Public Health Reports

Vol. 65 • OCTOBER 27, 1950 • *No. 43*

Rural Health Cooperatives

By HELEN L. JOHNSTON, B.A.*

Many families on farms and in small towns find that they live at the far end of the road when they look for health services. The more rural a county's population, the fewer doctors, dentists, and hospitals it is likely to have. In some areas, of course, families on farms and in small towns live close to cities and can reach city doctors and hospitals quickly and conveniently. Two-thirds of the counties in the United States, however, are far removed from metropolitan centers. The services received by families living in these isolated counties are likely to be limited to those they can obtain locally (*1* pp. 1–2).

Groups of persons in some rural communities have been looking into local shortages of doctors and hospital beds. Some have made a diagnosis of their community health needs based on a rather careful investigation. Others have based their diagnosis on a more superficial examination. Just as they have diagnosed their need, so in some areas men and women from farms and small towns are planning and carrying out their own prescriptions to meet that need. Among other measures, they are prescribing cooperative associations to obtain for themselves and their communities health services they cannot get by working individually.

Definition

Cooperatives are self-help organizations, formed voluntarily on a nonprofit basis by groups of people wishing to meet a common need. Ownership and control rest equally with all members. The members set the goals and determine general policies. They elect a board of directors which, in turn, employs a manager who carries out the association's policies and conducts its affairs under the board's general supervision. Each member is entitled to one vote in electing directors and deciding other questions coming before the membership.

Rural people have been applying cooperative principles and methods, developed through formally organized associations, to the solu-

*Medical Economics Branch, Division of Medical and Hospital Resources, Bureau of Medical Services, Public Health Service.

tion of a variety of rural problems for more than 100 years. They have only recently started prescribing the use of these principles and methods to help meet their health problems.

Objectives

Rural health cooperatives usually have two major objectives. First, they want to bridge the gap—in terms of miles to be travelled—between local families and needed health services. To meet this objective, they usually plan local health service centers, staffed by one or more doctors. Their second objective, as a rule, is to bridge the gap—in terms of cost—between local services and the people who need them. For this purpose, they develop prepayment plans to help local families budget the costs of health services and thereby use them more effectively. A further reason underlying the prepayment plans is the wish to provide regular support for local health services.

Over-all Record

Available records show that 101 rural health cooperatives had been formed by mid-1949. The oldest was organized in 1929. Eighty-six were formed after January 1945.

The cooperatives were scattered in small communities in 21 States, nearly all west of the Mississippi. Most of them were formed in predominantly rural areas. All but 18 established headquarters in communities of less than 2,500.

Table 1 shows the status of 93 of the 101 groups on record in mid-1949. At that time a little more than half—54 associations—were operating health service centers, with or without a prepayment plan, or were taking steps to establish their own local centers. More than one-third—39 associations—had become inactive or had disbanded.

Some inactive groups had their plans halted by local problems that proved impossible to solve at the time. In at least a few cases, changes in the local situation eventually may enable some groups to revive their plans. Only six disbanded groups ever operated a health service center. In several cases, the group had to close its center when the one doctor on whom it had depended left the community and the group was unable to find another doctor willing to participate.

Several groups now operating a health service center without a local prepayment plan reported that people in their area had been interested chiefly in obtaining local services rather than in developing and operating a prepayment plan. Several others, however, had originally planned to offer prepaid services and abandoned this plan only when it seemed unlikely that they could get medical cooperation on any other basis.

Membership figures were available for about two-thirds of the 101 associations. Nearly all had a rather small membership. Only three

Table 1. *Rural health cooperatives of record, number and current status, by States, 1949*

State	Associations of record	Current status				
		Operating with prepayment [1]	Operating without prepayment [2]	In process of organizing, raising funds, or building	Inactive or disbanded [3]	Unknown
Arizona	1					1
Colorado	2	1	1			
Idaho	4			1	3	
Indiana	1				1	
Iowa	2			1	1	
Kansas	2	1		1		
Michigan	1					1
Minnesota	7		2	4	1	
Missouri	1				1	
Nebraska	3			1	2	
New Mexico	2			1		1
North Carolina	1	1				
North Dakota	3			2	1	
Oklahoma	3	3				
Oregon	4	1		1	2	
South Dakota	1	1				
Tennessee	1	1				
Texas	52	13	8	5	21	5
Utah	2	1			1	
Washington	4			1	3	
Wisconsin	4	1		1	2	
Total	101	24	11	19	39	8

[1] Includes one association nearly ready to operate at the time information was obtained.
[2] One association was also raising money for a new health service center through which it planned to offer prepaid services.
[3] Six of the inactive or disbanded associations offered prepaid health services for at least a short period before closing. One additional group sold its health service center to a doctor. In several areas an effort to secure a county bond issue to build a hospital had been substituted for the cooperative project. Some groups never went beyond the initial planning stage. Possible changes in the local situation eventually may enable some to revive their plans.

had more than 1,000 member families. These included two operating with their own prepayment plans and one still in the process of setting up a health service center. Of the other 43 active associations reporting membership, 30 had less than 500 member families. Of 15 inactive or disbanded groups for which reports were available for membership at the peak of operation or at the time of disbanding, 12 had less than 500 member families.

Study

The over-all record, which shows that more than a third of the groups organized have given up their plans or disbanded entirely, indicates to some extent the difficulties cooperatives face. To help groups in widely scattered rural communities benefit from each other's experience, as well as to answer questions many people have been asking about health cooperatives and their purposes and methods, a study of rural health cooperatives was started in August 1948.[1] Forty-eight groups were selected to show the experience of rural health cooperatives in various stages of development. The 48 groups include:

[1] The study was started under the direction of the Farm Credit Administration in the U. S. Department of Agriculture and completed under the direction of the Public Health Service. The complete findings of the study are presented in a report, Rural Health Cooperatives, which will be released soon as a joint publication of the two agencies. This article reviews salient features of the longer report.

19 operating health service centers through which prepaid services were provided dues-paying members (all but two provided prepaid medical care in the doctor's office, a practice typical of cooperative prepayment plans);
6 operating health service centers without a prepayment plan;
6 in the process of organizing, raising funds, or building;
17 that had given up after a short period of operation or had abandoned their plans but never operated.

Excluded from the study were all groups with a predominantly urban membership, organizations providing benefits in cash rather than in service, health plans supervised by the Farm Security Administration, and organizations formed primarily as units for enrolling rural people in a Blue Cross, Blue Shield, or other type of prepayment plan in which subscribers have only an indirect voice, if any, in determining the policies of the plan.

