# Prevalence of Arthritis and Rheumatism in the United States

By THEODORE D. WOOLSEY, B.A.

The importance of arthritis and rheumatism as common chronic diseases and as leading causes of suffering and disability scarcely needs to be demonstrated to anyone working in the field of public health or medicine. Numerous morbidity surveys have confirmed the significance of these diseases, and any general practitioner whose practice is not wholly confined to young people could doubtless substantiate it from his own experience.

Nevertheless, quantitative information in some detail is needed by public health organizations, rehabilitation agencies, and pharmaceutical firms for the planning of programs for the control of this group of diseases, for studying their epidemiology, and for many other purposes. Such information should include, as a minimum, data on the prevalence of the diseases to show the population groups most affected, the amount and severity of the disability caused, and the psychological and economic effect of the disability on the afflicted person and his or her family.

In 1951 the most recent statistics available on the prevalence of arthritis and rheumatism in the United States were 15 years old. From the results of the National Health Survey of 1935–36 (*1*) it had been estimated that there were at that time approximately 6,850,000 persons of all ages in the country with "rheumatism," including under that title all muscular rheumatism, lumbago, arthritis, gout, "neuritis," and "neuralgia" (*2*). From the 5-year general morbidity survey in the Eastern Health District of Baltimore, 1938–42, more detailed statistics were compiled on the frequency and severity of disabling attacks and the degree of association of the prevalence of rheumatism and arthritis with various social and economic factors in an urban community. (See references *3*, *4*, *5*, and papers referred to therein.)

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## New Data Collected

At the present time, with new possibilities opening up for treatment of the rheumatoid diseases, public health forces are mobilizing for concerted efforts to control these diseases and to alleviate their consequences. Hence, it is particularly important to collect up-to-date statistical information to serve the needs of research and control agencies.

Therefore, in September 1951 the Division of Public Health Methods undertook to obtain new estimates of the number of recognized cases of chronic arthritis and muscular rheumatism in the United States. An additional objective was to determine the proportion of these cases that had been seen by a doctor and the proportion that had entailed some reduction or change in the amount or type of work that the afflicted person could perform.

The data that were collected are limited in scope, but they are also broad in applicability because of the representativeness of the population upon which they were based. The procedure employed was to add six brief questions

to the interview that is the basis of one of the regular monthly canvasses conducted by the Census Bureau's Current Population Survey. This survey is conducted in a very carefully designed sample of the population of the country. The sample is of the type known as a "probability" sample, which means that for estimates made from the sample it is possible to state the limits of error due to sampling. The interviewers of the Bureau of the Census periodically visit about 25,000 households scattered in 68 sample areas in 42 States and the District of Columbia. They obtain from some responsible person in the household information on employment, unemployment, and other economic and social characteristics of household members. The surveys usually cover only the population 14 years of age and over.

From this sample, estimates are made for the civilian population of the country as a whole, exclusive of the inmates of resident institutions such as homes for the aged, mental hospitals, and penal institutions. In September 1951 this population numbered approximately 109,000,000 persons 14 years of age and over.

The experience of the Public Health Service in household morbidity surveys indicates that the respondent for the family can give the interviewer reasonably reliable information on any specific diagnosis stated by a doctor. In the particular case of the rheumatism group of diseases, however, the average respondent probably does not distinguish clearly between the various diagnoses within the group. Consequently, this survey attempted to make only a rough division of the group into two classes—arthritis and rheumatism.

### Design of the Interview

The interview questions on arthritis and rheumatism were worded as follows:

1. "This month we are making a study to find out how many people have arthritis or rheumatism or other ailments of that type, such as gout or lumbago. First of all, I'd like to check the persons in the household who have any trouble of that sort."

(All persons 14 years of age and over who were reported to have any form of arthritis or to have fibrositis, gout, lumbago, myositis, or any form of rheumatism, *except* rheumatic fever or rheumatic heart disease, were identified. All succeeding questions dealt with the persons thus identified.)

