Public Health Reports

Vol. 57 • AUGUST 28, 1942 • *No. 35*

EVALUATING DENTAL HEALTH PROGRAMS [1]

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The number of dental units operating in State departments or boards of health and the number of dental programs operating in the political subdivisions of States have increased markedly in this country during the past 5 years (*1*, *2*). This activity in the promotion of dental health has stimulated interest in and study of the development of methods for evaluating the various administrative set-ups under which these dental programs function. A result of this study has been the proposal of numerous evaluation techniques (*3*, *4*, *5*, *6*, *7*). The apparent limitations of each of these techniques for the complete appraisal of a dental program, however, have given rise to considerable discussion as to their relative merits as measuring devices (*6*, *8*, *9*). Inasmuch as these limitations are measured on the basis of a mythical over-all yardstick, it would appear that a recognition of the individual worth of the several techniques, each of which evaluates the accomplishments of a separate phase of a dental program, might result in a very useful combination of techniques.

This paper is concerned with the presentation and interpretation of data collected for the purpose of appraising the dental program of a small urban community. Various methods are employed in comparing the findings in this community with similar findings in a nearby urban center which had not had an organized dental program up to the time these data were collected. Thus, through the application of different measures to the same material, a means is afforded for studying the relative usefulness of each device in measuring the attainment of the objectives of the program.

A necessary prerequisite to the evaluation of a dental program, therefore, is a definition of its objectives. This definition should be arrived at after a detailed examination of the known facts regarding the hazards to dental health and what can be done to eliminate or reduce those hazards. The chief hazard to dental health in children, for example, is dental caries. The usual clinical sequence of this

[1] From the Division of Public Health Methods, National Institute of Health.

disease and its degenerative sequelae are as follows: The tooth is attacked by caries; the caries progresses to pulp involvement; then acute toothache may result in immediate extraction of the tooth or an infected pulp may result in the formation of an apical abscess and the establishment of a focus of infection, loss of the tooth, shifting of the remaining teeth, malocclusion, loss of intermaxillary space, collapse of the oral structures, maldevelopment, facial deformity, and malfunction. The maldevelopment and malfunction thus resulting may effect varying degrees of interference with such normal physiologic functions of the oral and contiguous structures as mastication, swallowing, speech, hearing, and respiration. Furthermore, malocclusion and malfunction are important precursors of the condition known as pyorrhea, which is the major cause of loss of teeth in adults. Preventing this disease or interrupting its sequence at the earliest possible stage is the principal objective of a dental program for children.

Inasmuch as the etiology of dental caries is unknown, prevention of the disease causing this degenerative sequence is still in the experimental stage. It is an established fact, however, that the treatment of early carious lesions by the proper placement of chemically and physically stable filling materials will prevent or delay the extension of caries to pulp involvement and tooth death. A primary purpose of dental health programs becomes, therefore, the exercise of procedures whereby the early detection and filling of carious teeth is accomplished and tooth loss is thereby prevented or indefinitely postponed.

Although the purpose of a dental program can thus be precisely and objectively stated, the administration of such a program cannot be limited to the performance of those functions which produce impersonal statistics showing the immediate accomplishment of that purpose. The permanency of any health program requires that its operative procedures meet with public approval, that the expenditure of public funds and of personnel time be properly accounted for, and that a demand for its continuation be sustained by an informed and actively interested public. This perspective on the administrative aspects of dental programs suggests that some clarification of the issues involved might result from an attempt to classify evaluation techniques into four major categories according to the characteristic to be measured: First, volume of administrative activity; second, public response to a unit volume of administrative activity; third, volume of clinical dental service dispensed; and fourth, the effect of a given program on dental health.

The first category would include those methods which attempt to evaluate the efficiency of the administrative organization in producing activities designed to promote dental health. Numerical data on circulars and pamphlets prepared and issued, radio and other talks

given, children examined, new local programs initiated, and refresher courses on children's dentistry conducted are usually considered routine recordings necessary to the justification of funds and personnel time expended. A determination of the unit cost of each activity should produce figures which afford a comparison of current costs with those of previous years, a comparison of the relative cost of each activity, and a comparison of these figures with similar ones from other organizations.

Evaluation techniques included in the second category—those concerned with measuring public response to administrative procedures—might give information such as number of children acquiring 100-percent correction cards,[2] attendance at lectures on dental subjects, requests for dental talks, attendance at dental clinics, requests for dental inspection service, and financial support and other evidences of interest by individuals or local civic organizations. Comparing these data to those of previous periods would indicate relative progress in obtaining public response. A comparison of response and administrative cost should furnish an evaluation on a cost basis of the various methods of eliciting public response.

Data on volume of clinical dental service are included in the third category of evaluation techniques. A direct measure of the amounts and kinds of dental service dispensed could be obtained from detailed clinical records of the population exposed to a program, if such records were available. However, since dental fillings are cumulative with age, an indirect measure of the volume of this type of service acquired by a population may be obtained through survey methods in which direct counts of filled teeth are made. Further, the annual rate at which teeth are being filled may be estimated as the sum of the annual increments obtained from age specific prevalence rates of filled teeth (*10*). The ratio of filled to carious (decayed, missing, or filled) teeth affords a good indication of the completeness of dental service.

The fourth category of evaluation techniques includes devices for quantitating the status of dental health in a community at a given time. These may be subdivided into direct and indirect methods. Direct methods attempt to measure dental health in terms of oral hygiene, a qualitative term dependent for its grading on a general over-all interpretation of such factors as oral cleanliness, prevalence of dental caries, care of defects as indicated by the ratio of filled to carious teeth, and condition of the saliva and gums. The indirect methods, on the other hand, attempt to measure quantitatively the evidences of dental ill health. Since dental caries is responsible for most dental ill health in children, and since, in the absence of dental

[2] Periodically each child is given a dental inspection notification card. The returned card, bearing a dentist's signature as evidence that needed dental treatment has been administered, becomes known as a 100-percent correction card.

treatment, the expected end for a tooth attacked by this disease is death of the tooth, various forms of accumulated tooth mortality rates have been suggested for measuring the effect of a given program on the number of deaths in a tooth population. This method represents an attempt to employ a technique which has demonstrated its usefulness in evaluating other specialized health programs.

The foregoing discussion has been concerned chiefly with an attempt to classify methods of evaluating dental programs according to their apparent function. This classification has been suggested on the assumption that the limitations of any single method do not necessarily preclude its usefulness, but may enhance its qualifications for measuring a particular phase of a dental program. The primary purpose of this paper in presenting the methods used to evaluate a specific dental program, that of Waynesboro, Pa., is not to render an authoritative report of the value of this particular program but rather to study the methodology of evaluation procedures.

MATERIAL AND METHODS

In the spring of 1939, the United States Public Health Service conducted an evaluation study of the dental program in the elementary schools of Waynesboro, Pa., an urban center of approximately 10,000 inhabitants located near the south central border of the State. A dental health program organized in Waynesboro in 1931 had been functioning continuously since that time. The administrative personnel consisted solely of a dental hygienist whose duties were limited by definition to annual examination of the teeth of each child in the first six grades, the performance of dental prophylaxis when indicated, and the preparation of individual cards notifying parents of a child's need for professional dental services. This notification card became known as a 100-percent correction card if and when it was returned to the dental hygienist bearing a dentist's signature as evidence that all dental defects had been corrected.

In an attempt to motivate group action for the correction of dental defects, a gold star was awarded to each classroom in which the entire enrollment had obtained 100-percent corrections. Additional incentive was provided during the last 3 years of the program by the manager of the local theater, who offered a free admission to all children obtaining 100-percent correction cards. An annual dental tag day and contributions by local social and civic organizations provided a yearly fund of approximately $250 which was used to provide some dental services for indigent children.

In order to conserve examination time and to facilitate the analysis of the resulting data, the dental examinations made for this study were limited to observations on the first permanent molars. This procedure was based on the assumption that a relatively accurate measure of the

dental condition of the permanent teeth of grade school children may be obtained from data on first molars alone. Evidence supporting this assumption is provided by an analysis (*11*) of data resulting from complete dental examinations of the entire grade school population of Hagerstown, Md. This analysis indicated that first molars alone contributed the following proportions of all defects found in the permanent teeth: 69 percent of all carious teeth, 78 percent of all carious tooth surfaces, 95 percent of all missing teeth (extracted plus remaining roots), and no less than 90 percent of all missing teeth in any one age group from 6 through 15 years.

In the present study this abbreviated dental examination was made on each child in the grade school population of Waynesboro. At the time of the examination, the condition of each first permanent molar or tooth space was recorded, each tooth being classified under one or more of the following categories: Free from disease, carious, filled, hypoplastic, unerupted, missing (extracted), or indicated for extraction. A tooth was classed as indicated for extraction when only roots remained, when the carious process obviously involved the pulp, or when in the judgment of the examiner the caries appeared so extensive that its mechanical removal would necessarily involve the pulp.

Similar dental examinations were made on the white children in the fifth, sixth, seventh, and eighth grades of the elementary schools of Hagerstown, Md., a city of approximately 30,000 population, to provide data on the characteristics of dental caries in the first permanent molars of children in a community which had not had an organized dental health program. A detailed description of Hagerstown, which is 12 miles southwest of Waynesboro, has been presented in a previous publication (*10*). With reference to such characteristics as nativity of population, industries, and socio-economic status, these two cities present no marked contrasts.

In general, the findings in first permanent molars will be presented in the form of age and sex specific prevalence rates per 100 children. Since the dental examinations made on the children in the fifth through the eighth grades of Hagerstown provided age specific findings for the age groups 10 to 14 years, inclusive, only the dental findings for these same age groups will be presented for the Waynesboro children. The desirability of providing a single figure to summarize quantitatively a particular dental finding for all ages is met in this presentation by determining the average rate for all ages. This is merely a numerical average of the age specific rates, and because these rates are expressed per 100 children, this average is equivalent to an adjusted rate on a standard population consisting of 100 children in each age group. Since dental defects accumulate with age, the value of an average per child over all ages, which is the summary figure usually presented, may be greatly influenced by the relative number of children in each

age group. This consideration may be of no great importance when dealing with periodic findings in a single city over a short span of years. However, this study is largely concerned with the comparison of dental findings in children of two cities. Therefore an adjusted rate on a standard population is employed to eliminate differences in the respective summary figures which might be due to differences in age distribution alone.

FINDINGS

The Waynesboro dental program operated in all eight grades of the elementary schools during the first 5 of its 8 years of existence, but was restricted to the lower six grades during the last 3 years. Therefore the enrollment in all eight grades for each of the first 5 years and the enrollment in the lower six grades for each of the last 3 years represents the number of children exposed to the program for each specified school year. The number of children who were subject to the direct influence of the program and the number and proportion of these children who received a dental examination are presented for each school year, 1931–32 through 1938–39, in table 1. These data indicate that in each of the first 5 years there was an appreciable increase over the previous year in the percentage of children receiving a dental examination, the proportion rising from 65.5 percent in 1931–32 to 96.5 percent in 1935–36. During each of the last 3 years 100 percent of the children enrolled in the lower six grades were examined.

TABLE 1.—*Number of children enrolled,*[1] *number and percentage receiving dental examination, and number and percentage of those examined who acquired 100-percent correction cards, by school year, Waynesboro elementary school children*

School year	1931–32	1932–33	1933–34	1934–35	1935–36	1936–37	1937–38	1938–39
Number of children enrolled	1,634	1,621	1,598	1,522	1,489	1,037	1,018	980
Number of children receiving dental examination	1,070	1,196	1,418	1,423	1,436	1,037	1,018	980
Percentage of enrollment examined	65.5	73.8	88.7	93.6	96.5	100.0	100.0	100.0
Number of children receiving 100-percent correction cards	259	253	457	504	690	803	851	861
Percentage of those examined who received 100-percent correction cards	24.2	21.2	32.2	35.4	48.0	77.4	83.6	87.8

[1] Includes children in all 8 grades for school years 1931–32 through 1935–36 and children in first 6 grades for school years 1936–37 to 1938–39, inclusive.