Visits were made during 1948 and 1949 to more than 40 organizations in 10 States. Information obtained through field visits was supplemented by correspondence with the groups visited and with other groups, as well as by review of organization papers and other material.

Areas Where 48 Groups Organized

All but 6 of the 48 cooperatives studied were organized in counties where at least half the people live on farms or in small towns. Most were formed in areas having not more than 6 or 8 families to each square mile. Only 7 were set up in rather poor areas. The rest were organized in counties with a rural level of living approximating, or above, the average for the country as a whole (*2, 3*).

Thirty-eight of the 48 associations were formed in predominantly rural counties located at a considerable distance from any large city. For this reason, the services within the borders of their counties in general are a fairly reliable measure of the services conveniently accessible to families living within their areas.

In most counties where rural health cooperatives were formed, local health services were deficient measured by ratios of doctors and hospital beds to population generally considered acceptable. Three of the counties had no doctor in 1946. Twelve additional counties had more than 3,000 persons for every practicing physician. Twenty had from 1,500 to 3,000 persons for each doctor. Eight counties had no general hospital at the time a cooperative was formed. Fifteen others had less than 2½ beds for every 1,000 persons (*2; 1*, table 6).

Development

Rural health cooperatives developed out of local recognition of need for more adequate local health services. The idea usually was introduced by someone acquainted with an existing health cooperative.

Sometimes it was suggested by a local farmer or cooperative leader. Just as often it was suggested by a local editor or other businessman.

Interest was stimulated and community support was built up through informal discussions among small groups, discussions at meetings of various local organizations, and community-wide meetings called to explore the possibilities of a health cooperative as a way to meet local health needs. After substantial community support was indicated, several local leaders usually took steps to incorporate.

In many States, groups proposing to form a health cooperative find there is no law on the statute books especially adapted to their needs (*4*). Laws applying to agricultural cooperatives usually are not broad enough to permit formation of a health cooperative. Laws providing for prepayment medical service plans, in general, are so written that development of these plans is left almost entirely to doctors. In a few States, including Texas and Wisconsin, a group can incorporate under special laws providing for cooperative associations sponsored by users of health services. In other States, most of the associations reporting the law under which they incorporated indicated that it was the charitable and benevolent or the nonprofit corporation law.

Membership

When the hurdle of incorporation has been surmounted, the groups start building membership in earnest. They usually place few restrictions on membership. Any individual or family may apply for a membership certificate. The certificate covers all members of a family including the father, mother, and all unmarried children living at home. Family dependents living under the same roof also are covered, as a rule.

The purchase price of a membership certificate represents the investment a family is required to make in a cooperative's facilities and equipment in order to qualify for membership. Except for a few associations, the amount ranges from $50 to $100. A member must also agree to abide by the association's articles and bylaws.

Usually membership applications are subject to approval by the board of directors. In addition some groups require a signed statement by an applicant concerning his own health and that of his dependents. Several reported that they require a physical examination of all applicants for membership or reserve the right to require such an examination after they open their health service center.

In general, the membership of a rural health cooperative is concentrated within a rather short distance of the association's headquarters. According to the reports of 23 active groups, at least half their member families live within 25 miles of their service center. Nineteen of these 23 groups reported that at least half live within

10 miles. Nearly all groups, however, stated that some member families live at distances of 50 miles or more.

Most associations draw members not only from the county in which they have headquarters but also from one or more adjoining counties. In isolated counties, however, the total population of the county in which a cooperative has its headquarters might be used as a rough measure of the total number of persons eligible for membership and likely to be interested in joining a rural health cooperative. In general, the more rural counties seemed to have a larger proportion of their residents included in a cooperative's membership than did other counties. Twelve out of 25 associations operating in isolated rural counties had headquarters in counties with no incorporated place of 2,500 or more. These 12 groups reported a membership equal to about 20 persons for every 100 residents in their counties. Thirteen associations operating in isolated semirural counties having at least one town of 2,500 or more, on the other hand, reported memberships equaling only about 8 to every 100 county residents.

Health Service Centers and Medical Staff

Twenty-five of the cooperatives studied were operating health service centers and six others were building or planning such centers in mid-1949. Twenty-two centers were built or remodelled by the group itself and are owned by the cooperative. Two operate centers which are publicly owned. One rents office quarters for a doctor.

Typically, the centers combined doctors' offices and hospital beds under one roof. Two, however, have clinics and two have buildings designed for hospital purposes only. The bed capacity of the centers with hospital facilities ranges from 10 to 100. Only two have more than 50 beds. Twelve reported less than 25 beds each.

Eight associations reported one doctor each; nine had two doctors; three had three doctors; and one had nine. In addition, two had one dentist each and one had two dentists. The two that did not provide office space for doctors in their service center had no doctors directly associated with the cooperative. No information was obtained for the number of doctors associated with two additional groups.

The 17 associations with prepayment plans providing medical care are the only ones having definite agreements with their doctors. Under the terms of their agreements the associations invariably assume responsibility for providing their doctors with equipment and a place in which to work. Most groups pay their doctors a regular monthly salary, in some cases with arrangements for a bonus payable out of net operating income at the end of the year. Other terms in the agreements of one or more associations include: permission to the doctor to retain fees for home calls, at least for those made outside

office hours; rotation of service on weekends; paid vacations; and rent-free living quarters.

Noninterference in Professional Matters

Health cooperatives themselves, of course, do not engage in medical practice nor do they attempt to dictate how it shall be carried on. The members and their elected boards of directors confine their interests to business aspects of the associations. They arrange with doctors for professional services and rely on those doctors for the conduct of all professional affairs.

The bylaws of health cooperatives often include safeguards against lay interference in professional matters or in the professional relationship between doctor and patient. Such a provision is recommended for all its member health groups by the Cooperative Health Federation of America, a national organization of lay-sponsored health associations and groups supporting such associations (*5*, p. 9). The Wisconsin State law governing lay organized and operated health associations provides for noninterference by lay persons in professional affairs (*6*).

Prepayment Plans

Typically, the prepayment plans developed by cooperatives provide medical care in the doctor's office. They emphasize service to prevent the development of serious illness or disability to the extent that prevention may be possible through care in the early stages of an ailment, regular physical check-ups, and other preventive measures.