2. "Has . . . ever been treated by a doctor for this condition, or talked to a doctor about it?"

3. If YES in 2: "Has a doctor ever told . . . what his (or her) condition is called?"

4. If YES in 3: "What did he say it was?" (The reply was coded by the interviewer as "A," if the response indicated any form of arthritis; as "R," if the response indicated fibrositis, gout, lumbago, myositis, or any form of rheumatism *except* rheumatic fever or rheumatic heart disease; as "OT" if any other disease was mentioned, such as "neuritis.")

5. "Has . . . had to cut down on or change his (or her) work or other usual activities in any way on account of this trouble?"

(When a YES answer was given the interviewer recorded the type of change that was made. Some changes that were mentioned were later edited to NO, because they seemed to represent adjustments that were only temporary or were optional on the part of the afflicted person. An example of the latter: "I never lift heavy weights whenever I can help it.")

6. "Has . . . had any definite signs of this ailment within the past month?"

From the answers to these questions by the respondents for the households in the sample, estimates were made of the number of persons in the civilian noninstitutional population of the United States, 14 years of age and over, who would have been reported to have arthritis or rheumatism, to have seen a doctor for the condition, and so forth, if every household in the United States had been visited. A few of the major results of the survey are shown in the tables and graphs that follow. A more detailed account of the survey findings will appear in a later report.

Since the estimates are based on a sample, they are, of course, subject to sampling error; where the frequencies in the tables are small this error may be relatively large. Hence, the smaller frequencies in the tables and the percentages where the base is likely to be small (in particular, percentages based upon the non-

white population) should be used with some caution. In the description of the survey results that follows it may be assumed that comparisons cited are statistically significant—unlikely to be attributable solely to random sampling fluctuations—unless otherwise noted. As in any survey, there are also errors due to biases in response. However, the careful training given to Census interviewers for the Current Population Survey, their experience with many different kinds of questions, and the preliminary testing of all questions used in this survey give a basis for confidence that such errors are not large.

### Estimated Cases

The persons reported by the family respondent as having arthritis or rheumatism may be classed as "presumptive" cases. These totaled an estimated 10,104,000 persons aged 14 years and over in the United States (table 1). A comparison of this figure with the corresponding estimate from the National Health Survey of 1935–36 is, unfortunately, unreliable as an indication of trend. The questions asked and the manner of conducting the two surveys differed. Furthermore, the earlier survey covered a population that was almost entirely urban.

In answer to the question about what the doctor had called the condition, the respondent sometimes mentioned a diagnosis which was not considered to be a form of arthritis or rheumatism in this survey. This happened in 484,000 (4.8 percent) of the presumptive cases. Such cases might easily be counterbalanced by definite cases of arthritis or rheumatism that the family failed to report because they were not recognized as cases for one reason or another. A more important reason for including these cases in the tables is that the total of all cases reported by the families (presumptive cases) is the figure that is most nearly comparable with that obtained from other family studies. Another 3,206,000 cases (31.7 percent) must be considered to be in the doubtful class either because the person had not seen a doctor at all (2,540,000 cases) or because the family did not know what the doctor's diagnosis was (666,000 cases). There were, however, an estimated 6,414,000 cases (63.5 percent) which had been seen by a doctor and identified by him as arthritis, rheumatism, gout, lumbago, myositis, or fibrositis. These may be described as "diagnosed" cases, although in some instances it is likely that the statement made by the doctor represented only a preliminary opinion. In about 70 percent of the 6,414,000 cases the respondent's de-

