown cases in a specified area.

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Recent estimates of prevalence which have appeared elsewhere have been based in part on the preliminary summaries of data presented in this report (1, 2).

Sources of Data

Reports used in this study bear various dates between January 1949 and January 1953. Included are reports from 19 entire States (except for 4 local health departments whose reports are tabulated separately because their tuberculosis control programs are administratively separate from the States'), districts in 2 States consisting of a number of counties in each, and 47 local health departments. Thus there is included a total of 72 areas presenting data on one or more aspects of the problem here discussed. These areas account for approximately 50 percent of all tuberculosis deaths and 46 percent of the total population in the United States. In all, 38 States and the District of Columbia are included either wholly or in part.

Statistical reports from a specific administrative level (State, district, or local) were included in this study only when there was known to be a definite policy and practice at that level of obtaining information on the supervision of cases and their current status. Generally, the reports used were prepared on the tuberculosis case register summary report, for the most part in accordance with recommended instructions (3). However, since these reports were prepared by individuals in many different health departments, there were undoubtedly some variations in the procedures used. In summarizing these reports, every attempt has been made to include from each only those data which were reported in accordance with accepted practice or which could be made comparable by a minimum of editing. It is for this reason that there is variation in the number of areas reporting each type of information tabulated.

Of the 72 areas for which data were available, 22 are places in which communitywide chest X-ray surveys have been conducted in cooperation with the Public Health Service. While the remaining 50 areas have had some X-ray case-finding activities, the proportions of the populations X-rayed have generally been much

smaller. Comparisons between the areas with more intensive case finding and areas with less intensive case finding are presented throughout this paper. It seems likely that the differences noted reflect the effects of the X-ray surveys and the intensification of tuberculosis control efforts resulting therefrom. However, there is no absolute assurance of this, since the surveyed areas are not statistically representative of all areas for which data are available. Nevertheless, certain comparisons may be made which appear meaningful. For example, comparisons of known prevalence rates in surveyed areas with those in nonsurveyed areas probably are sound enough to permit some conclusions as to the effects of communitywide surveys.

Known Prevalence

In the 72 areas included in this study, there were 233,028 tuberculosis cases known to health departments and considered by the health departments to be significant for supervision, a rate of 339 known significant cases per 100,000 population (table 1). As is also indicated in

Table 1. Known tuberculosis cases and case rates in selected groups of health department areas

[United States, January 1949 through January 1953]

	Number of health department areas with data available	Population included in group of areas (as of Apr. 1, 1950)	Cases	Cases per 100,000 population
Total known cases	72	68,762,021	233,028	339
Survey areas	22	12,239,785	57,973	474
Other areas	50	56,522,236	175,055	310
Active cases	56	45,343,259	72,185	159
Survey areas	22	12,239,785	21,725	178
Other areas	34	33,103,474	50,460	152
Positive sputum cases at home	49	45,504,340	11,760	26
Survey areas	16	7,232,554	2,569	36
Other areas	33	38,271,786	9,191	24
Hospitalized cases plus positive sputum cases at home	47	42,929,325	36,773	86
Survey areas	16	7,232,554	8,677	120
Other areas	31	35,696,771	28,096	79

table 1, the areas which have had community-wide chest X-ray surveys had much higher rates of known significant tuberculosis (474 per 100,000 population) than did other areas (310 per 100,000 population). For individual areas the rates ranged from 50 to 1,800 cases per 100,000 population.

Aside from the true prevalence of tuberculosis in each area, factors which appear to influence the number of known significant cases are: (a) the extent and effectiveness of case finding and reporting, (b) the extent of efforts to maintain supervision of known significant cases, and (c) the promptness with which cases are dismissed. Some health departments, for example, dismiss a case merely because it is reported as lost, while others make a thorough search for the patient before discharging him as lost. Some health departments, too, find it administratively desirable to dismiss cases from the central register as soon as they are classified as inactive, while others may continue supervision until the cases have been arrested or inactive for 5 years.