For prepayment plan coverage, a member family must pay a certain amount each year in advance. Some associations arrange for quarterly or semiannual dues payment if a member family wishes to pay in installments rather than in one lump sum annually. Most groups, however, provide that dues are payable annually on a certain date or within a certain period.

The annual dues of different groups range from $12 to $30 for one person; from $18 to $48 for a family of two; from $22 to $60 for a family of three; and from $25 to $66 for a family of four. Most groups require payment of an additional amount each year for each dependent when the family group numbers more than four. For dependent children, unmarried and living at home, the additional dues payment required by different groups ranges from $1 to $8. For adult dependents living with the family, it ranges from $2 to $15.

Cooperatives often refer to fully prepaid services as "free services." Actually, of course, so-called "free services" are those for which advance payment has been made in the form of annual dues. Usually cooperatives limit fully prepaid services to care provided by staff doctors at the association's health service center. In addition, each person in a member family is entitled, as a rule, to certain other serv-

ices—usually X-ray and laboratory services and hospital care—at reduced rates.

Among the conditions excluded from prepaid services by one or more associations are ailments existing before a family joins; maternity care during the first 10 months; cases coming under the provisions of local, State, or Federal law; and chronic diseases.

Eighteen of the 19 prepaid service groups included in the study reported a total of 12,570 membership-certificate holders. Of these, about 10,000 were dues-paying member families. Family memberships averaged 3.5 persons. The prepayment plans of the 18 groups, therefore, covered about 35,000 persons.[2]

Services to Nonmembers

The members of cooperatives assume major responsibility for making health services available in their communities by their initial investment in facilities and equipment and by their payment of regular dues to support the local health service center. At the same time, they recognize that any health institution—particularly in a rural community deficient in local health services—has a responsibility to the community as a whole. The services offered by cooperative health service centers, therefore, are not restricted to members. They are available to any person in need of care. Nonmembers, however, must pay the fees for service customarily charged in the community, since they have not made an advance payment in the form of annual dues nor have they fulfilled other requirements for cooperative membership and participation in the prepayment plan. According to the reports of successful cooperatives, satisfied nonmember users of service are one source of new memberships after cooperative health service centers start operating.

Reports of operating prepaid service cooperatives show that, on the average, from 10 to 50 percent of their clinical services and from 25 to 50 percent of their hospital services are performed for nonmembers. The income from nonmembers, like that from members, as a rule, becomes part of the general funds of an association.

Pioneering Problems of Rural Health Cooperatives

Pioneering groups in any field are likely to meet skepticism, distrust, and opposition. This is true of health cooperatives just as it is of pioneering efforts in other fields of activity. Often their natural skepticism about a new idea keeps families from joining until they see substantial evidence that a cooperative can carry out its plans.

Groups tackling a new type of enterprise are also likely to lack facts needed to plan and develop sound organizations. A stumbling block to rural health cooperatives has been lack of information about

[2] For all 24 prepaid service cooperatives operating in mid-1949, the reported membership-certificate holders totaled 14,500 families. About 40,250 persons were included in dues-paying member families.

costs and technical problems involved in building, equipping, and operating a health service center, as well as in developing and operating a prepayment plan. Often groups had no local resources to which they could turn for sound advice and needed facts. Many turned to an operating association, using it more or less as a model, sometimes without considering differences between its area and their own, or differences in conditions at the time of organization.

Financing Problems

Many groups started with the thought that income from initial membership fees would provide most, if not all, the funds needed to build and equip a health service center. The amount actually needed often proved far greater than a group's original estimates. One association reported that the cost of its health service center was three times and another seven times what was originally planned. Problems of initial financing were among those that caused several groups to abandon their plans.

The fact that building costs were at first seriously underestimated led many groups into difficulty when they had to go back to their members for more funds. Some members lost confidence in the cooperative's leadership. The fact that the average family income was comparatively low in a number of areas also led to difficulty. An officer of one group said, "The association's plans have plenty of support, but when it comes to raising $100,000 it is another matter."

When groups borrowed rather heavily in order to complete and equip health service centers, they sometimes found it hard to repay the amounts borrowed. On the other hand, a group that refused to go into debt had a half-completed building in mid-1949 and no funds to complete it.

Problems of financing maintenance and operation, like those of initial financing, arose to some extent from lack of information and underestimating of actual costs. Some groups started with no funds on hand when they opened their health service center. At best, the income from annual dues, in the case of groups with their own prepayment plans, and from service charges paid by both members and nonmembers barely met operating expenses. Often a newly opened health service center operated "in the red" for at least a few months after opening. Several cooperatives found it necessary to increase the dues or other charges shortly after opening. This led to misunderstanding and sometimes to distrust when the reasons for the increase were not well understood by the members and the community.

Securing Doctors

Getting and keeping doctors in an isolated rural community is likely to prove difficult in view of current shortages of medical per-

sonnel. For some cooperatives, the problem has been accentuated by medical opposition. This opposition has taken several forms. Sometimes the doctors serving cooperatives have been unable to transfer their medical society membership to the local society. Or they have been unable to practice in local hospitals. One group reported that an employment agency refused its advertisement for a doctor.

Some groups have modified their plans in order to overcome medical opposition. One reported getting a doctor by dissolving the association and selling him its hospital. Another excluded medical and surgical care from its prepayment plan. Two gave up prepayment entirely. Medical opposition was among the underlying causes of the inability to get or keep a doctor reported by 7 of the 17 inactive or disbanded groups studied.

On the other hand, local doctors worked with some groups and other groups reached an understanding with local doctors and their organizations which enabled them to carry out their plans. On the State level, a meeting of medical and cooperative leaders in Texas led to the publication of a list of requirements for cooperatives by the State medical association (*7*, *8*). In June 1949, the American Medical Association took a similar step as the result of a series of meetings of a joint committee representing the American Medical Association, the Cooperative Health Federation, and other consumers' organizations (*9*).

Prepayment Plan Problems

Lay sponsorship of prepaid medical care plans is still a rather new idea. Many States have no law under which a group can organize for this purpose (*4*). Where groups can organize, they often lack information for setting up workable schedules of annual dues and prepaid services. They meet resistance from those opposed to lay development and control of prepayment systems as well as from those opposed to salaried payment of doctors—the system of payment usually used by cooperatives.