**Table 1. Estimated [1] number and percentage of cases of arthritis and rheumatism in the civilian noninstitutional population of the United States, 14 years of age and over, by sex, medical attendance, and reported diagnosis, September 1951**

| Medical attendance and reported diagnosis | Number (in thousands) | | | Percent of all cases | | | Percent of population | | |
|---|---|---|---|---|---|---|---|---|---|
| | Both sexes | Males | Females | Both sexes | Males | Females | Both sexes | Males | Females |
| All cases reported by families | 10,104 | 3,914 | 6,190 | 100.0 | 100.0 | 100.0 | 9.3 | 7.6 | 10.8 |
| Cases seen by a doctor | 7,564 | 2,784 | 4,780 | 74.9 | 71.1 | 77.2 | 6.9 | 5.4 | 8.4 |
| Doctor called it: | | | | | | | | | |
| Arthritis [2] | 4,670 | 1,560 | 3,110 | 46.2 | 39.9 | 50.2 | 4.3 | 3.0 | 5.4 |
| "Rheumatism" [2] | 1,744 | 792 | 952 | 17.3 | 20.2 | 15.4 | 1.6 | 1.5 | 1.7 |
| Other [2] | 484 | 144 | 340 | 4.8 | 3.7 | 5.5 | .4 | .3 | .6 |
| Unknown to family | 666 | 288 | 378 | 6.6 | 7.4 | 6.1 | .6 | .6 | .7 |
| Cases not seen by a doctor | 2,540 | 1,130 | 1,410 | 25.1 | 28.9 | 22.8 | 2.3 | 2.2 | 2.5 |

[1] Estimates are derived from a sample survey and are therefore subject to sampling variability, which may be relatively large where the quantities shown are small.

[2] Arthritis includes any diagnosis reported by the family containing the word "arthritis"; "rheumatism" includes the terms: rheumatism, gout, lumbago, myositis, and fibrositis; "other" includes all other terms and diagnoses and, hence, consists of terms and diagnoses not classified as arthritis or rheumatism in this survey. This last category is included in the tables because the total of all cases reported by the families is the figure that is more nearly comparable with that obtained in other family studies.

scription of the doctor's diagnosis contained the word "arthritis." In the remainder it was simply "rheumatism" or one of the other terms that were included under that heading in this survey.

It should be emphasized that the estimate of 6,414,000 so-called "diagnosed" cases of rheumatism and arthritis among persons 14 years of age and over was obtained from information supplied by lay respondents, reporting what they believed the doctor had said. A sample of the population carefully screened for these diseases and subjected to all the procedures necessary for a firm diagnosis might give a substantially different figure. However, a screening and diagnostic study of that type would of necessity be smaller and less broadly based. It is only by linking such surveys as the one described here with more intensive studies of smaller groups that we shall be able to estimate the number of persons in the country with unquestioned cases of rheumatoid or degenerative arthritis or other forms of rheumatism. The survey of September 1951 will therefore be useful as a means of calibration, provided the identical questions used in the national survey are also incorporated in the smaller surveys to provide the link.

### More Women Afflicted

Table 1 also shows the percentage distribution of the cases in these various categories for males and females separately and the percentage of the civilian noninstitutional population 14 years of age and over falling into each class, that is, the prevalence rate per 100 population. The prevalence of presumptive cases is 9.3 percent; of all cases seen by a doctor, 6.9 percent; and of diagnosed cases of rheumatism and arthritis, 5.9 percent. The prevalence among females is considerably higher than among males. There seems to be a consistency in this sex difference in all the prevalence rates in the table. It is worthy of note, however, that while the percentage prevalence for females exceeds that for males by approximately 80 percent for the diagnosed cases identified as "arthritis," the sex difference for cases identified as "rheumatism" is not statistically significant.