Active Cases and Hospitalization

In 56 areas with information available regarding activity status, there were 72,185 active tuberculosis cases known to health authorities, or approximately 159 per 100,000 population. Among these areas there was a range from 30 to 1,227 known active cases per 100,000 population (fig. 1). Variations in these rates no doubt parallel variation in the true prevalence of tuberculosis more closely than do the rates for total cases known, since health department policies for keeping active cases in their case registers are more nearly uniform than those governing total significant cases (which include arrested cases).

Known prevalence of active tuberculosis is also influenced, however, by the extent and effectiveness of case finding and case holding. This is suggested by the fact that those areas which have had communitywide chest X-ray surveys showed 178 known active cases per 100,000 population, in comparison with a rate of 152 in the nonsurvey areas. Before the surveys, survey areas had rates similar to those of nonsurvey areas.

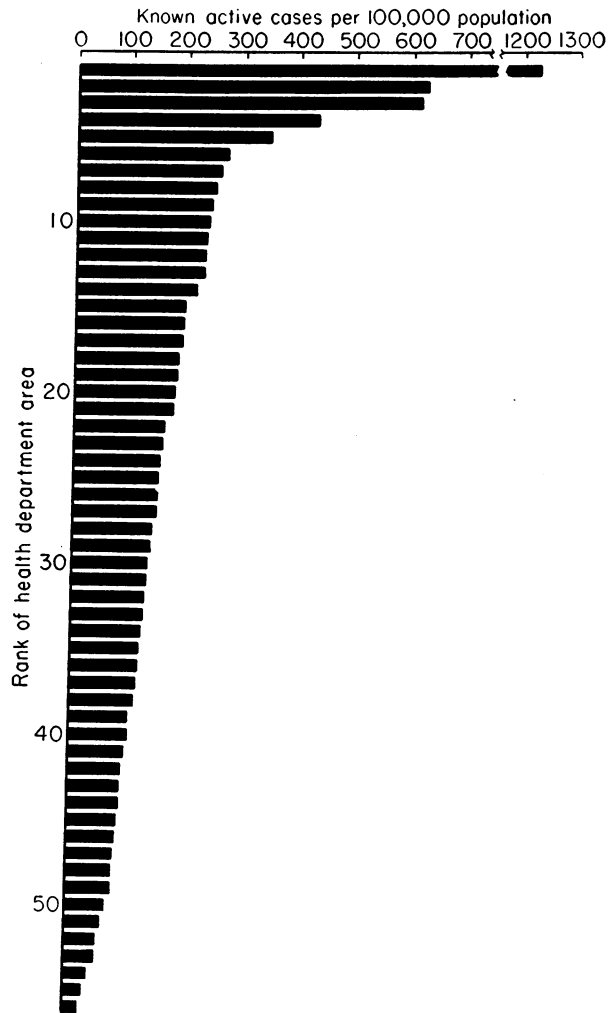


Figure 1. Known active tuberculosis cases per 100,000 population, 56 health department areas in the United States.

Cases were diagnosed as active with varying amounts of clinical proof. Those with positive sputum and those hospitalized for tuberculosis may be said to have the most clearcut evidence of active tuberculosis, and thus as a group may be said to be the more serious cases. In these terms, again the areas which have had communitywide surveys had higher rates than did the other areas: The cases hospitalized for tuberculosis plus the positive sputum cases at home amounted to 120 per 100,000 population in the group of survey areas, as compared with only 79 per 100,000 in the other areas (table 1).

Approximately 46 percent of the known active cases in the areas studied were hospitalized. In the area most acutely in need of more beds, only 20 percent of the known active cases

were hospitalized, while in the areas with sufficient numbers of beds, about 80 percent were hospitalized. One large area which was endeavoring to hospitalize all those needing such care had 74 percent of its known active cases hospitalized and still had a short waiting list. These and other data indicate that of the known active cases in a community, approximately three-fourths need and will accept hospitalization, and one-fourth will not be hospitalized at a specific time. This latter group of known active cases will include the few who are unwilling to be hospitalized or who have adequate care at home, those awaiting hospitalization, and those who have been hospitalized previously but whose disease has not yet been arrested. Since cases usually are known to health authorities before they are hospitalized, more complete information on numbers of known active cases may provide a means of indicating hospital bed needs for tuberculosis.