Some problems faced by health cooperatives with prepayment plans are also faced by other types of prepayment plans when they extend their operations into rural areas. Among these are such barriers to family participation as relatively low income and indifference, neglect, and lack of understanding. Adverse selection—the fact that those anticipating a need for service are most likely to join—is another problem cooperatives share with other prepayment plans. So also is the need to maintain dues and other charges at a level high enough to support services that will attract members and yet low enough to be within the reach of the average family's pocketbook.

Membership and Community Problems

Nearly all groups reported difficulty in getting enough members to support what the group proposed to do. One cooperative board member said that only half as many families joined as were originally expected. Another reported that failure to gain substantial community support was among the chief reasons for the group's present inactive status.

Delays in getting started contributed to difficulties in building membership. Doubts and rumors spread as to whether a cooperative would or could accomplish anything and whether it would be able to get good doctors even if it succeeded in building and equipping a health service center. In some areas the cooperative effort was abandoned because the need which the group was formed primarily to meet was cared for by plans to finance a hospital through a county bond issue, by the formation of a cooperative in a nearby community, or in some other way.

Community attitudes and situations also affected a group's success in getting members. Local opposition to cooperatives of all types, competing factions within communities, and rivalry between adjoining communities in some cases hindered a health cooperative in securing members.

Lack of information and understanding about what a comprehensive health service is and how it may be attained sometimes led to overemphasis on buildings and too little emphasis on other factors important in providing and maintaining adequate services. Indifference and complacency about health needs of the family and the community also led to difficulty in obtaining members and substantial community support.

Too great reliance on a single leader, difficulty in keeping people informed about a cooperative's status and progress, poor choice of location for a health service center, failure to secure doctors or managers who understood and sympathized with cooperative principles and methods, and lack of successful experience with other types of cooperatives are among other factors that sometimes hindered cooperative groups or caused their discontinuance.

Assets

"Local need was our greatest asset," according to the report of one cooperative. Others emphasized that the need for more doctors and more hospital beds in their areas helped them get support for their plans.

Assets to their development reported by some cooperatives offset problems reported by others. While a number of groups commented on the difficulty of raising funds to build and equip a health service

center in a relatively poor area, others reported that good economic conditions at the time of organization helped them get started.

The support and cooperation of doctors in the area were reported by some groups as helping them avoid mistakes as well as providing an environment in which it was possible for them to carry out their plans. Eight cooperatives reported that getting well-qualified doctors who were well liked was one of their greatest assets in getting started and in gaining community acceptance.

Twenty associations reported strong support from many organizations and from all parts of their areas as among the chief factors contributing to their success. Success in keeping people informed about the reasons for delay and about the progress of a cooperative helped in gaining support. So also did the successful record of other types of cooperatives in the area.

Among other assets reported by the cooperatives were effective leadership; capable management; local understanding of cooperative principles and methods; gradual growth in understanding of the cooperative prepayment plan; successful operation and good service over a period of time; and the opportunity to demonstrate their ability to meet emergency needs of the community.

Recommendations

Based on their own experience, cooperative leaders made recommendations for capitalizing on local assets and avoiding or minimizing local problems. Nearly all emphasized that a group should first get the facts about local need and then take care to adapt their planning to actual need. In planning, they believed that care should also be taken to consider the community's resources. In addition, the feeling was expressed that it was better to start with the idea of building a community group interested in improving their health situation in whatever ways are possible and feasible rather than to start with a plan to build a hospital.

Other recommendations included:

1. Choose the organization committee or board carefully. Be sure they represent different organizations and different sections within the area.

2. Build membership soundly. Make certain that the association has adequate community support for its plans.

3. Keep people informed both during the organization period and afterward. The key to good membership relations is "to keep members in touch so they think of the association as their business."

4. Develop sound plans for financing; plan to have funds on hand when a health service center first opens.

5. Emphasize service in prepayment plans; "promise only what can

be delivered"; make preventive medicine part of the plan; keep accurate records of income from members and services they use.

6. Choose doctors carefully; make certain they are not just interested in a job but are interested in making and keeping people well; make businesslike arrangements with doctors.

7. Arrange for exchange of ideas among cooperatives and also, possibly, for group purchasing and use of special services.

Possibilities

The present record of health cooperatives parallels in many ways the past record of other types of cooperatives. Cooperatives to market farm products, purchase farm supplies, insure property, or secure credit, electricity, and other services have gone through similar stages of trial and error and met similar resistance. The security of their present place in the national economy is indicated by the fact that about two-thirds of the Nation's farmers now belong to one or more marketing, purchasing, or service cooperatives.[3]

Cooperatives, like other types of enterprise, however, must have a satisfactory environment in order to develop soundly and successfully. For such an environment, health cooperatives need State laws which permit their organization and operation, understanding and acceptance of their objectives and methods among members of the medical profession, and information and assistance on technical problems of setting up and operating a health service center and a prepayment plan.

Health cooperatives also need to have available information, based on the pooled experience of many groups, on general problems of organization and operation. An additional requirement for sound, well-balanced planning is to have in their communities better understanding of what good health means, what services are required to provide for its maintenance, and how these services can best be made available.

Along with these possible improvements in their environment, health groups, themselves, can use greater care in investigating their local situation and in defining their local need and ways to meet it in terms of services they must have locally and those they can arrange through health facilities and agencies elsewhere. They can obtain reliable facts about costs of setting up and operating a health service center and plan realistically to meet those costs. They can carry out sound education and information programs for their members and their communities. Finally, they can cultivate the interest and seek the endorsement and support of all local groups, including the medical profession, making a determined and sustained effort to draw into their planning and development all groups concerned.

[3] Estimate based on figures reported for specialized groups of cooperatives such as dairy cooperatives, credit associations, and others. A single farmer, of course, often belongs to more than one association. There is at present no precise way to eliminate such duplication in reported membership figures.

Some cooperative leaders have recommended group arrangements among cooperatives as a means of improving and expanding the services that any one cooperative health service center might find it possible to provide. Going beyond this recommendation, it would seem likely that in many cases health cooperatives might perform a worth while service for their communities if they worked out arrangements with health institutions under other sponsorship as well as with cooperatives in their areas for specialists' care and for sharing costly equipment and the services of technicians trained in its use.