TABLE 2.—*Number of children, number of first permanent molars decayed or missing or filled, extracted, indicated for extraction, extracted or extraction indicated, and filled, and rates per 100 children, by age and sex, for 700 Waynesboro children*

	347 boys						353 girls					
Age last birthday	10	11	12	13	14	Adjusted rate	10	11	12	13	14	Adjusted rate
Number of children	69	79	76	77	46		78	78	79	77	41	
Number of first molars decayed, missing, or filled	191	249	217	244	146		220	238	235	254	127	
Number decayed, missing, or filled per 100 children	276.8	315.2	285.5	316.9	317.4	302.4	282.0	305.1	297.5	329.9	309.8	304.9
Number of first molars extracted	17	44	49	62	55		27	35	54	69	51	
Number extracted per 100 children	24.6	55.7	64.5	80.5	119.6	68.9	34.6	44.9	68.4	89.6	124.4	72.4
Number of first molar extractions indicated	2	3	1	8			3	4	6	2	3	
Number of extractions indicated per 100 children	2.9	3.8	1.3	10.4	10.9	5.9	3.8	5.1	7.6	2.6	7.3	5.2
Number of first molars extracted or extraction indicated	19	47	50	70	60		30	39	60	71	54	
First molar mortality rate, per 100 children	27.5	59.5	65.8	90.9	130.4	74.8	38.5	50.0	75.9	92.2	131.7	77.7
Number of first molars filled	112	164	116	126	49		142	169	144	139	57	
Number filled per 100 children	162.3	207.6	152.6	163.6	106.5	158.5	182.1	216.7	182.3	180.5	139.0	180.1

TABLE 3.—*Number of children, number of first permanent molars decayed or missing or filled, extracted, indicated for extraction, extracted or extraction indicated, and filled, and rates per 100 children by age and sex, for 1,915 Hagerstown children*

	923 boys						992 girls					
Age last birthday	10	11	12	13	14	Adjusted rate	10	11	12	13	14	Adjusted rate
Number of children	66	176	223	261	197		82	201	244	297	168	
Number of first molars decayed, missing, or filled	174	500	684	762	598		229	599	764	899	524	
Number decayed, missing, or filled per 100 children	263.6	284.1	306.7	292.0	303.6	290.0	279.3	298.0	313.1	302.7	311.9	301.0
Number of first molars extracted	14	64	131	149	135		25	83	149	186	169	
Number extracted per 100 children	21.2	36.4	58.7	57.1	68.5	47.2	30.5	41.3	61.1	62.6	100.6	59.2
Number of first molar extractions indicated	13	56	108	87	87		46	73	87	117	59	
Number of extractions indicated per 100 children	19.7	31.8	48.4	33.3	44.2	35.5	56.1	36.3	35.6	39.4	35.1	40.5
Number of first molars extracted or extraction indicated	27	120	239	236	222		71	156	236	303	228	
First molar mortality rate per 100 children	40.9	68.2	107.2	90.4	112.7	83.9	86.6	77.6	96.7	102.0	135.7	99.7
Number of first molars filled	49	120	170	212	151		60	180	288	286	146	
Number filled per 100 children	74.2	68.2	76.2	81.2	76.6	75.3	73.2	89.6	118.0	96.3	86.9	92.8

Since 100-percent correction cards were employed in the Waynesboro dental program, these records provide a means for determining the trend of public response to the program. A study of the proportions of examined children who acquired 100-percent correction cards, by school year (fig. 1), reveals that these increased yearly from 24.2 percent in 1931–32 to 87.8 percent in 1938–39. However, it will be noted that the trend is not uniform. Relatively small annual increases for the first 5 years were followed by a sharp increase for the school year 1936–37, which showed a proportion of 77.4 percent as against 48.0 percent for the preceding year. It is of interest that this marked rise in the percentage of children acquiring 100-percent correction

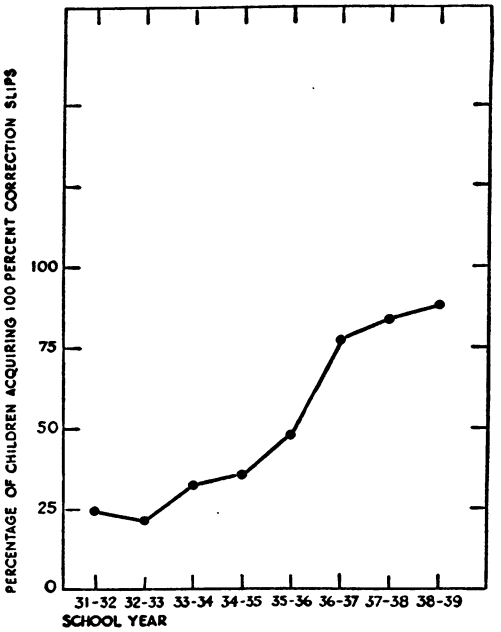

FIGURE 1.—Proportion of Waynesboro children who acquired 100-percent correction cards, by school year, 1931-32 through 1938-39.

cards during the last 3 school years was preceded by two definite changes in the administrative aspects of the program. The first of these was the reduction in coverage from all eight grades to the first six, and the second was the reward of a free movie to all children obtaining 100-percent correction cards. Both of these changes may have had a beneficial effect in stimulating response, the former making possible the expenditure of more administrative time per child, and the latter providing a motive tangible to a child for attempting to obtain the correction of dental defects.

In presenting the findings resulting from the dental examinations of Waynesboro and Hagerstown children, a comparison of the prevalence rates of dental caries seems first in order. The number of first perma-

nent molars which had been attacked by caries was determined from counts of those teeth in which there was evidence of present or past caries, that is, teeth decayed, missing, or filled. Figure 2 presents these findings in terms of age and sex specific rates per 100 children. Although the rates for the two cities show slight variations, no consistent difference is apparent in the age trends. The adjusted rates show remarkedly close agreement:

	Waynesboro	*Hagerstown*
Boys	302. 4	290. 0
Girls	304. 9	301. 0

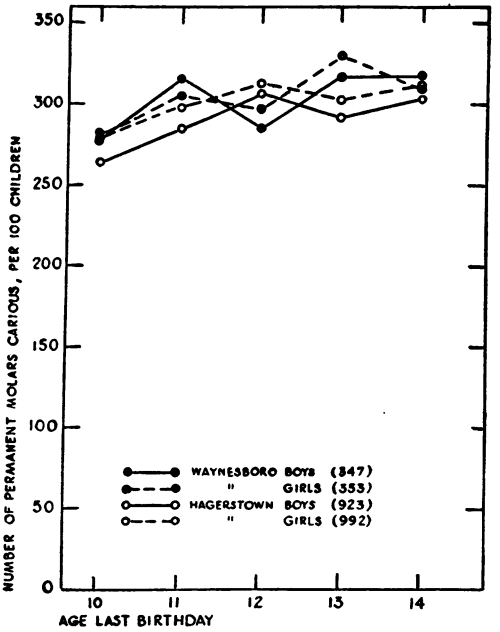

FIGURE 2.—Carious (decayed, missing, or filled) first permanent molars per 100 children in Waynesboro and Hagerstown, 1939.

The striking similarity in the caries prevalence rates in first permanent molars of Hagerstown and Waynesboro children indicates that the dental needs arising from carious defects in the children of these two cities were of relatively the same magnitude. Therefore, one measure of the extent to which dental service was being supplied to meet these needs is afforded by a direct comparison of the number of dental fillings found at the time of the examinations. From the data on the frequency of filled first permanent molars, presented in figure 3, it is evident that Waynesboro children showed markedly higher filling rates than did Hagerstown children. This is also evident from the following adjusted rates, which indicate that children under the Waynesboro program received twice as much dental service in the form of fillings as did children in Hagerstown:

	Waynesboro	*Hagerstown*
Boys	158. 5	75. 3
Girls	180. 1	92. 8

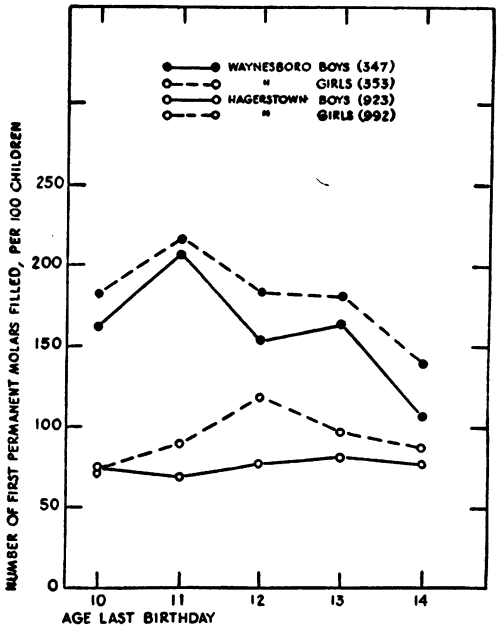

FIGURE 3.—First permanent molars filled per 100 children in Waynesboro and Hagerstown, 1939.

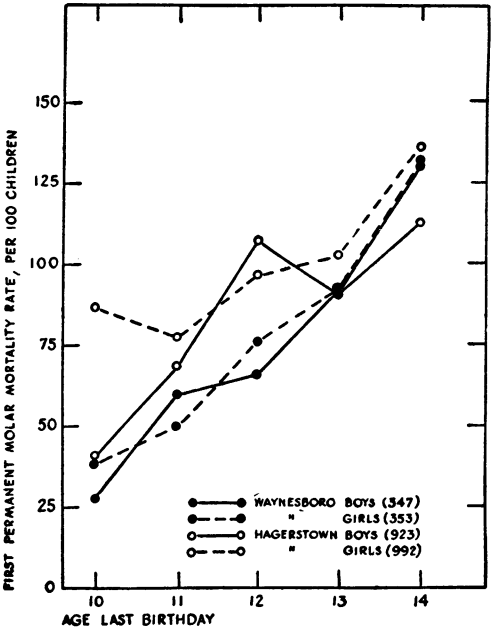

FIGURE 4.—First permanent molar mortality rates (extracted or extraction indicated) per 100 children in Waynesboro and Hagerstown, 1939.

Since dental fillings are cumulative with age in the presence of constant periodic dental service, the decided decrease in the number of fillings per 100 children after age 11 in the Waynesboro group is noteworthy. In this connection it was observed from the data on 100-percent correction cards that a marked increase in the proportion of children acquiring these slips occurred during the last 3 school years studied, when the program operated in the first six grades only. It might be expected, therefore, that the amount of exposure to these 3 years of increased service would be reflected in the age specific filling rates of Waynesboro children. This assumption is

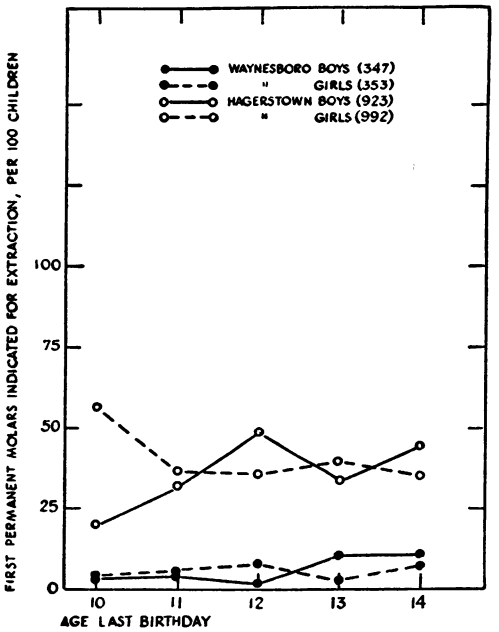

FIGURE 5.—First permanent molars indicated for extraction per 100 children in Waynesboro and Hagerstown, 1929.

in direct accord with the findings, a conclusion based on the premise that, in general, children 11 years of age were in the sixth grade at the time the dental examinations were made for the present study. Thus they constitute the oldest age group studied which had been subjected to the influences of the dental program during its last 3 years. Proceeding on this same premise, we assume that children 12 years of age were in the seventh grade and therefore had been exposed during the first 2 of these 3 years, whereas children 13 and 14 years old were in the eighth grade and had experienced only 1 year or less of exposure to the dental program during the last 3 years of its operation.