Positive Sputum Cases at Home

From the public health point of view, the cases usually considered most important are the positive sputum cases at home. These are the cases which have been definitely proved to be infectious and which, because they are at home, are in a position to spread tuberculosis to family and community. Information was available from 49 areas on the number of cases at home with positive sputum or other demonstrations of tubercle bacilli. In these areas, 11,760 such cases were known (table 1)—a rate of 26 per 100,000 population. In the surveyed areas, there were 36 cases per 100,000 population as compared with 24 per 100,000 in the other areas. In other words, in the areas with more intensive X-ray case finding, there were more cases at home known to have positive sputum, as well as more cases hospitalized.

Supervision of Cases

How effectively are known tuberculosis cases supervised? How frequently are they ignored as if they were unknown? The effectiveness of health department efforts to determine the sputum status of their known cases is shown in figure 2. Of 34,836 active and activity undetermined cases at home in 36 areas with appropriate data available, 14,965, or 43 percent,

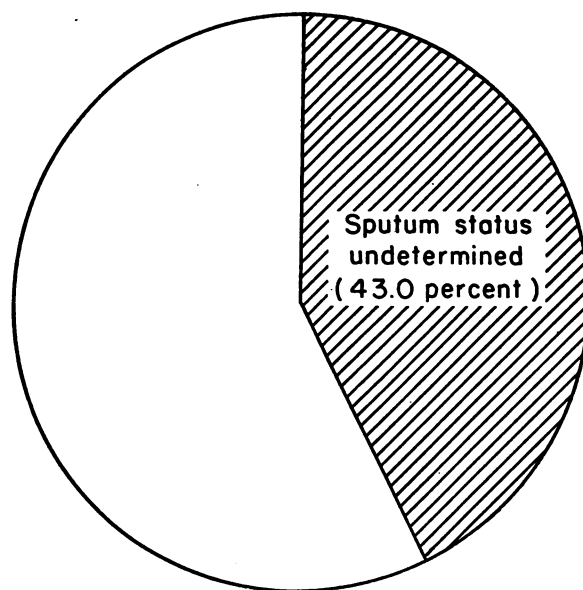


Figure 2. Sputum examination status of active and activity undetermined cases of tuberculosis at home.

were of undetermined sputum status. Communitywide chest X-ray surveys have been conducted in 14 of these areas, and reports reveal less than one-third of the active and activity undetermined cases at home with unknown sputum status, as compared to almost half in other areas.

Health departments generally have the policy of obtaining periodic reports regarding the supervision of significant cases in the tuberculosis case register. Another index of the effectiveness of supervision is the proportion of unhospitalized cases in the register for which the health department has had no examination report within the past 12 months. Although such information was available from only 28 of the areas included in this study, the data are nevertheless suggestive. A total of 47,110 tuberculosis cases at home were classified by examination status, and it was found that 15,815 of those cases, or 33.6 percent (fig. 3) had had no X-ray or clinical examination report within the preceding 12 months. While some of these patients may have been more recently examined, the health department had no information to show that they were receiving either medical or public health supervision.

Communitywide surveys had been conducted in 13 of these areas. For these 13 areas as a

group, 27 percent of the significant cases at home had not had an examination report within the preceding 12 months, as compared with 42 percent for the other areas. Only one community-wide survey area reported a higher than average percentage of cases without an examination report during the preceding year.

Often a distinction is made between the unknown cases in a community constituting sources of infection, and the known cases presumed to be under control and therefore not sources of infection. However, it is clear that there are still large numbers of known tuberculosis cases which, according to health department records, are not being supervised and are probably receiving little more attention from the health departments than are the unknown cases.

In a few areas, data on examination status of patients at home have been tabulated separately for the active cases on the one hand, and for the arrested and inactive cases on the other. It is rather surprising that the active cases at home in these areas show just as high a proportion of cases not recently examined as do the arrested and inactive cases. Since the supervision of active cases at home is generally believed to be far more important than that of the arrested cases, it would appear especially desirable to intensify efforts to obtain examination reports on known active cases.