As with other types of health institutions in rural areas, most cooperative health service centers have arrangements, usually informal, with nearby hospitals and doctors for at least occasional consultation and referral. These arrangements might well be formalized on a systematic basis and expanded in order that the services of all the participating health institutions might be strengthened and improved (*10*). The development of effective arrangements for area-wide integration of services would help rural health cooperatives, particularly those in sparsely settled areas, to meet one of the basic objectives of the Cooperative Health Federation which aims to "promote a more effective approach to the organization of medical care by combining a method of prepayment with a method of group practice" (*5*, p. 3).

Contribution

Although the achievements of rural health cooperatives thus far appear small measured in terms of total rural health needs, the organizations demonstrate interest and willingness on the part of rural people to work for their own health security. Moreover, cooperatives have developed a pattern of organization and operation combining efforts to establish health service centers and attract doctors with efforts to provide for their support and effective use by local people.

Cooperatives call for local people themselves to assume responsibility for providing adequate community health services. Whatever approach may be made to rural health problems, the best results can be achieved only as local people assume local responsibility and play an active part in meeting local need.

REFERENCES

(*1*) Hubbard, John P., Pennell, Maryland Y., and Britten, Rollo H.: Health Services for the Rural Child. Chicago, American Medical Association, 1948, 58 pp.

(*2*) U. S. Bureau of the Census: 16th Census of the United States, 1940. Population. Vol. I. Number of Inhabitants. Washington, Government Printing Office, 1942, 1236 pp.

(*3*) U. S. Bureau of Census: County Data Book. A Supplement to the Statistical Abstract of the United States. Washington, Government Printing Office, 1947, 431 pp.

(*4*) Hansen, Horace R.: Laws affecting group health plans. Reprinted from The Iowa Law Review **35**: 209–236 (1950).

(5) Cooperative Health Federation of America: Body of Policy. A Statement of Principles and Objectives for Member Plans. St. Paul, Minn., Group Health Association, 1949, 14 pp.
(6) Laws of Wisconsin, 1946–1947. Ch. 408, 185.26 (1).
(7) Rural health and cooperative hospitals. Texas M. J. 44: 5–7 (1948).
(8) Transactions. 81st Annual Session of the State Medical Association. Report of committee on cooperative hospital regulations. Texas M. J. 44: 125–126 (1948).
(9) Proceedings of the Atlantic City Session, American Medical Association. Suggested principles for lay-sponsored voluntary health plans. J. A. M. A. 140: 685–687 (1949).
(10) McGibony, J. R. and Block, Louis: Better patient care through coordination. Pub. Health Rep. 64: 1499–1527 (1949).

The Cancer Program in Medical Schools

—A Review—

By Raymond F. Kaiser, M. D.*

The family physician, usually a general practitioner, is the person upon whom the great mass of people rely for care in their illnesses. It is this same family physician who has the first opportunity to suspect and discover the existence of cancer and other malignant conditions in their incipiency. The general practitioner is the "pivotal figure" in any cancer program because on his advice and its reception the welfare of the patient depends.

Since the first essential in the control of cancer is early diagnosis, the physician's education must be sufficiently specific to enable him to diagnose the many types of cancer in their earliest stages. Recognizing the fact that most family physicians see only a few cases of cancer annually, and taking cognizance of the difficulties involved in increasing their familiarity with the disease through postgraduate training, the National Advisory Cancer Council turned its attention to the teaching of cancer in medical schools. In 1944, a study was made of the teaching of cancer in medical schools by a subcommittee of the Council. This study indicated that a need existed for improving cancer teaching.

On the basis of this study (*1*) a conference of medical school deans and educators met in 1946 at the National Cancer Institute to discuss the problems of cancer teaching. They agreed that substantial changes should be made in professional cancer education so that the

*Senior Surgeon, Assistant Chief, Cancer Control Branch, and Chief, Training and Project Grants Section, National Cancer Institute of the National Institutes of Health, Public Health Service, Bethesda, Md.

904961—50—3

oncoming generation of general practitioners would be more adequately prepared to meet the cancer problem.

The conference recommended that (1) the deans and faculties of medical schools review their teaching of cancer, integrate cancer instruction in the basic sciences with clinical presentations of the disease, and stimulate cancer research in their schools since research improves teaching and stimulates student interest; and (2) that the Public Health Service consider ways and means of providing necessary financial assistance to medical schools to undertake integrated programs of cancer teaching through annual grants of from $10,000 to $25,000 for a period of years (*2*).

It was against this background that the National Cancer Institute in June 1947 undertook a program of grants to coordinate the teaching of cancer in medical schools. At the outset it was agreed that the intent of the program was not that of training specialists in oncology in the same sense that specialists are trained in radiology, pathology, or surgery. This program had as its objectives: (1) Developing an awareness of "cancer" among medical students; (2) coordinating cancer teaching in any manner which would provide the student with a comprehensive concept of the disease in all its aspects at some time during the course of his studies; (3) emphasizing the need for group presentation and consultation in the diagnosis and treatment of cancer; (4) utilizing current knowledge concerning the disease, filling in general gaps in students' knowledge; (5) improving the medical service to cancer patients; (6) de-emphasizing instruction as to the incurability of cancer; (7) stimulating student interest in cancer research; and (8) increasing the participation of the internist in the cancer teaching.

In initiating this program, it was realized that the method for improving cancer teaching would vary from school to school, and there was no desire on the part of the Council to suggest a uniform plan. It was decided that each school should endeavor to develop the type of teaching program which best met its particular circumstances. Since this was a long-range program, continuity of funds was essential, and the National Cancer Institute provided maximum assurance of such continuity. The use of grant funds was left, insofar as possible, to the discretion of each school concerned to permit maximum flexibility, with the reservation that these monies should not be used to replace existing budgetary commitments nor to underwrite specific research projects.

The degree of freedom considered essential to the program at the outset led to a certain hesitancy and confusion in the organization of suitable programs. Lack of precedents and the absence of specific instructions as to program content stimulated a review of existing cancer teaching practices by medical school faculties and resulted

in the development of appropriate policies governing cancer teaching programs. Arising out of this situation was the establishment in the schools of medicine of what might be called an experimental program in cancer education. Also, it was recognized that to fulfill effectively the purposes of this program considerable integration was necessary. It was found that this could best be accomplished through the establishment of a position variously titled but essentially that of "coordinator of cancer teaching." Initially, the schools experienced some difficulty in obtaining qualified individuals who could serve in this capacity, and, in some instances, the schools found it necessary to recruit personnel from outside their own institutions. However, in a relatively short time all participating schools had designated a staff member to serve as cancer coordinator.