Figure 1 illustrates not only the contrast

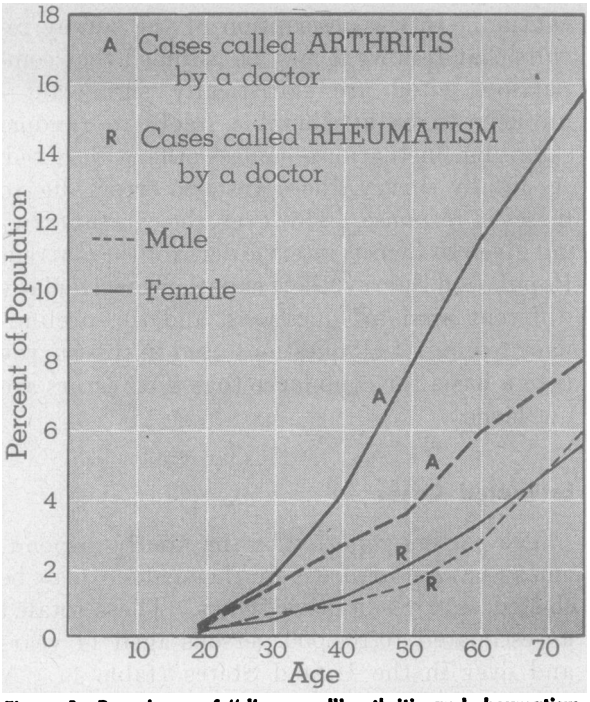


**Figure 1. Prevalence of "diagnosed" arthritis and rheumatism by sex and age in the civilian noninstitutional population of the United States, September 1951.**

between the sexes in the prevalence of diagnosed arthritis but also the sharp increase with age in the prevalence of both arthritis and rheumatism.

By no means all persons reported as cases by the families in the survey were sufficiently disabled to cause any material reduction or change in work or other usual activities. The kinds of changes or adjustments that were considered of sufficient importance to be counted included: giving up gainful work or housework entirely; changing to a lighter or more suitable type of work, such as a type that did not require use of the fingers; giving up all heavier parts of the work or of household chores; changing to part-time or occasional work; moving to a warmer climate; changing the conditions of work, for example, from night to day shift; giving up athletics entirely (for a young person). Among those who had seen a doctor, 31 percent had made some such change in the amount or type of work or other usual activities (table 2). The corresponding figure for those who had not seen a doctor was 13 percent. Thirty-four percent of the diagnosed cases identified as arthritis and 29 percent of those identified as rheumatism

**Table 2. Estimated [1] number and percentage of cases of arthritis and rheumatism in the civilian noninstitutional population of the United States, 14 years of age and over, by residence, race, medical attendance, and reported diagnosis, September 1951**