Estimated Known Prevalence

As indicated earlier, data presented in the foregoing analysis apply only to those areas for which information was available for the 1949 to 1953 period. While these areas represent almost half of the population of the continental United States, they were selected on the basis of the reports available and therefore are not necessarily a random sample. Yet, to a considerable extent, these areas can be tested for representativeness on the following bases: (a) the racial distribution of the population; (b) the geographic distribution of the areas included; (c) the inclusion of areas both with organized local health units and those without; (d) the inclusion of both State and locally directed programs; (e) the adequacy of the tuberculosis control programs in the various areas included, as measured by various indexes, together with data obtained in the course of field

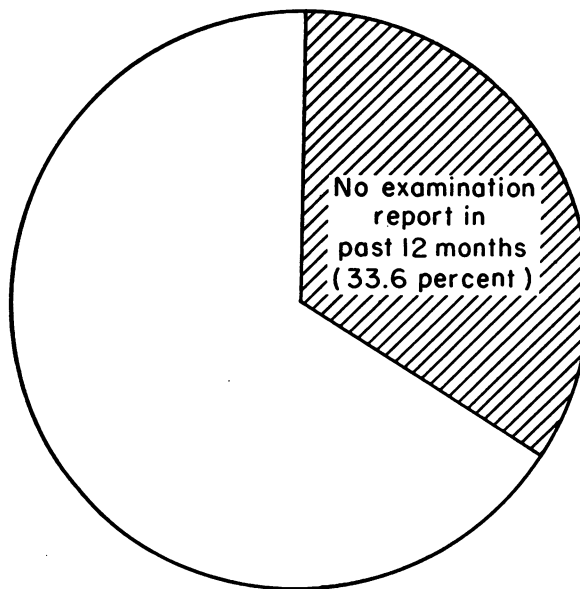


Figure 3. Recentness of medical examination report on known significant tuberculosis cases at home.

consultation; (f) the tuberculosis death rate; (g) the inclusion of areas which have recently had intensive X-ray case-finding surveys; and (h) the inclusion of populations in mental and penal institutions.

In each except the last three of these respects, the group of areas considered in the present study appears to be fairly representative of the continental United States. It was noted, however, that the areas as a group differ from the remainder of the United States in that they had a slightly higher tuberculosis death rate, a disproportionately large number of areas which have had communitywide X-ray surveys, and underrepresentation of the populations of mental and penal institutions. Careful attention has been given to the weighting of each of these three factors in estimating the prevalence of known tuberculosis cases in the continental United States.

By projecting the data contained in table 1, we can arrive at estimates of known tuberculosis prevalence in the continental United States, as follows:

Total known significant cases	-----	450,000 to 500,000
Known active cases	-----	225,000 to 250,000
Known positive sputum cases at home	-----	35,000 to 40,000

These national estimates are probably the best informed guesses as to the size of the tuberculosis problem known to health departments throughout the country. As case reporting and supervision further improve, and as reports from health departments become more generally available, this type of data will become increasingly more meaningful as an index of our tuberculosis control problem.

Summary

1. Tuberculosis case register reports for areas comprising nearly half the population of the continental United States are analyzed.

2. In the areas studied, there was an average of 339 known significant tuberculosis cases and 159 known active cases per 100,000 population.

3. In 43 percent of the cases at home classified as active or activity undetermined, sputum status was unknown to the health departments reporting.

4. About one-third of the known significant cases at home had not had an X-ray or clinical examination within the preceding 12-month period, according to the health department records studied.

5. In the areas which have had community-wide chest X-ray surveys, prevalence rates for known significant cases and for known active cases were substantially higher than in other

areas. The communitywide survey areas had examined the sputa of a higher proportion of their patients and had maintained followup information more satisfactorily than had the non-survey areas.

6. It is estimated that there are almost 500,000 known significant tuberculosis cases in the continental United States, and that nearly 250,000 of them are active. Approximately 40,000 of these are known positive sputum cases at home, and there is an additional large number at home whose sputum status is undetermined.

7. In spite of the rapid decline in tuberculosis mortality, it is apparent that the disease remains a problem of very serious dimensions.

8. In view of the large proportion of cases for which both sputum status information and recent examination reports are lacking, it is apparent that the public health supervision of individual tuberculosis patients is inadequate in many areas.

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Correction

In the table, "Thirty-one community-wide X-ray surveys, 1945-53," p. 548, May issue, the figure in the last column for Milwaukee, Wis., should read 557.