At present there are 8 radiologists, 25 pathologists, 35 surgeons, and 11 internists serving as cancer coordinators. At first, surgeons, radiologists, and pathologists were concerned with the cancer teaching problem. More recently the internist has become interested, and in some 20 schools the departments of medicine have been stimulated by this program to become active in cancer teaching. In a few instances, these persons have been appointed as heads of separate departments of oncology. In general, however, they serve as chairmen of cancer committees with representation from the departments of radiology, surgery, pathology, internal medicine, and medical administration. The cancer teaching program has accelerated the establishment of such cancer committees. These committees have diverse responsibilities, but, in general, they concern themselves with cancer teaching and research and serve as a screening advisory group for research activities and all matters relating to cancer within the medical school. Since the inception of this program, 74 cancer committees have been established.

As was anticipated, the cancer coordinators encountered a number of common problems in the conduct of their teaching programs. They experienced difficulty in crossing departmental lines. The somewhat inflexible nature of the medical school curriculum brought resistance to giving up curriculum hours. The amount of material the individual student must assimilate has increased tremendously and this added to the difficulty of the task. In a few instances, some degree of inertia was encountered, and, lastly, the concept of teaching cancer as a unified subject at first seemed to conflict with the orthodox principles of "horizontal teaching." There has been considerable discussion and variance of opinion as to the advantages of "vertical" versus "horizontal" teaching. Although a few schools use the vertical plan and a large number use the horizontal method, it has become apparent that in by far the majority of schools the best solution is a combination of both methods of teaching, determined in large part by the custom in

each school (*3*). These problems have been and are being gradually resolved. Each year brings further extension of suitable cancer teaching programs.

The schools present many variations in their programs to improve undergraduate medical education in cancer. However, all have one common denominator—the coordination of cancer teaching and other cancer interests in the medical school through one individual of professional rank who is responsible for the correlation of individual efforts in the various departments. All schools participating in the program have such an individual directing their cancer teaching activities.

Obviously, such a faculty member must have adequate assistance—a supporting staff of assistant professors, instructors, teaching fellows, stenographers, clerks, technicians, and research associates. Currently being supported under the teaching program are 73 men in 39 schools who are receiving training toward their specialty boards (pathology 23, surgery 20, internal medicine 14, radiology 12, obstetrics-gynecology 3, and pediatrics 1) while serving as instructors in cancer. In all, since the beginning of this program, 432 additional individuals have been added to the staffs of the Nation's medical schools. Since a cancer teaching program centers largely around the tumor or cancer clinic, any improvement in this facility generally enhances the effectiveness of the teaching program. Recognizing this situation, 20 schools have established tumor clinics and 39 additional schools have expanded or improved their clinics since the inception of this program, with a consequent increase of the students' contact with clinical material and improved services to cancer patients.

Out of the surveys conducted by the medical schools came evidence of the inadequacy of visual educational materials. As a result, eight schools established photography departments, and all schools renovated or supplemented facilities for visual education.

Obviously, good teaching in cancer requires an effective, adequate pathology service. Under this program, 53 schools have strengthened this service through preparation and collection of lantern slides or the addition of equipment to pathology laboratories. Nine schools have established tumor registers. Of particular interest is the fact that 27 schools have established cancer cytology teaching services with the assistance of this program.

Recognizing the fact that good clinic records and adequate follow-up services play an essential part in the management of cancer cases, and in cancer teaching as well, 38 schools have improved these areas. Secondarily, such improved services have enabled 17 schools to include social and psychological problems of the cancer patient.

Partial dissolution of the dividing lines between departments and disciplines has been necessary to promote the correlation of cancer

instruction in medical schools. This correlation has been accomplished by: initiating or strengthening cancer seminars in 27 schools, tumor conferences in 57 schools, correlation conferences in 7 schools, cancer symposia in 30 schools, and small group studies in 14 schools. The free interchange of ideas, experiences, and points of view thus encouraged among members of the teaching staffs concerned with cancer cannot help but have a favorable effect on the development of pertinent cancer teaching programs.

As a means of drawing together the fragments of cancer knowledge which a medical student may have acquired during the earlier years of his medical training, 48 schools inaugurated new cancer courses concerned with cancer biology, its historical background, and other pertinent material during the last 3 years of the medical students' studies. Twenty-two schools have found it desirable to extend their cancer teaching in the field of radio-isotopes. Realizing that research is of paramount importance in developing the interest of instructors and students in cancer, 36 schools have found it possible to establish programs which provide students with opportunities for research, while 51 schools have strengthened their basic research activities. Of major importance is the fact that 31 schools have been stimulated to undertake clinical research studies, bringing the departments of medicine more actively into the cancer teaching program.

Over 3 years ago the first grants were made by the National Cancer Institute to schools of medicine to improve their teaching of cancer. It is now possible to point to a number of general accomplishments under this program:

1. There has been general acceptance of the program—all approved medical schools in the Nation are participating.

2. It has increased the awareness of cancer, not only in students but in medical school faculties as well.

3. It has stimulated the participation of the internist in cancer teaching.

4. It has pointed up the need for integration and correlation of cancer teaching, as well as teaching in other diseases.

5. It has broadened the concept of cancer as a disease worthy of special attention and deserving of identification as a distinct but not necessarily separate public health therapeutic and research problem.

6. It has increased cancer facilities and services to cancer patients through the establishment and further development of cancer clinics.

7. It has strengthened and expanded cancer histopathologic services through the addition of teaching tools and equipment in departments of pathology.

8. It has focused attention on visual education to a greater extent than ever before through the establishment of photography depart-

ments and supplementation of facilities and materials for visual education.

9. It has assisted in the establishment of more adequate record systems and has assisted in the development of follow-up services.

10. It has encouraged student research and assisted in the development of cancer research programs in a number of schools.

11. It has stimulated the expansion of clinical research.

12. It has pointed up the need for cancer instruction in postgraduate fields and has furthered such teaching.

13. It has brought about closer working relationships between medical schools and official health agencies.

14. Lastly, it has accomplished material improvement in the teaching of cancer.

The measure of success of this program depends not only on the formulation of instruction and its organization in the school curriculum but also on the enthusiasm and sound leadership of the medical schools and particularly of the physicians in charge of its policy.

REFERENCES

(*1*) National Advisory Cancer Council: A report. Cancer facilities and services. J. Nat. Cancer Inst. **6**: 239 (1946).