If the primary function of a dental filling is to prevent the extension of a carious process to pulp involvement and death of the tooth, then some indication of the relative volume of dental service provided for the school children of these two cities should be obtainable from a comparison of the tooth deaths which have occurred in the first permanent molars of these children. For the purpose of making this comparison, the number of teeth extracted and the number of teeth indicated for extraction were summed, and age and sex specific first molar mortality rates, per 100 children, were calculated. This procedure was based on the assumption that teeth indicated for

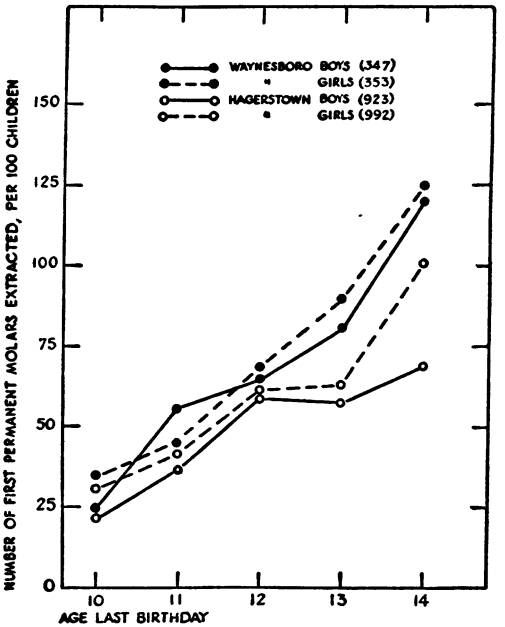

FIGURE 6.—First permanent molars extracted per 100 children in Waynesboro and Hagerstown, 1939.

extraction would be extracted if facilities for this type of dental service were provided and utilized. Therefore, it would appear not only reasonable but necessary to include counts of teeth so indicated with counts of teeth previously extracted when attempting to determine the number of tooth deaths which have resulted from untreated caries in a given group of children. From the first permanent molar mortality rates presented in figure 4 it is evident that Waynesboro girls have consistently lower rates than Hagerstown girls, and that for the age groups 10, 11, and 12, the findings are in the same direction for the boys. The average rates for all ages are:

	Waynesboro	*Hagerstown*
Boys	74.8	83.9
Girls	77.7	99.7

It is of interest to note that for the age groups 13 and 14 years the Waynesboro rates are not appreciably different from the Hagerstown rates. However, for the younger age groups studied—10, 11, and 12 years—the rates for Waynesboro children are roughly one-third lower than those for Hagerstown children. This is additional evidence that children under the influence of the Waynesboro dental program during the last 3 years of its operation definitely benefited by it.

Since a tooth indicated for extraction represents the need for a specific type of dental service, and since others have suggested that only counts of teeth actually extracted be used to evaluate dental programs, it appears desirable to study separately the characteristics of these two components of tooth mortality. When the findings on indicated extractions are examined (fig. 5), it is apparent that the Hagerstown rates are roughly five to seven times as great as the Waynesboro rates. The averages of these rates, for all ages, are as follows:

	Waynesboro	*Hagerstown*
Boys	5.9	35.5
Girls	5.3	40.5

The relative importance of indicated extractions in the total tooth mortality rates is emphasized by the fact that they accounted for approximately 40 percent of the first permanent molar deaths in Hagerstown children and for only 7 percent of those occurring in Waynesboro children. Furthermore, inasmuch as the prevalence of indicated extractions is inversely related to extraction service, these data indicate the wide disparity which exists in these communities with respect to provisions for this particular type of dental care in school children.

The number of extracted first permanent molars for the children studied is presented in figure 6 as prevalence rates per 100 children. Although the rates for Waynesboro children are consistently higher than those for Hagerstown children, the specific meaning of this finding of itself is questionable, since it has been demonstrated that extracted teeth may represent varying proportions of the total tooth deaths. The adjusted or average rates for all ages are as follows:

	Waynesboro	*Hagerstown*
Boys	68.9	47.2
Girls	72.4	59.2

However, for the general purpose of studying evaluation techniques the result of this comparison is of considerable importance, since it specifically demonstrates that an appraisal of the Waynesboro dental program from counts of extracted teeth alone would result in an erroneous conclusion.

DISCUSSION

The results of direct comparisons of dental findings in Waynesboro and Hagerstown school children have indicated the dental health benefits accruing to the Waynesboro children under an organized dental health program. Since these findings comprise individual types of data which might be employed in appraising dental programs, it seems desirable to reexamine them with a view of establishing the specific usefulness and limitations of each type as a yardstick for evaluating dental programs in general.

An analysis of data resulting from the use of the 100-percent correction cards in Waynesboro indicates (fig. 1) that the present administrative conduct of the program is apparently successful in eliciting public response. Although no data of a similar nature are available for Hagerstown to afford a direct comparison between the two cities, an internal comparison of the Waynesboro findings can be made. When this is done, it is noted that among children under the direct influence of the program the proportion acquiring 100-percent correction cards has increased annually for the last 8 years from 24 to 88 percent. This finding gives evidence of a marked and gratifying trend toward complete coverage. A more detailed examination of this trend indicates that a pronounced rise occurred during the last 3 of the 8 years studied. Inasmuch as this rise followed changes in the administrative conduct of the program, a further specific use of the 100-percent correction card is suggested, namely, to determine the relative merits of different administrative procedures in stimulating response.

One of the limitations of this record form lies in the fact that it does not differentiate, for example, between the child who required the filling of two small pit cavities and the child who required the extraction of two permanent teeth. It does, however, afford a record for use in measuring ability to bring about a visit of the child to the dentist. Whether or not that visit is most effectively timed or the service is complete and efficient remains for more detailed techniques to evaluate. Certainly the 100-percent correction card appears to offer a simple. inexpensive means of collecting specific data for determining the trend of public interest and response to a program and for evaluating the motivating powers of different administrative tactics.

If getting the child to the dentist for periodic dental service may be considered the first major function to be performed by a dental health program, then determining the volume and completeness of service dispensed becomes its second major function. With reference to this second objective, the filling of carious teeth constitutes the principal dental service problem in school children. Therefore, data on the frequency of fillings should afford a relative measure of the quantity of dental care provided. It was found that Waynesboro

children had received approximately twice as many fillings as Hagerstown children. Comparisons of this type are obviously useful, but a determination of the ratio of fillings to carious defects for a particular group of children provides more exact information on the completeness with which dental needs are being supplied. Data on fillings also give evidence of the motivating capabilities of a program, since the finding of a single filling in the mouth of a child indicates that the child in question has visited the dentist at least once. In general, however, findings with regard to fillings are of special value in estimating the volume of dental service dispensed and in calculating the unit cost of that service.

Since the fundamental purpose in providing dental service to grade school children is to prevent the loss of teeth, it follows that the adequacy and effectiveness of efforts directed towards accomplishing this purpose may be measured by the reduction achieved in tooth mortality. This statement is based on the premise that dental service should bear an inverse relationship to tooth mortality. Although the tooth mortality rates of Waynesboro and Hagerstown children (fig. 3) showed the expected inverse relation between dental care and tooth loss, the 100-percent correction card and the data on fillings were a distinct aid in bringing out this relationship. The 100-percent correction card demonstrated that among children under the direct influence of the Waynesboro program a markedly greater proportion had obtained the correction of dental defects during each of the last 3 years of the program than during the first 5 years. The data on fillings presented objective evidence that the amount of exposure to this period of increased service coverage was reflected in the age specific filling rates. In direct accord with these variations in volume of service received, the tooth mortality rates for Waynesboro children exposed during 2 or more of the last 3 years of the program were roughly one-third lower than the rates for Hagerstown children in the same age groups. On the other hand, the rates for Waynesboro children exposed during 1 year or less of these last 3 years were not appreciably different from the rates for the Hagerstown children in similar age groups.

The relationship between volume of dental service and tooth mortality, however, is extremely variable, since the effectiveness of dental care is dependent on a variety of factors. The first of these is the fact that dental caries is a chronic disease. It is evident from age specific findings on caries and tooth mortality in the permanent teeth of children that caries may progress to pulp involvement and tooth loss within 1 year after the first objective evidence of the original attack, but the rate of extension of this disease process varies greatly, and a tooth attacked may survive for many years.

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This suggests that an annual examination and service program of the Waynesboro type is probably most effective in preserving those teeth with a relatively slow caries process, and it is the filling of these teeth which would least affect the tooth mortality rates during the grade school ages. Therefore, in attempting a complete evaluation of dental services in terms of tooth mortality rates it is obvious that one is not justified in limiting observations to time periods short of those when teeth filled would have died had they not been filled.

Second, the time of placement of a filling relative to the stage of the carious process is very important from the standpoint of tooth survival. The probability of saving a tooth which has first degree caries by filling is very great, but the probability decreases rapidly as the caries progresses to second degree, third degree, and fourth degree caries, when it is practically nil. Thus the service which a dentist is able to give a child for the preservation of those teeth which have been attacked by caries is determined largely by the degree of the caries extension at the time of the child's visit. If that service, for example, consists of an attempt to fill successfully five teeth with third degree caries in one case, and five teeth with first degree caries in a second case, the volume of service dispensed may very well be the same in both cases, but the effectiveness of the respective fillings in preventing tooth loss is likely to be markedly lower in the first than in the second case.

A third factor to be considered in determining the relationship of timing to the effectiveness of dental service arises from the assumption that teeth attacked soon after eruption are more likely to be affected by a rapid extension of the carious process to pulp involvement than are teeth attacked later. Since teeth are not fully calcified at the time of eruption, this assumption appears reasonable, because the distance to be traversed by the caries to pulp involvement is appreciably less in newly erupted teeth. The operation of these factors is in accord with the consensus among pedodontists that young children should visit the dentist at 3-month intervals, whereas the length of those intervals may be increased to 6 months or a year in older children and adults. These considerations suggest that since the Waynesboro program has accomplished a fairly good service coverage of children in the first six grades, on an annual basis, it would seem desirable to divert some administrative time toward decreasing the length of the interval between dental visits in order to reduce more effectively that tooth loss which occurs in school children.

From the foregoing discussion it may be concluded that tooth mortality rates do not of themselves afford a good means for estimating the volume of dental service provided for elementary school children. However, they do offer a very useful yardstick for evaluating the progress of a dental health program in preventing or postponing that

tooth loss which occurs in children during the grade school ages. Furthermore, the value of tooth mortality rates is not limited to the measurement of this progress. These rates also afford a very useful working tool for determining a practical and efficient spacing of dental visits, in order that, through the most effective timing of dental service, tooth loss in childhood may be reduced to a minimum.

The fact that indicated extractions accounted for roughly 40 percent of the first permanent molar mortality in the Hagerstown children and for only 7 percent of that occurring in the Waynesboro children emphasizes the wide differences which may exist with respect to this characteristic. In addition, these findings indicate that one of the primary and most complete health functions which the Waynesboro program is accomplishing is the removal of the health hazard represented by infected roots and devitalized and abscessed teeth among teeth indicated for extraction. It is recognized that the inclusion of indicated extractions with extracted teeth introduces additional variability into the tooth mortality rates thus computed. However, the findings discussed in a previous section of this paper clearly point out that counts of extracted teeth alone do not provide sufficient data for a reliable estimate of the total tooth loss.