| Medical attendance and reported diagnosis | Total | Urban | Rural nonfarm | Rural farm | White | Nonwhite |
|---|---|---|---|---|---|---|
| | Number of cases (in thousands) | | | | | |
| All cases reported by families | 10, 104 | 5, 546 | 2, 408 | 2, 150 | 9, 092 | 1, 012 |
| Cases seen by a doctor | 7, 564 | 4, 200 | 1, 874 | 1, 490 | 6, 902 | 662 |
| Doctor called it: | | | | | | |
| Arthritis [2] | 4, 670 | 2, 682 | 1, 206 | 782 | 4, 344 | 326 |
| "Rheumatism" [2] | 1, 744 | 810 | 464 | 470 | 1, 526 | 218 |
| Other and unknown [2] | 1, 150 | 708 | 204 | 238 | 1, 032 | 118 |
| Cases not seen by a doctor | 2, 540 | 1, 346 | 534 | 660 | 2, 190 | 350 |
| | Percent of all cases | | | | | |
| All cases reported by families | 100. 0 | 100. 0 | 100. 0 | 100. 0 | 100. 0 | 100. 0 |
| Cases seen by a doctor | 74. 9 | 75. 7 | 77. 8 | 69. 3 | 75. 9 | 65. 4 |
| Doctor called it: | | | | | | |
| Arthritis [2] | 46. 2 | 48. 4 | 50. 1 | 36. 4 | 47. 8 | 32. 2 |
| "Rheumatism" [2] | 17. 3 | 14. 6 | 19. 3 | 21. 9 | 16. 8 | 21. 5 |
| Other and unknown [2] | 11. 4 | 12. 8 | 8. 5 | 11. 1 | 11. 4 | 11. 7 |
| Cases not seen by a doctor | 25. 1 | 24. 3 | 22. 2 | 30. 7 | 24. 1 | 34. 6 |
| | Percent of population | | | | | |
| All cases reported by families | 9. 3 | 8. 0 | 10. 1 | 13. 6 | 9. 2 | 9. 9 |
| Cases seen by a doctor | 6. 9 | 6. 0 | 7. 9 | 9. 5 | 7. 0 | 6. 5 |
| Doctor called it: | | | | | | |
| Arthritis [2] | 4. 3 | 3. 9 | 5. 1 | 5. 0 | 4. 4 | 3. 2 |
| "Rheumatism" [2] | 1. 6 | 1. 2 | 2. 0 | 3. 0 | 1. 5 | 2. 1 |
| Other and unknown [2] | 1. 1 | 1. 0 | . 9 | 1. 5 | 1. 0 | 1. 2 |
| Cases not seen by a doctor | 2. 3 | 1. 9 | 2. 2 | 4. 2 | 2. 2 | 3. 4 |
| | Percent of cases for which a change in amount or type of work or other usual activities was reported | | | | | |
| All cases reported by families | 26. 2 | 24. 9 | 25. 4 | 30. 7 | 25. 6 | 32. 0 |
| Cases seen by a doctor | 30. 8 | 29. 3 | 29. 3 | 37. 0 | 30. 1 | 38. 1 |
| Doctor called it: | | | | | | |
| Arthritis [2] | 33. 6 | 33. 2 | 32. 2 | 37. 1 | 33. 0 | 41. 7 |
| "Rheumatism" [2] | 29. 4 | 26. 4 | 24. 6 | 39. 1 | 27. 7 | 41. 3 |
| Other and unknown [2] | 21. 9 | 17. 8 | 23. 5 | 32. 8 | 21. 9 | 22. 0 |
| Cases not seen by a doctor | 12. 6 | 11. 1 | 11. 6 | 16. 4 | 11. 3 | 20. 6 |

[1, 2] See footnotes, table 1.

reported a change in the amount or type of work.

The percentage of the population in each age group with diagnosed cases of arthritis or rheumatism is shown in figure 2. The upper line shows all such cases, while the lower line is for those diagnosed cases in which the person had made a change in the amount or type of

his, or her, work. An indication of the magnitude of the economic aspects of this public health problem may be seen in this graph. From 1.5 to 5 percent of the population in the upper working ages (45 to 65) have had to give up entirely, cut down on, or make some other significant change in their work or other usual activities because of ailments described to the families by the attending physicians as some form of arthritis or rheumatism. If all presumptive cases were included, the figure would, of course, be higher.

### Higher Prevalence Rates in Rural Areas

Although only a few of the survey results bearing upon the distribution of these diseases in the population can be shown here, certain variables that appear to be particularly important have been included in tables 2 and 3. A review of some of the points of interest in these tables brings out the following relationships:

1. The proportion of all presumptive cases that had been seen by a doctor was significantly lower in the rural farm population than in either the urban or rural nonfarm groups. In the two latter population groups the proportion is about the same (table 2).