(*2*) National Advisory Cancer Council: A report. Cancer in the medical school curriculum. J. Nat. Cancer Inst. **8**: 1 (1947).

(*3*) Harvey, Samuel C.: A preliminary consideration of the program of the U. S. Public Health Service for the improvement of teaching in cancer. Proceedings of the Annual Congress on Medical Education and Licensure, Chicago, Feb. 7 and 8, 1949.

(*4*) Adair, Frank E.: Prophylaxis of cancer. Bull. New York Acad. Med. **23**: 383 (1947).

(*5*) Higgins, William H.: The professional responsibility in the control of cancer. Virginia Medical Monthly, February 1949.

(*6*) Proceedings of the National Cancer Conference, 1949—Professional education techniques as they relate to cancer, pp. 259–275.

(*7*) Kaiser, Raymond F.: Cancer teaching in medical schools. Pub. Health Rep. **64**: 749 (1949).

Studies on Mass Control of Dental Caries Through Fluoridation of the Public Water Supply

By H. Trendley Dean, Francis A. Arnold, Jr., Philip Jay, and John W. Knutson*

Numerous epidemiological studies (*1*) conducted in widely separated parts of the world clearly demonstrate that the use of fluoride drinking water during the formative period of the teeth is associated with a 60- to 65-percent reduction in dental caries experience. This inverse relationship between dental caries prevalence and fluorides in drinking water approaches its maximum at a fluoride (F) concentration of 1.0 to 1.5 ppm., a concentration which Dean (*2*) established as the minimum threshold concentration of mottled enamel or endemic fluorosis. These findings led to the proposal that optimum amounts of fluorides be added to the drinking water supply as a partial caries-control measure. The proposal engendered extensive field and laboratory studies on the physiological effects of fluoride ingestion (*1*). The results of these studies indicated that not only was 1.0 ppm. in the drinking water an optimal concentration for caries control but well within the limits of safety.

In 1945, three studies to determine the caries prophylactic value of artificially fluoridated drinking water were started in the United States and Canada. A number of additional study projects have been initiated in the United States since that time. One of the studies started in 1945, that in Grand Rapids, Mich., serves as the basis for this preliminary report.

Material and Methods

In order to afford a direct control on the observations during fluoridation of the drinking water supply at Grand Rapids, Mich., a control city, Muskegon, Mich., whose source of drinking water supply and geographical and climatological characteristics were similar to those of Grand Rapids, was selected. In addition, data were collected for direct comparisons with dental caries rates in Aurora, Ill., where the naturally occurring fluoride concentration of the public water supply is 1.2 ppm. of F. The base-line information collected consisted

*Director, and Associate Director, National Institute of Dental Research; Professor, University of Michigan School of Dentistry and Public Health Service Consultant; and Chief, Division of Dental Public Health, respectively. Cooperating in the study with the Public Health Service were the Michigan State Health Department and the University of Michigan.

of detailed dental examinations of virtually the entire school population of Grand Rapids, Muskegon, and Aurora, those in continuous residence being selected for comparison in this report. The 1949 samples used for comparison in this report were taken from the kindergarten, and first, fourth, eighth, and eleventh grades.

Fluoridation of the Grand Rapids water supply was started January 25, 1945. Sodium fluoride, over 90 percent pure, commercial grade, was used as the source of fluorine. Automatic feeders were employed to control the amount of sodium fluoride fed into the water supply, and daily tests were made at different points in the distribution system to assure maintenance of a uniform concentration of 1.0 ppm.

Table 1. *Distribution of children examined at Grand Rapids, Muskegon, and Aurora, according to age, continuity of residence, and year of examination*

Age	Grand Rapids, Mich.				Aurora, Ill.		Muskegon, Mich.			
	1944–45		1949–50		1945–46		1944–45		1949–50	
	Total	Contin. res.	Total	Contin. res.	Total	Contin. res.	Total	Contin. res.	Total	Contin. res.
4	396	323	101	75	40	30	23	20	64	51
5	2,163	1,633	1,050	777	573	407	570	402	462	340
6	2,425	1,789	994	697	721	473	760	462	534	393
7	2,481	1,806	94	54	774	516	679	408	50	30
8	2,355	1,647	198	155	723	469	678	376	22	12
9	2,371	1,639	686	519	610	368	660	357	269	197
10	2,323	1,626	187	125	645	397	682	359	81	52
11	2,309	1,556	188	140	614	383	603	293	198	146
12	2,483	1,685	190	130	645	401	623	328	66	28
13	2,498	1,668	779	574	661	401	662	377	333	214
14	2,658	1,690	218	153	801	433	717	369	119	66
15	2,431	1,511	111	64	872	467	648	292	76	34
16	1,721	1,107	306	209	633	371	481	248	219	132
Total	28,614	19,680	5,102	3,672	8,312	5,116	7,786	4,291	2,493	1,695

The mechanics of adding the fluoride to the water supply is relatively simple and the desired concentration was maintained (*3*). Examination of samples of children in Grand Rapids and Muskegon have been made yearly and will continue to be made for the duration of the study. In making the dental examinations, mouth mirror and explorer were used under good lighting conditions. The examinations were conducted in the school buildings and the findings recorded in a precoded system for direct transfer to punch cards so that the processing of the data could be handled with mechanical devices. The number of children examined in 1944–45 and in 1949 and their distribution by age are shown in table 1.

Findings

Deciduous Teeth. The dental caries experience in the deciduous teeth, expressed as def (decayed, extraction indicated, or filled)[1]

[1] For purposes of further clarification "DMF" relates to the caries experience in permanent teeth while the lower case "def" relates to the caries experience of deciduous, or primary, teeth.

teeth per child, is shown in table 2. In the 1944–45 examinations of Grand Rapids children, 323 four-year-olds had 4.2 def teeth per child; 1,633 five-year-olds, 5.4; 1,789 six-year-olds, 6.4 per child; and 1,806 seven-year-olds, 6.3 per child. In 1949, for Grand Rapids children, 75 four-year-olds had 2.7 def teeth per child; [2] 777 five-year-olds, 3.3; 697 six-year-olds, 4.6; and 54 seven-year-olds, 4.8. The reduction in the 1949 Grand Rapids rates by comparison with those for 1944–45 was 35.7, 38.9, 28.1, and 23.8 percent, respectively. The Muskegon data (table 2) show for the 1944–45 base line 402 five-year-olds with 6.8 def teeth per child, and for 462 six-year-olds, 7.2. The 1949 examinations of 340 five-year-old children and 393 six-year-old children show 5.6 and 6.0 def teeth per child, respectively, a percentage reduction from the Muskegon 1944–45 base line of 17.7 and 16.7 percent, respectively. It should be noted, however, that the 1944–45 rates for these age groups were somewhat higher than the 1944–45 base-line rates at Grand Rapids.