The marked variations which may exist with respect to the diagnosis of teeth indicated for extraction present a problem for study and definition which is important not only for the purpose of refining evaluation techniques employing tooth mortality rates, but also because of its practical value to the dental clinician. In order to provide some notion of the reliability of the figures on extractions indicated under the definitions employed in this study, a second examination on all 12-year-old children of Hagerstown was made by another examiner in the fall of 1939. Although the two examinations were made by different examiners the findings cannot be considered entirely independent since both men have been associated with the Hagerstown dental studies since 1937. A comparison of the findings of Examiner 1 with those of Examiner 2 (table 4) shows an agreement that would be considered good if the examinations had both been made by the same person. For general use, however, further study should be made of the definitions of "indicated extractions" in order that the diagnosis may be as accurate and as objective as possible.

TABLE 4.—*First permanent molars indicated for extraction, extracted, and indicated extractions plus extracted, per 100 children, by sex and dental examiner, for Hagerstown children aged 12*

	Number of children	Extractions indicated per 100 children	Extracted teeth per 100 children	Extracted plus indicated extractions per 100 children
	Boys			
Examiner 1	223	48.4	58.7	107.2
Examiner 2	278	45.7	55.4	101.1
	Girls			
Examiner 1	244	35.6	61.1	96.7
Examiner 2	275	39.6	58.2	97.8

SUMMARY AND CONCLUSIONS

Methods for evaluating dental programs have been classified according to function into four major categories:

1. Those which measure the efficiency of the administrative organization in producing activities designed to promote dental health.
2. Those which measure public response to a unit volume of administrative activity.
3. Those which measure volume of dental service dispensed.
4. Those which measure the effects of a program on dental health.

This gross classification is used as a working base from which to approach a study of the meaning, usefulness, and limitations of various methods, so that through complete definitions and more detailed classifications the benefits of a variety of evaluation techniques may be understood and utilized.

Dental findings in children of Waynesboro, Pa., a city which has had a dental program, were compared with similar findings in children of Hagerstown, Md., a city which has not had an organized dental program. These comparisons showed that:

1. The prevalence of dental caries in the teeth of Waynesboro and Hagerstown children are strikingly similar, and therefore the dental needs arising from carious defects in the children of these two communities are of relatively the same magnitude.
2. Waynesboro children have received more than twice as much dental service in the form of fillings and extraction service as have Hagerstown children.
3. For those Waynesboro children studied who had received the maximum dental service under the program (ages 10, 11, and 12), the tooth mortality rates were roughly one-third lower than those for Hagerstown children in the same age groups.
4. Teeth indicated for extraction accounted for 40 percent of the first permanent molar mortality in Hagerstown children and for only 7 percent of that occurring in Waynesboro children, a finding which accounted for the prevalence of extracted teeth being consistently greater in Waynesboro children than in Hagerstown children.

In addition, the use of 100-percent correction cards in Waynesboro showed that the percentage of children obtaining the correction of dental defects had increased yearly from 24 percent in the first year of the program to 88 percent in the eighth year, and that the effects of administrative changes in the conduct of the program were reflected in the rate of this yearly increase.

For purposes of evaluating dental programs these findings were interpreted as follows:

1. The 100-percent correction card offers a simple, inexpensive method for measuring public response to a program and for determining the relative effectiveness of different types of administrative procedures.

2. Counts of items of service, such as fillings and extractions, provide a means for estimating the volume of dental service supplied, for determining the ratio of service to dental needs, and for calculating the unit cost of dental service.

3. Tooth mortality rates afford an accurate yardstick for measuring the progress being made against that tooth loss which occurs during an observed age span, but they are not of themselves particularly useful in estimating the volume of dental service dispensed, since the magnitude of the inverse relationship between tooth mortality and dental service may be extremely variable.

4. Counts of extracted teeth alone should not be used to evaluate a dental program unless some knowledge of the relative number of indicated extractions is available.

The apparent usefulness of these various dental findings as yardsticks for evaluating dental programs, and the recognition of some of their limitations, the obvious imperfections in our understanding of the meaning of each technique, and the realization of the exceedingly variable conditions under which a program may be initiated, administered, and supported, all serve to emphasize the need for further study of evaluation methods and to demonstrate the folly of stabilizing our present knowledge of the appraisal of dental health programs through standardization.

REFERENCES

(1) Cady, F. C., Dean, H. T., and Messner, C. T.: A survey of dental activities of State departments and institutions of the United States. Pub. Health Bull. No. 227. U. S. Government Printing Office, Washington, D. C., 1936.

(2) Cady, F. C.: Dental health organizations in State departments of health of the United States. Pub. Health Bull. No. 251. U. S. Government Printing Office, Washington, D. C., 1939.

(3) American Child Health Association: School health research monographs number III. Public health aspects of dental decay in children. (1930).

(4) Day, C. D. M., and Sedwick, H. J.: Studies on the incidence of dental caries. Dental Cosmos, **77**: 442–452 (1935).

(5) Wisan, J. M.: Evaluation of dental programs for children. Am. J. Pub. Health, **28**: 859–862 (1938).

(6) Turner, C. E.: How to improve dental conditions in the United States. Am. J. Pub. Health, **29**: 326–327 (1939).

(7) Knutson, J. W., and Klein, Henry: Studies on dental caries. IV. Tooth mortality in elementary school children. Pub. Health Rep., **53**: 1021–1032 (June 24, 1938).

(8) Klein, Henry, and Palmer, C. E.: Community economic status and the dental problem of school children. Pub. Health Rep., **55**: 187–205 (Feb. 2, 1940).

(9) Committee for the Standardization of Record Forms, American Association of Public Health Dentists. Replies by State and city health departments to inquiries on the requirements of evaluation forms. Unpublished data (1940).
(10) Klein, Henry, Palmer, C. E., and Knutson, J. W.: Studies on dental caries. I. Dental status and dental needs of elementary school children. Pub. Health Rep., 53: 751–765 (May 13, 1938).
(11) Knutson, J. W., Klein, Henry, and Palmer, C. E.: Dental needs of grade school children of Hagerstown, Maryland. J. Am. Dent. Assoc., 27: 579–588 (1940).

STUDIES IN URIC ACID CLEARANCE [1]

By EDWARD J. STIEGLITZ, *In Charge Investigations in Gerontology, National Institute of Health* [2]

In the course of investigations into renal function studies in relation to senescence at the Baltimore City Hospitals and in some previous researches into the renal elimination of uric acid, a fairly large series of simultaneous uric acid and urea clearance tests were determined. Though the results of a few such parallel observations have been previously reported (*1*), no extensive series of cases have been found in the literature.

It is as yet unsettled whether specific depression of the renal ability to excrete uric acid is an important or secondary factor in the pathogenesis of gout. An incidence of 31 percent of chronic nephritis in 55 cases of gout, as reported by Schnitker and Richter (*2*), is unusually high in comparison with other diseases of the senescent period, such as hypertensive arterial disease, arthritis, and pernicious anemia. Yet these same authors report that renal function is rarely significantly impaired in gout in the absence of nephritis. Talbott and his coworkers (*3*) state that most gouty patients show some evidence of renal damage but that there does not appear to be any constitutional inferiority of the kidneys in excreting urates. Earlier investigations by Folin, Berglund, and Derick (*4*) lead to the conclusion that the unique high levels of uric acid in normal human blood, in contrast to the concentrations in the blood of other species, are due to a lack of responsiveness on the part of the human kidney and that this characteristic is exaggerated in gout. It is well recognized (*5*) that the blood uric acid may be raised above normal in a number of conditions other than gout, but that it is not necessarily raised in all cases of impaired renal function (*6*).

Brøchner-Mortensen has emphasized (*7*) the great variability of the uric acid clearance in both normal and gouty subjects. Contrariwise, Stefanini (*8*) has suggested that slight impairment of the renal ability to secrete uric acid is a most sensitive and early test of kidney

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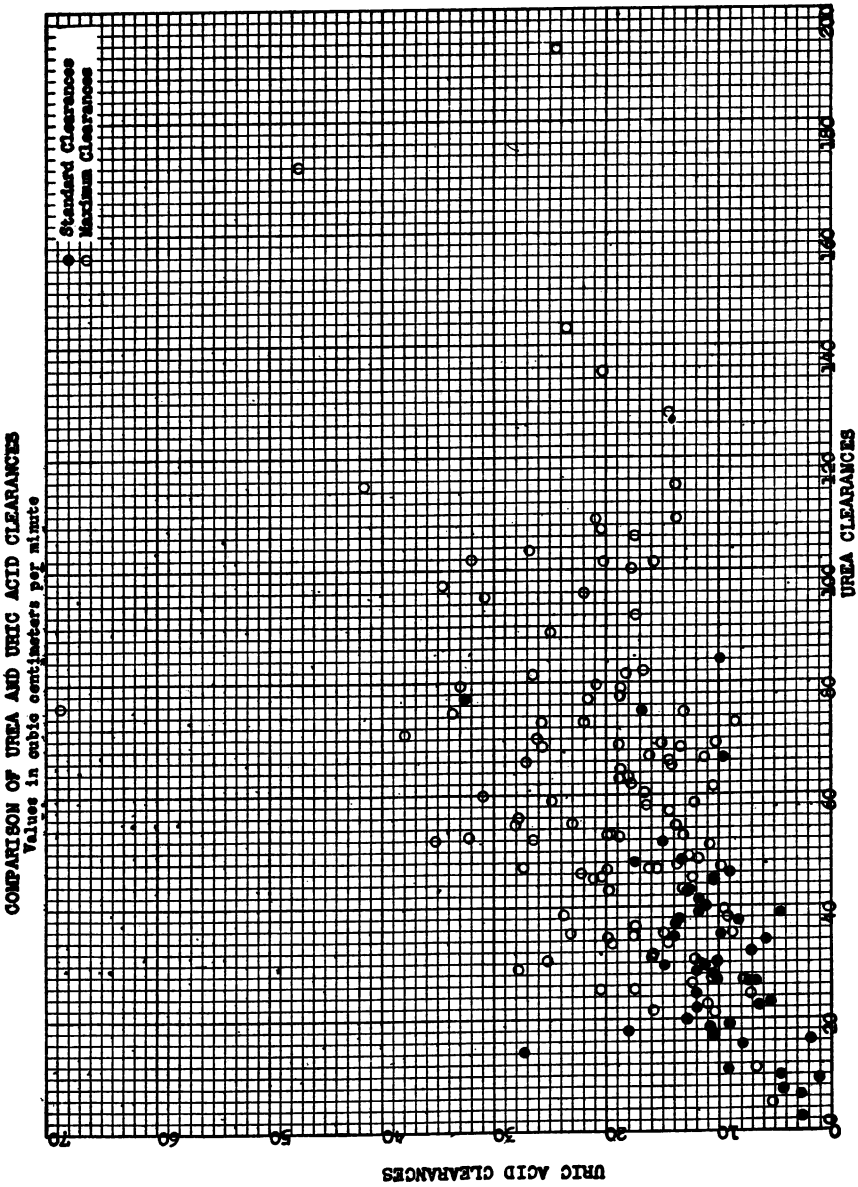
[2] With the technical assistance of Marvin Yiengst, B. S., medical technician.

function. With such conflicting viewpoints, it appeared desirable to determine the degree of parallelism between uric acid and urea clearances in nongouty subjects. An exact parallelism is not to be expected, for the two substances are probably secreted by different portions of the nephron. Gersh (*9*), applying histochemical methods, has demonstrated that, in the rabbit at least, uric acid is eliminated by the glomeruli. Clinical functional studies (*7*) tend to confirm this viewpoint. Urea, on the other hand, is probably secreted by both the glomeruli and the proximal convoluted tubules (*10*, *11*, *12*), although Smith (*13*) dogmatically asserts that urea is excreted by glomerular filtration. The present report is limited to a comparison of the uric acid and urea clearance rates in man when the two are determined simultaneously.