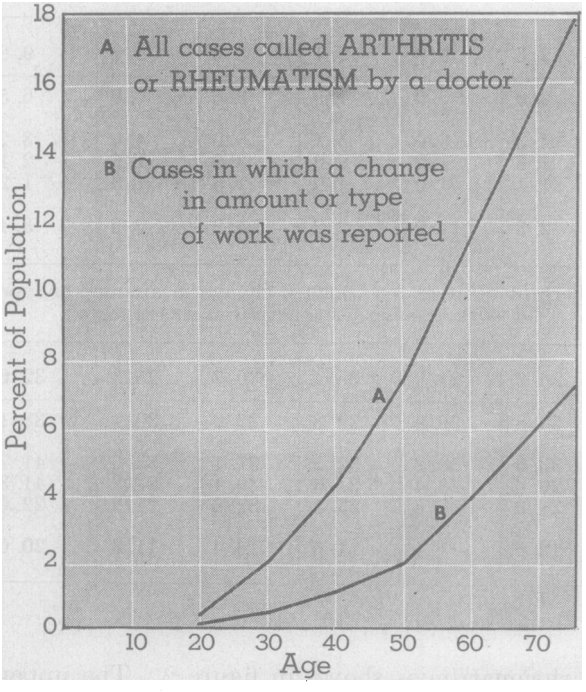


**Figure 2. Prevalence of "diagnosed" arthritis and rheumatism in the civilian noninstitutional population of the United States, September 1951. (All cases, and cases in which a change in amount or type of work was reported.)**

2. The proportion of cases seen by a doctor was lower for the nonwhite population than for the white (table 2).

3. The prevalence of diagnosed cases of arthritis is higher in the population living in rural areas than it is in the cities. The same holds true for cases identified as rheumatism. The difference between rural nonfarm and rural farm populations in the prevalence of diagnosed cases of rheumatism and arthritis combined is not great enough to exclude the possibility that it is a result of random sampling variation. However, the evidence on occupational differences supports the hypothesis that rheumatism and arthritis of all forms combined are more prevalent in the population of farm areas. Since these differences in the urban and rural prevalence of diagnosed cases are partly a function of the differing proportions of cases seen by a doctor, it is also worth noting that the prevalance of all presumptive cases is also highest in the rural farm group and lowest in the urban (table 2).

4. The prevalence of presumptive cases in the nonwhite population is not significantly higher than the prevalence in the white population (table 2).

5. The proportion of presumptive cases for which a change in the amount or type of work or other usual activities was reported was higher among rural farm families than among urban or among rural nonfarm families. Furthermore, the proportion of cases associated with a change of this sort was higher in the nonwhite population than in the white population (table 2).

6. Age-adjusted prevalence rates, that is, rates that have been adjusted to make allowances for differences in the age distribution of the population being compared (table 3), show that the percentage of persons engaged in farming reported as having rheumatism or arthritis was higher than that among employed persons in general. On the other hand, "professional, technical, and kindred workers" and "clerical and kindred workers" tended to have a lower prevalence when compared with all employed persons of their own sex. These

**Table 3. Estimated [1] number and percentage of employed civilians reported by the family to have arthritis or rheumatism, by sex and occupation, September 1951**

| Occupation | Males | | | Females | | |
|---|---|---|---|---|---|---|
| | Number (in thousands) | Percent of employed population | | Number (in thousands) | Percent of employed population | |
| | | Crude | Adjusted [2] | | Crude | Adjusted [2] |
| All occupations | 2,824 | 6.6 | 6.3 | 1,298 | 6.8 | 7.7 |
| Professional, technical, and kindred workers | 116 | 3.8 | 3.6 | 92 | 4.6 | 5.0 |
| Farmers and farm managers | 625 | 16.6 | 11.5 | 24 | [3] | [3] |
| Managers, officials, proprietors, except farm | 309 | 5.9 | 4.7 | 102 | 9.2 | 7.6 |
| Clerical and kindred workers | 130 | 4.8 | 5.2 | 185 | 3.6 | 5.7 |
| Sales workers | 100 | 4.3 | 4.5 | 92 | 6.2 | 7.0 |
| Craftsmen, foremen, and kindred workers | 546 | 6.6 | 6.1 | 12 | [3] | [3] |
| Operatives and kindred workers | 484 | 5.4 | 6.1 | 235 | 6.6 | 7.4 |
| Private household workers | 2 | [3] | [3] | 181 | 10.6 | 9.5 |
| Service workers, except private household | 187 | 7.2 | 5.8 | 159 | 7.6 | 7.6 |
| Farm laborers and foremen | 106 | 5.5 | 8.0 | 206 | 13.1 | 15.1 |
| Laborers, except farm and mine | 219 | 5.8 | 6.3 | 10 | [3] | [3] |

[1] See footnote 1, table 1.
[2] Age-adjusted by the "indirect method" to the total employed population of both sexes.
[3] Percentages not computed because of small frequencies.

figures suggest hypotheses that should be tested in more intensive studies; without information on such factors as income, education, and diet, it is impossible to say whether the differences are due to occupation per se. The statistics suggest, however, that outdoor occupation may be a factor in determining the prevalence of arthritis and rheumatism.