METHODS

Observations were made upon 160 individuals, none of whom were afflicted with gout as far as could be determined by the usual clinical methods. The subjects of the tests ranged in age from the early twenties to the late seventies. Most of the younger individuals studied were normal. The older patients from the medical wards of the Baltimore City Hospitals almost all suffered from some disabling cardiovascular disorder. Arteriosclerosis was the most frequent disease, and many were disabled because of some previous cerebral vascular accident. No instances of frank cardiac decompensation were included in the series.

The clinical test procedure was the same in all instances: A complete specimen of urine was collected about 1 hour after the patient had previously voided. The precise time in minutes between these voidings was noted so that the rate of urine secretion per minute could be known. Blood for analysis was drawn from a cubital vein at the end of this secretion period. By encouraging a liberal intake of water before and during the test period, it was possible to obtain maximum clearances (urinary volumes in excess of 2 cc. per minute) in most instances. Almost all the tests were carried out in midmorning. The calculation of the urea and uric acid clearance followed the formulae of Van Slyke et al. (*12*), expressing the "maximum" clearance as $\frac{U\,V}{B}$ and the "standard" clearance (less than 2 cc. urine per minute) as $\frac{U\sqrt{V}}{B}$ where U is the concentration of solute (urea or uric acid) in the urine, V the volume of urine in cubic centimeters per minute, and B the concentration of solute in whole blood. The average normal for the standard urea clearance is 54 cc. blood cleared per minute and the average normal maximum urea clearance is 75 cc. blood per minute (*12*).


COMPARISON OF UREA AND URIC ACID CLEARANCES
Values in cubic centimeters per minute
Standard Clearances
Maximum Clearances
URIC ACID CLEARANCES
UREA CLEARANCES
0
10
20
30
40
50
60
70
80
90
100
120
140
160
180
200

All analyses were made on the same day the specimens were collected. The urea and uric acid concentrations were determined in the same specimens. The analytic methods were:

Urine urea: The urease method of Van Slyke and Cullen (*14*, pp. 547–550), determining the preformed ammonia separately as well as the total ammonia (preformed and derived from urea) and then subtracting the preformed ammonia from the total.

Blood urea: The urease method of Van Slyke and Cullen (*14*, p. 556) applied to whole blood, with aeration and direct titration of the ammonia formed.

Urinary uric acid: Colorimetric method of Benedict and Franke with arseno-phosphotungstic acid and sodium cyanide (*14*, p. 590).

Blood uric acid: Haden's modification of the Folin-Wu method for preparing protein-free blood filtrate with tungstic acid (*14*, p. 66) and the Benedict and Franke direct colorimetric method with arseno-phosphotungstic acid and sodium cyanide (*14*, pp. 591–593).

RESULTS

Comparison of the 160 simultaneous urea and uric acid clearances in cubic centimeters of blood cleared per minute is best revealed graphically (fig. 1). It is notable that there is a fairly close correlation between the two secretory rates and that this correlation is most marked when a moderate degree of impairment of renal function existed. The spread of variation, however, is so great at all levels that it would be wholly unwarranted to conclude that there is more than a general parallelism between the uric acid and urea clearance rates. Age and/or arteriosclerosis do not seem to depress the one excretion any more than the other. These data and other information from the literature imply that it is improbable that the rise in incidence in gout which occurs with aging is primarily due to a progressive and selective impairment of the renal ability to secrete uric acid associated with renal and vascular senescence.

REFERENCES

(*1*) Brøchner-Mortensen, K.: Diagnosis of gout. Acta Medica Scand., **99**: 538–562 (1939).

(*2*) Schnitker, M. A., and Richter, A.: Nephritis in gout. Am. J. Med. Sci., **192**: 241–252 (1936).

(*3*) Coombs, F. S., Pecora, L. J., Thorogood, E., Consolazia, W. V., and Talbott, J. A.: Renal function in patients with gout. J. Clin. Invest., **19**: 525–535 (1940).

(*4*) Folin, O., Berglund, H., and Derick, C.: The uric acid problem. J. Biol. Chem., **60**: 361–471 (1924).

(*5*) Jordan, E. P., and Gaston, D.: The blood uric acid in disease. J. Clin. Invest., **11**: 747–752 (1932).

(*6*) Johnston, C.: The relationship of blood uric acid content to the state of renal function in nephritis. J. Clin. Invest., **9**: 555–559 (1931).

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(7) Brøchner-Mortensen, K.: Uric Acid in Blood and Urine. Ejnar Munksgaard, Copenhagen, 1937.
(8) Stefanini, S.: Capacity of concentration, dilution and elimination of uric acid as test for renal functions. Clinica Pediatrica, 18: 784–810 (1936).
(9) Gersh, I.: Histochemical studies on mammalian kidney; the glomerular elimination of uric acid in the rabbit. Anat. Record, 58: 369–385 (1934).
(10) Oliver, J.: A further study of the regenerated epithelium in chronic uranium nephritis. An anatomical investigation of its function. J. Exper. Med., 23: 301–321 (1916).
(11) Stieglitz, E. J.: Histochemical studies on the mechanism of renal secretion. Am. J. Anat., 29: 33 (1921).
(12) Van Slyke, D. D., Stillman, E., Moller, E., Ehrech, W., McIntosh, J. F., Leiter, L., Mackay, E. M., Hannon, R. R., Moore, H. S., and Johnson, E.: Observations on the Course of Different Types of Bright's Disease and on the Resultant Changes in Renal Anatomy. Williams and Wilkins, Baltimore, 1930.
(13) Smith, H. W.: The Physiology of the Kidney. Oxford University Press, New York, 1937. Chap. 12, p. 119.
(14) Peters, J. P., and Van Slyke, D. D.: Quantitative Clinical Chemistry. Volume II. Williams and Wilkins, Baltimore, 1932.

NOTE ON A TOXIC PRINCIPLE IN EGGS OF THE TICK, *DERMACENTOR ANDERSONI* STILES*

By EDWARD A. STEINHAUS, *Assistant Bacteriologist, United States Public Health Service*

While conducting studies of microorganisms occurring spontaneously in the Rocky Mountain wood tick, *Dermacentor andersoni*, peculiar toxic reactions have been observed in guinea pigs following the parenteral introduction of triturated tick eggs. Apparently this is the first time this phenomenon has been noted in this species of tick.

TABLE 1.—*Results of inoculations of varying amounts of tick-egg suspension and filtrates into guinea pigs*

(All animals except 2 were injected intraperitoneally)

Number of guinea pigs	Amount of inoculum (cc.)	Average number of days until death	Comments on survivors
Suspensions			
4	Under 1	1.2	1 survived after showing toxic symptoms
7	1.0	2.3	1 survived after becoming almost moribund.
15	2.0	2.3	
5	2.5	2.0	
Filtrates			
2[1]	0.5	0	Both survived.
4	1.0	3.0	
3	2.0	2.0	1 survived.
2	2.5	2.5	

[1] These two animals were injected subcutaneously.

* From the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

EXPERIMENTAL DATA

As shown in table 1, 29 out of 31 guinea pigs injected with varying quantities of saline suspensions of *D. andersoni* eggs died, as did also 8 of 11 animals that received different amounts of Berkefeld filtrates of such suspensions. There was usually a slight rise in temperature (ranging from 39.6° to 40.8° C.) the day after inoculation. In most cases death occurred during the second day following a period of 6 to 12 hours of marked symptoms. However, death also occurred as early as the eighteenth hour and in two instances as late as the sixth day. In a typical case, the animal is depressed and has lost its appetite on the morning of the second day. Later in the day, or on the third day, it is either prostrate or has so little strength that it can be toppled over by a slight push. On autopsy, excess fluid is commonly found in the abdominal cavity, the omentum is usually thickened, and it and the subcutaneous tissues may be hemorrhagic. Flecks of exudate throughout the abdominal cavity are frequent. The lungs may be injected.

The reactions in rabbits and mice are similar but occur less consistently.

Repeated attempts to reproduce this condition in fresh animals by the transfer of blood and of saline suspensions of liver, spleen, lung, brain, and spinal cord were unsuccessful. Aerobic and anaerobic cultures made of the various guinea pig tissues usually remained sterile, but occasionally a micrococcus was isolated. However, cultures of this organism, which was also found on the surface of the eggs, did not produce the symptoms discussed. Furthermore, eggs which had been thoroughly sterilized exteriorly gave typical results.

Six guinea pigs receiving the tick-egg suspension *per os* showed no ill effects.

Filtrates (Berkefeld N) of the tick-egg suspensions, when inoculated into guinea pigs, gave results indistinguishable from those caused by the suspension itself (see table 1).

The active principle did not pass through collodion or viscose membranes during a period of 8 days. It was not destroyed by alcohol and was slightly less resistant to acetone. It withstood drying for at least a month and, in the case of the dried alcohol precipitate, was still potent after a period of 7 months. Attempts to immunize against the active principle failed, but 7 of 9 guinea pigs tested for possible immunity died in anaphylactic shock. This could have been due to normal tick-egg proteins.

Regendanz and Reichenow (*1*), by injecting experimental animals with large quantities of *Rhipicephalus sanguineus* eggs, and Oswald (*2*), by injecting the eggs of this and other ticks (*Hyalomma scupense*, *Boophilus calcaratus*, and *Rhipicephalus bursa*), produced reactions

which they (particularly the former authors) considered characteristic of tick paralysis. However, the writer is not prepared to suggest that the toxic principle in the eggs of *D. andersoni* is the one concerned in the production of tick paralysis by this species of tick.

SUMMARY

When large numbers of eggs of normal *Dermacentor andersoni* ticks were inoculated into experimental animals, characteristic toxic symptoms followed by death in 2 or 3 days usually resulted. The active principle was filterable, resistant to drying, alcohol and acetone, and was apparently nondialyzable.

REFERENCES

(*1*) Regendanz, P., and Reichenow, E.: Über Zeckengift und Zeckenparalyse. Arch. f. Schiffs- u. Tropen- Hyg., **35**: 255–273 (1931).
(*2*) Oswald, B.: Revue des traveaux publiés en Yougoslavie sur le problème des tiques et nouvelles recherches sur le poison de lurs Oeufs. Ann. Parasit. Humaine et Comparée, **16**: 548–559 (1938).

CANCER MORTALITY [1]

A Review

The fourth and final report of a series of studies of cancer mortality in the United States has recently been issued. These reports are based on unpublished data made available by the Bureau of the Census.

The following observations are made from age curves of cancer mortality specific for site, sex, and geographic section of the United States: (1) although deaths from cancer of any site are confined largely to ages over 35 years there is distinct variation in the mean age at death and in the relative age curves of specific sites of cancer; (2) sectional differences in the relative age curves of specific sites of cancer are minor, the uniformity of the curves for specific organs in different sections is striking; (3) the mean age at death for sites com-

[1] Cancer mortality in the United States. IV. Age variation in mortality from cancer of specific sites, 1930-32. Public Health Bulletin No. 275.

Earlier studies in this series are:

Cancer mortality in the United States.

I. Trend of recorded cancer mortality in the death registration States of 1900, from 1900 to 1935. Public Health Bulletin No. 248.

II. Recorded cancer mortality in geographic sections of the death registration States of 1920, from 1920 to 1935. Public Health Bulletin No. 252.

III. Geographic variation in recorded cancer mortality for detailed sites, for an average of the years 1930-32. Public Health Bulletin No. 257.

These studies, prepared by Associate Statistician Mary Gover, United States Public Health Service, are from the Division of Public Health Methods and the National Cancer Institute of the National Institute of Health in cooperation with the Division of Vital Statistics, United States Bureau of the Census. They may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. Bulletins 248, 252, and 275 are priced at 10 cents per copy; Bulletin 257 is 15 cents per copy.

mon to both sexes is practically the same for men and women; however, the standard deviations of the age distributions of deaths are generally less for men, or there is a greater concentration of deaths at the mean age for men particularly for the external sites of cancer for which the male rates are relatively high.

INCIDENCE OF HOSPITALIZATION, JULY 1942

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among about 8,000,000 members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover about 60 hospital service plans scattered throughout the country, mostly in large cities.

Item	July	
	1942	1941
1. Number of plans supplying data	66	46
2. Number of persons eligible for hospital care	8,846,262	5,440,932
3. Number of persons admitted for hospital care	91,212	54,925
4. Incidence per 1000 persons, annual rate, during current month (daily rate x 365)	121.3	118.8
5. Simple average of annual rates for the twelve months ended July 31	107.4	

DEATHS DURING WEEK ENDED AUGUST 15, 1942

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce

	Week ended Aug. 15, 1942	Corresponding week, 1941
Data from 88 large cities of the United States:		
Total deaths	7,231	7,308
Average for 3 prior years	7,160	
Total deaths, first 32 weeks of year	271,365	275,753
Deaths per 1,000 population, first 32 weeks of year, annual rate	11.8	12.0
Deaths under 1 year of age	560	477
Average for 3 prior years	472	
Deaths under 1 year of age, first 32 weeks of year	17,991	16,801
Data from industrial insurance companies:		
Policies in force	64,942,559	64,418,462
Number of death claims	10,193	10,925
Death claims per 1,000 policies in force, annual rate	8.2	8.8
Death claims per 1,000 policies, first 32 weeks of year, annual rate	9.5	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 22, 1942

Summary

The seasonal rise in the reported cases of poliomyelitis continued during the week, but the current incidence remains below that for any prior year since 1938. A total of 183 cases was reported for the week, as compared with 173 for the preceding week, and a 5-year (1937–41) median of 492 cases. More than 600 cases were reported for the corresponding week in 1941 and 1940. The following named 7 States reported 10 or more cases for the current week: Illinois 27, New York 15, New Jersey 12, Michigan 12, Nebraska 12, Ohio 11, and Kentucky 10.

The incidence of meningococcus meningitis declined, but remains above that for any other prior year since 1938. A total of 42 cases was reported, as compared with 47 last week and a 5-year median of 34 cases for the week. The largest numbers of cases were reported from the Middle Atlantic and South Atlantic States.

Only 3 cases of smallpox were reported during the week, the same as for the corresponding week last year. A total of 612 cases has been reported this year to date, as compared with 1,153 for the same period last year, and a 5-year median of 7,974. The incidence of typhoid fever is below that for any prior year of record.

A total of 148 cases of endemic typhus fever was reported, as compared with 164 for the preceding week. Georgia reported 51 cases, Texas 40, and Alabama 19. All but one of the current cases were reported in the Southern States.

Other reports include 1 case of anthrax in Arkansas, 35 cases of amebic dysentery (14 in Texas), 271 cases of bacillary dysentery (153 in Texas), 278 cases of unspecified dysentery (229 in Virginia), 22 scattered cases of infectious encephalitis, 1 case of leprosy in New York, 8 cases of Rocky Mountain spotted fever (none of which were in the Mountain or Pacific States), and 13 cases of tularemia.

The death rate for the current week for 88 large cities in the United States is 10.4 per 1,000 population, as compared with 10.1 last week and a 3-year average of 9.8, which is the lowest rate for any week of 3-year averages. The death rate may be expected to increase gradually (in the absence of any severe epidemic) until the peak is reached sometime next January or February.

Telegraphic morbidity reports from State health officers for the week ended August 22, 1942, and comparison with corresponding week of 1941 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941	
NEW ENG.												
Maine	0	1	0	------	------	------	72	9	3	0	0	0
New Hampshire	0	0	0	------	------	------	0	0	0	0	0	0
Vermont	0	0	0	------	------	------	11	12	9	0	0	0
Massachusetts	2	4	3	------	------	------	62	73	65	2	0	1
Rhode Island	0	3	0	------	------	------	4	0	0	0	0	0
Connecticut	0	0	0	[1]3	------	------	10	24	9	0	1	0
MID. ATL.												
New York	4	7	9	7	------	1	60	90	127	7	2	7
New Jersey	2	1	5	1	2	2	36	31	31	2	0	0
Pennsylvania	6	8	8	------	------	------	31	92	92	3	0	4
E. N. CEN.												
Ohio	3	4	8	1	2	2	16	28	15	0	1	1
Indiana	7	1	3	3	7	------	5	1	5	1	2	0
Illinois	19	9	11	3	2	2	7	24	24	1	3	2
Michigan[2]	1	0	6	1	------	1	37	27	36	3	1	1
Wisconsin	0	1	1	12	2	11	78	76	76	0	1	0
W. NO. CEN.												
Minnesota	1	3	3	------	2	2	8	3	3	0	0	0
Iowa	3	0	3	------	------	------	15	5	5	2	0	1
Missouri	8	5	9	------	------	1	18	7	7	0	0	0
North Dakota	0	0	0	------	18	1	7	18	3	1	0	0
South Dakota	0	7	0	------	------	------	2	2	0	0	0	0
Nebraska	0	1	1	6	------	------	19	0	1	0	0	1
Kansas	1	2	2	1	------	------	6	11	7	0	2	1
SO. ATL.												
Delaware	0	0	0	------	------	------	0	1	0	0	0	0
Maryland[2]	4	1	5	1	3	3	9	4	3	3	2	1
Dist. of Col.	1	0	1	------	------	------	4	10	5	2	0	0
Virginia	8	16	15	43	40	40	8	22	22	1	4	1
West Virginia	2	0	5	------	6	11	2	31	3	0	0	1
North Carolina	10	14	23	------	------	------	2	14	14	1	0	1
South Carolina	19	22	8	104	56	56	5	55	5	0	0	0
Georgia	11	11	20	8	8	1	3	37	0	0	0	0
Florida	2	2	3	1	2	1	2	4	4	3	0	0
E. SO. CEN.												
Kentucky	4	3	7	------	------	1	3	6	6	1	0	0
Tennessee	2	10	10	9	11	6	1	15	23	0	0	1
Alabama	7	11	13	11	7	7	9	4	5	1	1	1
Mississippi[2]	8	14	14	------	------	------	------	------	------	1	0	0
W. SO. CEN.												
Arkansas	2	10	10	2	2	2	1	12	9	1	1	0
Louisiana	8	5	10	8	------	4	3	1	2	1	0	2
Oklahoma	0	3	3	11	19	19	0	7	3	0	0	1
Texas	25	18	18	105	285	61	25	35	24	0	1	2
MOUNTAIN												
Montana	0	1	1	1	------	------	11	3	9	0	0	0
Idaho	0	0	0	------	------	------	7	0	1	0	0	0
Wyoming	0	0	0	7	------	------	5	3	3	0	0	0
Colorado	1	10	6	16	19	1	11	14	5	1	0	0
New Mexico	1	1	1	------	------	------	2	4	4	0	0	0
Arizona	2	1	1	20	15	12	3	20	8	0	0	1
Utah[2]	0	0	1	------	9	------	31	6	9	0	0	0
Nevada	0	0	------	------	------	------	0	2	------	0	0	------
PACIFIC												
Washington	1	0	0	1	------	------	54	1	9	0	1	0
Oregon	0	5	1	6	6	6	34	8	8	2	0	0
California	10	3	14	15	16	10	65	74	74	2	1	1
Total	185	218	272	407	539	351	804	926	879	42	24	34
33 weeks	7,426	7,530	11,968	80,798	489,845	159,976	466,584	823,703	348,447	2,396	1,410	1,410

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 22, 1942, and comparison with corresponding week of 1941 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet Fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41	Week ended		Median 1937–41
	Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941		Aug. 22, 1942	Aug. 23, 1941	
NEW ENG.												
Maine	0	2	2	4	2	2	0	0	0	0	0	0
New Hampshire	1	0	0	0	2	1	0	0	0	0	0	0
Vermont	0	0	0	0	2	2	0	0	0	0	0	0
Massachusetts	0	8	6	63	36	25	0	0	0	6	1	1
Rhode Island	0	4	0	4	4	1	0	0	0	0	0	1
Connecticut	2	7	3	7	6	6	0	0	0	3	1	2
MID. ATL.												
New York	15	66	39	36	35	55	0	0	0	12	18	18
New Jersey	12	25	12	18	15	15	0	0	0	8	7	8
Pennsylvania	5	82	15	32	30	49	0	0	0	14	18	18
E. NO. CEN.												
Ohio	11	44	22	32	28	40	0	0	0	8	7	18
Indiana	5	7	7	13	8	14	0	0	2	6	2	4
Illinois	27	23	21	43	38	48	0	0	2	4	23	19
Michigan [3]	12	6	21	26	27	54	1	1	1	1	7	7
Wisconsin	0	2	2	37	28	34	0	0	1	0	0	0
W. NO. CEN.												
Minnesota	3	14	10	16	8	17	0	0	0	0	0	0
Iowa	7	2	2	9	5	12	0	0	1	1	3	5
Missouri	8	0	1	19	6	13	1	0	1	10	7	22
North Dakota	0	0	0	1	0	2	0	0	1	0	0	0
South Dakota	0	0	1	2	2	4	0	0	0	0	0	0
Nebraska	12	0	1	2	3	3	0	1	0	3	0	0
Kansas	3	1	3	21	16	20	0	0	0	2	0	4
SO. ATL.												
Delaware	2	2	0	0	1	1	0	0	0	1	1	1
Maryland [3]	0	21	2	6	31	12	0	0	0	2	11	10
Dist. of Col	0	6	3	12	4	4	0	0	0	0	2	3
Virginia	0	9	1	9	11	10	0	0	0	9	10	17
West Virginia	5	4	4	18	21	19	0	0	0	1	7	15
North Carolina	8	4	4	22	11	13	0	0	0	1	7	15
South Carlina	1	8	0	5	5	5	0	0	0	2	6	15
Georgia	0	74	4	6	14	9	0	0	0	21	28	24
Florida	2	14	3	0	2	2	0	0	0	10	7	3
E. SO. CEN.												
Kentucky	10	25	4	22	23	21	0	1	0	17	16	33
Tennessee	5	39	1	31	13	13	0	0	0	6	15	28
Alabama	1	78	2	12	11	12	0	0	0	2	5	14
Mississippi [3]	1	5	5	12	4	5	0	0	0	5	12	7
W. SO. CEN.												
Arkansas	6	1	1	6	2	4	0	0	0	11	13	25
Louisiana	3	7	6	1	3	5	0	0	0	12	9	18
Oklahoma	2	1	1	3	5	6	0	0	0	6	5	25
Texas	3	5	11	23	16	16	1	0	0	18	31	56
MOUNTAIN												
Montana	0	0	0	4	9	9	0	0	0	0	1	1
Idaho	0	0	0	0	1	1	0	0	0	0	1	1
Wyoming	0	0	0	4	0	0	0	0	0	0	0	0
Colorado	0	1	2	11	9	9	0	0	0	2	1	1
New Mexico	1	0	1	2	1	2	0	0	0	1	3	4
Arizona	0	0	0	1	1	1	0	0	0	2	0	2
Utah [3]	0	1	0	2	2	5	0	0	0	0	2	0
Nevada	0	0	----	0	0	----	0	0	----	0	0	----
PACIFIC												
Washington	1	0	1	5	7	7	0	0	0	3	9	6
Oregon	0	3	2	2	11	8	0	0	0	2	4	3
California	9	16	16	37	45	47	0	0	0	0	3	11
Total	188	617	492	641	564	690	3	3	25	212	303	503
33 weeks	1,505	3,401	2,652	89,173	89,736	116,482	612	1,153	7,974	4,025	4,760	7,105