7. In every occupational group in which both men and women are represented in substantial numbers, the age-adjusted prevalence rate for females is higher than that for males. Though not all of the differences are statistically significant, the pattern is consistent. Thus, the sex differences commented upon earlier cannot be entirely accounted for by the dissimilarity in the usual activities of men and women in general (table 3). Small differences between the rates for various occupations shown in this table, however, should be interpreted with caution because the sampling error is relatively large in some groups.

## Summary

Some findings from the September 1951 survey of arthritis and rheumatism are presented. From the survey data it has been estimated that there are approximately 10,104,000 persons 14 years of age and over in the United States who believe that they have arthritis or rheumatism. About 75 percent of these persons have seen a doctor about their condition. An estimated total of 6,414,000 have been told by a doctor that their condition was arthritis, "rheumatism," gout, lumbago, myositis, or fibrositis. About 5 percent of the 10 million persons who believe that they have one of these diseases apparently do not, if they reported correctly what the doctor told them; and others must also be considered doubtful cases for one reason or another. However, about one-fourth of the 10 million cases had made some significant change in the amount or type of work they performed or in their other usual activities. Sex, race, age, urban or rural residence, and occupation are examined as factors affecting the prevalence of the diseases.

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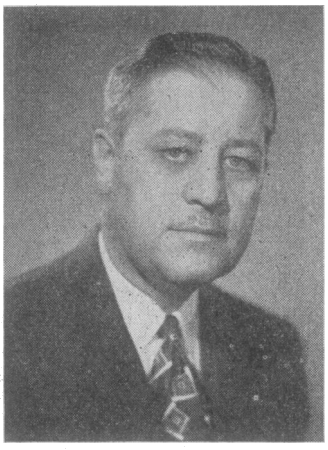
## Dr. Otis L. Anderson New Chief of Bureau of State Services



The appointment of Assistant Surgeon General Otis L. Anderson as chief of the Bureau of State Services of the Public Health Service was announced by Surgeon General Leonard A. Scheele May 3, 1952. Formerly associate chief of the Bureau of Medical Services, Dr. Anderson succeeds Dr. Joseph W. Mountin, who died April 26.

Dr. Anderson entered the Commissioned Corps of the Public Health Service in 1930, after interning at the Public Health Service hospital in Baltimore, Md. After serving on the staffs of Public Health Service hospitals in Boston, Ellis Island, and Norfolk, he was assigned in 1936 to the Virginia State Department of Health to direct its venereal disease control program. In 1940, he was named Public Health Service venereal disease control consultant to health departments and industries in Michigan, Minnesota, Wisconsin, Iowa, Illinois, Indiana, and Ohio, and in 1941 he undertook the direction of the industrial phase of the national venereal disease control program.

Dr. Anderson was appointed assistant chief of the Division of Venereal Disease in 1942. He was assigned in 1944 to New Orleans to direct the Public Health Service programs in Louisiana, Florida, Alabama, Mississippi, South Carolina, Georgia, and Tennessee. Later in 1944, he returned to Washington to administer the 23 Public Health Service hospitals. He was appointed associate chief of the Bureau of Medical Services in 1949. Dr. Anderson is a fellow of the American Medical Association and of the American College of Physicians, a diplomate of the American Board of Preventive Medicine and Public Health. He is a member of the American Public Health Association, the American Hospital Association, and the Association of Military Surgeons.