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended August 22, 1942—Continued

Division and State	Whooping Cough		Week ended Aug. 22, 1942								
	Week ended			Dysentery							
	Aug. 22, 1942	Aug. 23, 1941	Anthrax	Amebic	Bacillary	Unspecified	Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
NEW ENG.											
Maine	27	13	0	0	0	0	0	0	0	0	0
New Hampshire	7	1	0	0	0	0	0	0	0	0	0
Vermont	49	14	0	0	0	0	0	0	0	0	0
Massachusetts	139	124	0	0	1	0	2	0	0	0	0
Rhode Island	12	15	0	0	0	0	0	0	0	0	0
Connecticut	61	44	0	0	0	0	0	0	0	0	0
MID. ATL.											
New York	358	253	0	1	19	0	8	1	0	0	1
New Jersey	184	116	0	2	0	0	0	0	0	0	0
Pennsylvania	267	193	0	1	1	0	0	0	1	0	0
E. NO. CEN.											
Ohio	158	221	0	0	0	1	0	0	0	0	0
Indiana	50	18	0	0	0	0	0	0	0	0	0
Illinois	320	213	0	0	32	0	0	0	1	0	0
Michigan[2]	268	182	0	0	14	0	0	0	0	0	0
Wisconsin	216	208	0	0	0	0	0	0	0	1	0
W. NO. CEN.											
Minnesota	50	53	0	0	0	0	0	0	0	1	0
Iowa	26	29	0	0	0	0	0	0	1	1	0
Missouri	17	4	0	0	0	9	0	0	0	0	0
North Dakota	3	18	0	0	0	0	1	0	0	0	0
South Dakota	1	18	0	0	0	0	1	0	1	0	0
Nebraska	2	4	0	0	0	0	0	0	0	0	0
Kansas	21	58	0	1	0	0	0	0	0	0	0
SO. ATL.											
Delaware	1	1	0	0	0	0	0	0	0	0	0
Maryland[1]	57	28	0	0	0	5	1	0	2	0	0
Dist. of Col	26	23	0	0	0	0	0	0	0	0	0
Virginia	21	57	0	0	0	229	0	0	2	0	0
West Virginia	6	13	0	0	0	0	0	0	0	0	0
North Carolina	92	107	0	0	0	0	0	0	0	0	2
South Carolina	53	53	0	0	0	0	0	0	0	0	13
Georgia	13	20	0	2	4	0	0	0	0	0	51
Florida	18	13	0	0	2	0	0	0	0	0	14
E. SO. CEN.											
Kentucky	42	51	0	0	3	0	0	0	0	0	0
Tennessee	24	44	0	0	0	9	0	0	0	1	1
Alabama	22	12	0	0	0	0	0	0	0	0	19
Mississippi[2]	----	----	0	0	0	0	0	0	0	0	2
W. SO. CEN.											
Arkansas	9	7	1	7	10	0	0	0	0	4	0
Louisiana	6	12	0	2	0	0	1	0	0	0	4
Oklahoma	11	6	0	0	0	10	0	0	0	0	0
Texas	126	136	0	14	153	0	1	0	0	0	40
MOUNTAIN											
Montana	22	21	0	1	0	0	1	0	0	1	0
Idaho	2	17	0	0	0	0	0	0	0	0	0
Wyoming	5	15	0	0	0	0	0	0	0	2	0
Colorado	25	108	0	0	13	0	0	0	0	1	0
New Mexico	14	54	0	0	2	0	0	0	0	0	0
Arizona	7	17	0	0	0	25	0	0	0	0	0
Utah[2]	9	48	0	0	0	0		0	0	1	0
Nevada	0	1	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	24	52	0	0	0	0	4	0	0	0	0
Oregon	22	17	0	0	0	0	0	0	0	0	0
California	170	267	0	4	17	0	2	0	0	0	0
Total	3,063	2,999	1	35	271	288	22	1	8	13	148
33 weeks	122,382	146,299	----	----	----	----	----	----	----	----	----

[1] New York City only.

[2] Period ended earlier than Saturday.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 8, 1942

This table lists the reports from 88 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Baltimore, Md	4	0	1	0	2	3	6	0	6	0	1	40
Barre, Vt	0	0	------	0	1	0	0	0	0	0	0	5
Billings, Mont	0	0	------	0	1	0	1	0	0	0	0	1
Birmingham, Ala	1	0	1	0	0	0	1	0	0	0	0	1
Boise, Idaho	0	0	------	0	0	0	0	0	0	0	0	0
Boston, Mass	0	0	------	1	19	3	7	0	17	0	1	45
Bridgeport, Conn	0	0	------	0	0	0	0	0	4	0	0	0
Brunswick, Ga	0	0	------	0	0	0	0	0	0	0	0	0
Buffalo, N. Y	0	0	------	0	1	1	4	0	3	0	0	29
Camden, N. J	0	0	------	0	0	0	0	0	0	0	0	3
Charleston, S. C	0	0	1	0	1	0	1	1	0	0	1	0
Charleston, W. Va	0	0	------	0	0	0	0	0	0	0	0	0
Chicago, Ill	5	0	1	0	4	0	7	11	17	0	0	179
Cincinnati, Ohio	0	0	1	1	2	0	1	0	7	0	0	15
Cleveland, Ohio	1	0	4	0	2	1	7	0	12	0	0	35
Columbus, Ohio	0	0	------	0	2	0	3	0	4	0	2	10
Concord, N. H	0	0	------	0	0	0	0	0	0	0	0	0
Cumberland, Md	0	0	------	0	0	0	0	0	0	0	0	0
Dallas, Texas	0	0	------	0	0	0	4	1	0	0	1	6
Denver, Colo	0	0	4	0	11	0	2	0	1	0	0	7
Detroit, Mich	6	0	1	0	7	1	6	1	18	0	1	121
Duluth, Minn	0	0	------	0	3	0	2	1	1	0	0	20
Fall River, Mass	2	0	------	0	1	0	0	0	3	0	0	3
Fargo, N. Dak	0	0	------	0	0	0	0	0	0	0	0	0
Flint, Mich	0	0	------	0	0	0	2	0	1	0	0	4
Fort Wayne, Ind	0	0	------	0	0	0	0	0	0	0	0	1
Frederick, Md	0	0	------	0	0	0	0	0	0	0	0	0
Galveston, Texas	0	0	------	0	0	0	3	0	0	0	0	8
Grand Rapids, Mich	0	0	------	0	0	0	1	0	1	0	0	7
Great Falls, Mont	0	0	------	0	1	0	0	0	0	0	0	8
Hartford, Conn	0	0	------	0	1	0	0	1	2	0	0	19
Helena, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Houston, Texas	2	0	------	0	1	0	9	0	1	0	1	1
Indianapolis, Ind	0	0	------	0	2	0	8	1	0	0	0	25
Kansas City, Mo	0	0	------	0	4	0	5	0	5	0	1	2
Kenosha, Wis	0	0	------	0	0	0	0	0	0	0	0	14
Little Rock, Ark	0	0	------	0	0	0	5	0	0	0	0	0
Los Angeles, Calif	4	0	6	0	27	0	10	0	9	0	9	16
Lynchburg, Va	0	0	------	0	0	0	0	0	0	0	0	1
Memphis, Tenn	0	0	------	1	3	0	2	1	1	1	3	5
Milwaukee, Wis	0	0	------	0	26	0	1	0	16	0	0	50
Minneapolis, Minn	0	0	------	0	2	0	4	0	6	0	0	5
Missoula, Mont	0	0	------	0	0	0	0	0	0	0	0	0
Mobile, Ala	0	0	3	0	0	0	3	0	0	0	0	0
Nashville, Tenn	0	0	------	0	0	0	1	1	2	0	0	0
Newark, N. J	0	0	------	0	6	0	5	1	5	0	0	24
New Haven, Conn	0	0	------	0	0	0	0	0	0	0	1	3
New Orleans, La	1	0	------	0	0	0	7	0	0	0	2	0
New York, N. Y	6	3	------	0	19	14	33	1	25	0	3	151
Omaha, Nebr	0	0	------	0	0	0	1	0	0	0	0	0
Philadelphia, Pa	1	0	------	0	7	1	12	0	14	0	1	90
Pittsburgh, Pa	1	0	------	1	1	0	8	0	9	0	0	28
Portland, Me	0	0	------	0	6	2	2	0	0	0	1	5
Providence, R. I	0	0	------	0	4	0	0	0	2	0	0	15

City reports for week ended August 8, 1942—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
Pueblo, Colo	0	0	.....	0	0	0	1	1	0	0	0	0
Racine, Wis	0	0	.....	0	5	0	0	0	3	0	0	19
Raleigh, N. C	1	0	.....	0	0	0	0	0	0	0	0	3
Reading, Pa	0	0	.....	0	1	0	2	0	0	0	0	12
Richmond, Va	0	0	.....	0	2	0	3	0	0	0	1	1
Roanoke, Va	1	0	.....	0	0	1	0	0	0	0	0	0
Rochester, N. Y	0	2	.....	0	1	0	1	1	2	0	0	9
Sacramento, Calif	0	0	.....	0	0	0	1	0	0	0	0	0
Saint Joseph, Mo	0	0	.....	0	0	0	2	0	0	0	0	0
Saint Louis, Mo	1	0	.....	0	2	0	9	0	4	1	0	4
Saint Paul, Minn	0	0	.....	0	1	0	3	0	2	0	0	32
Salt Lake City, Utah	0	0	.....	0	18	0	2	0	0	0	0	6
San Antonio, Tex	0	0	.....	0	0	0	0	0	1	0	1	2
San Francisco, Calif	1	0	1	1	14	0	6	0	5	0	0	12
Savannah, Ga	0	0	.....	0	0	0	0	0	0	0	0	0
Seattle, Wash	0	0	.....	0	18	0	3	0	0	0	0	16
Shreveport, La	0	0	.....	0	0	0	3	0	0	0	0	0
South Bend, Ind	1	0	.....	0	1	0	0	0	0	0	0	6
Spokane, Wash	0	0	.....	0	7	0	1	0	0	0	0	7
Springfield, Ill	0	0	.....	0	0	0	0	0	0	0	0	2
Springfield, Mass	1	0	.....	0	4	0	1	0	0	0	0	0
Superior, Wis	0	0	.....	0	0	0	0	0	0	0	0	0
Syracuse, N. Y	0	0	.....	0	15	0	1	0	0	0	0	36
Tacoma, Wash	0	0	.....	0	19	0	0	0	0	0	0	0
Tampa, Fla	0	0	.....	0	0	0	1	0	0	0	0	0
Terre Haute, Ind	0	0	.....	0	1	0	2	0	0	0	0	1
Topeka, Kans	0	0	.....	0	1	0	1	0	0	0	0	4
Trenton, N. J	0	0	.....	0	0	0	1	0	1	0	1	3
Washington, D. C	2	0	1	0	2	1	6	0	6	0	0	24
Wheeling, W. Va	0	0	.....	0	1	0	1	0	0	0	0	2
Wichita, Kans	0	1	.....	0	5	0	2	0	0	0	0	11
Wilmington, Del	2	0	.....	0	0	0	1	0	1	0	0	0
Winston-Salem, N. C	0	0	.....	0	0	0	1	0	1	0	0	1
Worcester, Mass	0	0	.....	0	0	1	6	0	7	0	1	56

Dysentery, amebic.—Cases: Chicago, 2; Detroit, 1; New York, 2.
Dysentery, bacillary.—Cases: Baltimore, 5; Chicago, 1; Cleveland, 1; Columbus, 2; Dallas, 1; Los Angeles, 4; Nashville, 2; New York, 8: Richmond, 4; St. Louis; 1; Syracuse, 1.
Rocky Mountain spotted fever.—Cases: Camden, 1; Shreveport, 1; Springfield, Ill., 1.
Tularemia.—Cases: Chicago, 1.
Typhus fever.—Cases: Charleston, S. C. 4; Dallas, 2; Houston, 1; Savannah, 5.

Rates (annual basis) per 100,000 population, for the group of 88 cities in the preceding table (estimated population, 1942, 33,791,053)

Period	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
		Cases	Deaths						
Week ended Aug. 8, 1942	6.79	3.86	0.77	43.98	36.26	34.72	0.31	5.09	196.13
Average for week 1937–41	9.51	3.74	1.40	[1] 59.10	38.05	34.93	0.47	8.73	215.33

[1] Median.

PLAGUE INFECTION IN CALIFORNIA

Plague infection has been reported proved in specimens collected in California as follows:

El Dorado County: July 27, in carcass of 1 ground squirrel, *C. beldingi*, found dead, and in a pool of tissue from 17 squirrels, same species, all from a locality 3 miles north of Meyers.

Los Angeles County: In pools of fleas from ground squrrrels, *C. fisheri*, as follows: July 17, 189 fleas from 24 squirrels taken at the Big Pines Incinerator Grounds at Big Pines; July 21, 19 fleas from 7 squirrels taken at the Public Camp in Big Pines Park, and 17 fleas from 8 squirrels taken at Arcadia Camp, Big Pines Park; July 22, 71 fleas from 21 squirrels taken on the premises of Jackson Stables at Big Pines; July 23 and 24, respectively, 94 fleas from 14 squirrels and 161 fleas from 9 squirrels taken at the Camp of the Owls at Big Pines; July 22, 8 fleas from 9 wood rats, *Neotoma* sp., taken at the Camp of the Owls at Big Pines.

Monterey County: July 20, in pools of fleas and ticks from ground squirrels, *C. beecheyi*, as follows: July 20, 200 fleas from 63 squirrels taken 5½ miles south and 2½ miles west of Salinas; July 21, 34 ticks from 52 squirrels taken 16 miles south of Salinas and 200 fleas from 36 squirrels taken 20 miles southeast of Monterey; July 22, 200 fleas from 50 squirrels taken 5½ miles south and 2½ miles west of Salinas.

Riverside County: May 2, in a pool of 64 fleas from 12 ground squirrels, *C. fisheri*, taken 6 miles west of Beaumont in the San Timiteo Canyon.

San Bernardino County: In pools of fleas from ground squirrels, *C. fisheri*, as follows: July 16, 43 fleas from 10 squirrels taken 2½ miles north of Wrightwood; July 16 and 17, respectively, 56 fleas from 12 squirrels and 32 fleas from 7 squirrels taken on Sheep Creek, 1 mile east of Wrightwood; July 20, 55 fleas from 6 squirrels taken at Wightwood.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 25, 1942.—During the week ended July 25, 1942, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1				2	1		1	1	6
Chickenpox	4	7	1	36	113	4	18	8	58	249
Diphtheria		9	2	16	2	4	1	2	2	38
Dysentery				13						13
Encephalomyelitis							1			1
German measles		1		3	12		1		4	21
Influenza		2			1				3	6
Lethargic encephalitis						4				4
Measles				25	122	15	11	4	3	180
Mumps	1	12			121	12	47	12	60	265
Pneumonia		4			7	1			4	16
Poliomyelitis		7		8	1	2				18
Scarlet fever	2		7	30	56	9	10	16	7	137
Tuberculosis	2	6	9	129	48			17	31	242
Typhoid and paratyphoid fever			6	6	1				2	15
Undulant fever									1	1
Whooping cough		5	3	219	57	1			21	306
Other communicable diseases		5			224	30		4	3	266

SAINT LUCIA

Vital statistics—Year 1941.—The following are vital statistics for Saint Lucia for the year 1941:

Number of births	2, 321
Births per 1,000 population	31. 8
Number of deaths	1, 368
Deaths per 1,000 population	18. 7
Infant mortality rate per 1,000 live births	117
Deaths from:	
Bronchitis	68
Cerebral hemorrhage	36
Congenital malformations and diseases of early infancy	105
Diarrhea and enteritis	88
Malaria	216
Pneumonia	90
Senility	138
Tuberculosis (respiratory)	85
Venereal diseases	82

SCOTLAND

Vital statistics—First quarter ended March 31, 1942.—Following are vital statistics for Scotland for the quarter ended March 31, 1942:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	12,743	10.3	Deaths from—Continued.		
Births	21,881	17.7	Influenza	165	
Deaths	19,441	15.7	Lethargic encephalitis	22	
Deaths under 1 year of age	1,961	[1] 90	Measles	16	
Deaths from:			Nephritis, acute and chronic	420	
Appendicitis	75		Pneumonia	1,101	.89
Cancer	2,157	1.75	Poliomyelitis	3	
Cerebral hemorrhage and appoplexy	2,056		Puerperal sepsis	48	
Cerebrospinal fever	72		Scarlet fever	6	
Cirrhosis of the liver	30		Senility	682	
Diabetes mellitus	201		Suicide	88	
Diarrhea and enteritis (under 2 years of age)	163		Syphilis	87	
Diphtheria	115		Tetanus	3	
Dysentery	12		Tuberculosis (all forms)	1,080	.87
Erysipelas	13		Typhoid and paratyphoid fever	10	
Heart disease	4,634		Whooping cough	27	
Homicide	6				

[1] Per 1,000 live births.

SWITZERLAND

Notifiable diseases—April 1942.—During the month of April 1942, cases of certain notifiable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	22	Paratyphoid fever	15
Chickenpox	146	Poliomyelitis	15
Diphtheria	94	Scarlet fever	248
German measles	68	Tuberculosis	429
Influenza	74	Typhoid fever	6
Measles	853	Undulant fever	11
Mumps	203	Whooping cough	46

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January-May 1942	June 1942	July 1942—week ended—			
				4	11	18	25
ASIA							
Ceylon	C	72	10				
China: Kunming (Yunnanfu)	C	525					
India	C	28,081	4,608				
Calcutta	C	690	461				
Chittagong	C	51	4				
Rangoon	C	1					
India (French)	C	10					

PLAGUE

[C indicates cases; P, present]

Place		January–May 1942	June 1942	July 1942—week ended—			
				4	11	18	25
AFRICA							
Basutoland	C	10					
Belgian Congo	C	2					
British East Africa:							
Kenya	C	452	22				
Nairobi	C	64					
Uganda	C	245	13				
Egypt: Port Said	C		1				
Madagascar	C	84					
Morocco	C	232	45				
Union of South Africa	C	55					
ASIA							
China.[1]							
India	C	385					
Indochina (French)	C	70					
Palestine: Haifa	C	4					
EUROPE							
Portugal: Azores Islands	C	1					
NORTH AMERICA							
Canada: Alberta Province—							
Plague-infected fleas							P
SOUTH AMERICA							
Argentina: Cordoba Province	C	7					
Brazil:							
Alagoas State	C	3					
Pernambuco State	C	6					
Chile: Valparaiso	C	1					
Peru:							
Ancash Department	C	6					
Lambayeque Department	C	3					
Libertad Department	C	6					
Salaverry—Plague-infected rats		P					
Lima Department	C	49					
Lima	C	12					
Piura Department	C	14					
OCEANIA							
Hawaii Territory: Plague-infected rats		19	5			1	2

[1] Plague has been reported in China as follows: Chekiang Province, Apr. 1–10, 1942, 4 cases; Fukien Province, Jan. 1–Apr. 5, 1942, plague appeared in 11 localities: Hunan Province, week ended Apr. 18, 1942, 2 cases; Suiyuan Province, pneumonic plague appeared in epidemic form during the period Jan. 1–Apr. 4, in the northwestern area.

SMALLPOX

[C indicates cases]

Place		January-May 1942	June 1942	July 1942—week ended—			
				4	11	18	25
AFRICA							
Algeria	C	450	90		11	14	
Belgian Congo	C	249					
British East Africa: Tanganyika	C	15					
Dahomey	C	53				3	
French Guinea	C	68	8				
Gold Coast	C	1,075		4	1		
Ivory Coast	C	50					
Morocco	C	1,151	62	20	7	26	9
Nigeria	C	1,216	86				
Niger Territory	C	466	46				
Portuguese East Africa	C		1				
Senegal	C	14				3	
Sudan (French)	C	32	126		5	3	
Tunisia	C	1					
Union of South Africa	C	560	7				
Zanzibar	C	[1] 2					
ASIA							
Ceylon	C	6	1				
China	C	8					
India	C	16,189	1,687				
Indochina (French)	C	2,401	155				
Iran	C	50					
Iraq	C	203	5				
Trans-Jordan	C	2					
EUROPE							
France:							
Seine Department	C	44					
Unoccupied zone	C	13					
Great Britain:							
England and Wales	C			3			
Scotland	C		5	23			
Portugal	C	35	1				
Spain	C	155	31		1		
NORTH AMERICA							
Canada	C	2			2		
Mexico	C	28					
SOUTH AMERICA							
Brazil	C		1				
British Guiana	C	1					
Colombia	C	197					
Venezuela (alastrim)	C	88	4				

[1] Imported.

TYPHUS FEVER

[C indicates cases; P, present]

Place		January–May 1942	June 1942	July 1942—week ended—			
				4	11	18	25
AFRICA							
Algeria	C	29,303	2,713		742		
Basutoland	C	32					
British East Africa: Kenya	C	8					
Egypt	C	16,903	2,199	39	4		
Ivory Coast	C	4					
Morocco	C	20,032	3,298	693	451	394	250
Nigeria	C		5				
Niger Territory	C	[1] 1					
Senegal	C	3					
Sierra Leone	C	7					
Tunisia	C	12,944	1,645		411		
Union of South Africa	C	507					
ASIA							
China	C	114					
India	C	6					
Iran	C	462					
Iraq	C	66	12				
Palestine	C	22					
Syria	C	22					
Trans-Jordan	C	5					
EUROPE							
Bulgaria	C	562	30	1			
Czechoslovakia	C	5					
France:							
Seine Department	C	1					
Unoccupied zone	C	224					
Germany	C	85					
Hungary	C	587	77	17	13	14	5
Irish Free State	C	8	1				
Portugal	C	1					
Rumania	C	3,077	224	19	13		11
Spain	C	3,810	40		7		
Canary Islands	C	1					
Turkey	C	P	45	8	13	5	6
Union of Soviet Socialist Republics	C	67					
NORTH AMERICA							
Guatemala	C	94					
Jamaica	C	23	4				
Mexico	C	310			3	4	7
Panama Canal Zone	C	1					
Puerto Rico	C	3					
SOUTH AMERICA							
Chile	C	39					
Colombia	C	1					
Ecuador	C	14					
Venezuela	C	15					
OCEANIA							
Australia	C	18					
Hawaii Territory	C	24	2			1	2

[1] Suspected.

YELLOW FEVER

[C indicates cases; D, deaths]

Place		January–May 1942	June 1942	July 1942—week ended—			
				4	11	18	25
AFRICA							
Belgian Congo: Libenge	D	[1] 1					
British East Africa: Kenya	C	1					
French West Africa	C	1					
Gold Coast	C	1	[1] 1				
Ivory Coast	C	[2] 2					
Senegal [3]							
Sierra Leone: Freetown	C	2					
Sudan (French)	D	[1] 1					
Togo: Hohoe	C	1					
SOUTH AMERICA [4]							
Brazil: Acre Territory	D	4					
Colombia:							
Boyaca Department	D	2					
Intendencia of Meta	D	1					
Santander Department	D	2					

[1] Suspected.
[2] Including 1 suspected case.
[3] According to information dated Feb. 9, 1942, 15 deaths from yellow fever among Europeans have occurred in Senegal.
[4] All yellow fever in South America is of the jungle type unless otherwise specified.

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