Table 2. *Dental caries experience, deciduous teeth, observed among 27,308 children, age 4–13, of Grand Rapids, Muskegon, and Aurora, expressed as def teeth per child with percentage reductions observed (continuous residents)*

Age	Grand Rapids, Mich.			Aurora, Ill.		Muskegon, Mich.		
	Examinations made		Percentage reduction	Examinations 1945–46	Percent less than G. R. 1944–45	Examinations made		Percent age less
	1944–45	1949–50				1944–45	1949–50	
4	4.2	2.7	35.7	2.1	50.0		4.4	
5	5.4	3.3	38.9	2.8	48.2	6.8	5.6	17.7
6	6.4	4.6	28.1	3.4	46.9	7.2	6.0	16.7
7	6.3	4.8	23.8	3.5	44.4	6.7		
8	5.8	4.7	19.0	3.6	37.9	6.1		
9	4.6	4.4	4.3	3.0	34.8	4.9	4.5	8.2
10	2.8	2.9	−3.6	2.3	17.9	3.1	2.8	9.7
11	1.3	1.2	7.7	1.2	7.7	1.3	1.2	7.7
12	.5	.4	20.0	.4	20.0			
13	.2	.1	50.0	.1	50.0			

The school population of Aurora was examined in the fall of 1945 for the purpose of developing a caries experience expectancy curve. The Aurora data (table 2) shows how much less caries experience was present when compared with the Grand Rapids base-line data. As previously noted, the 1949 examinations at Grand Rapids showed reductions of 35.7, 38.9, 28.1, and 23.8 when compared with the 1944–45 rates. If the rates observed at Aurora are compared with the 1944–45 Grand Rapids data, reductions of 50.0, 48.2, 46.9, and 44.4 percent would be expected. Attention is called, however, to the inadequacy of the sample in the four- and seven-year-olds in the 1949

[2] It is likely that the 1949 four-year-olds were somewhat older than the 1944–45 four-year-olds since they were all enrolled in kindergarten, whereas 1944–45 four-year-olds included nursery school or pre-kindergarten children.

Grand Rapids sample and that none of the six-year-olds had used fluoride water continuously since birth.

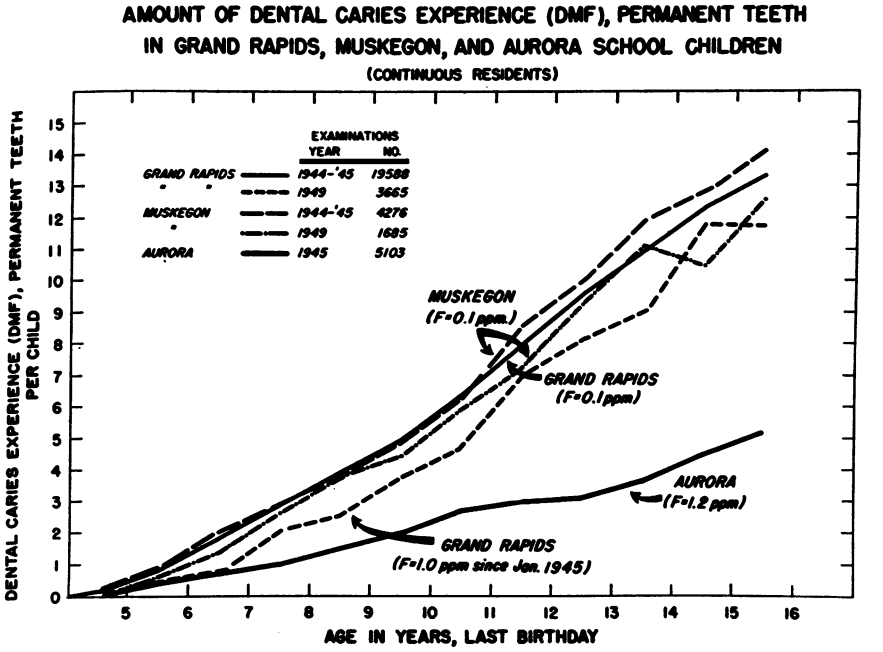
Permanent Teeth. Table 3 shows the DMF (decayed, missing, or filled teeth) rates for the permanent teeth of children aged 5 through 16 who were continuous residents. In 1944–45 at Grand Rapids, there were examined 1,789 six-year-old children, 1,806 seven-year-olds, 1,647 eight-year-olds, and 1,639 nine-year-olds; these specific age groups showed a DMF rate of 0.78, 1.89, 2.94, and 3.90, respectively. The 1949 Grand Rapids examination of 697, 54, 155, and 519 children in these respective age groups showed 0.38, 0.76, 2.16, and 2.48 DMF teeth per child or a reduction of 51.3, 59.8, 26.5, and 36.4 percent, respectively. Attention is called to the size of the samples of seven- and eight-year-olds and the selection of sample by school grade rather than by age.

Table 3. ***Dental caries experience, permanent teeth, observed among 33,955 children, age 5–16, of Grand Rapids, Muskegon, and Aurora, expressed as DMF teeth per child with percentage reductions observed (continuous residents)***

Age	Grand Rapids, Mich.			Aurora, Ill.		Muskegon, Mich.		
	Examinations made		Percentage reduction	Examinations 1945–46	Percent less than G. R. 1944–45	Examinations made		Percentage change
	1944–45	1949–50				1944–45	1949–50	
5	0.11	0.03	72.7	0.06	45.5	0.06	0.14	+133.3
6	.78	.38	51.3	.28	64.1	.81	.63	−22.2
7	1.89	.76	59.8	.70	63.0	1.99	1.43	−28.2
8	2.94	2.16	26.5	1.04	64.6	2.81	2.58	−8.2
9	3.90	2.48	36.4	1.52	61.0	3.81	3.88	+1.8
10	4.92	3.56	27.7	2.02	59.0	4.91	4.44	−9.6
11	6.41	4.69	26.8	2.67	58.4	6.32	5.93	−6.2
12	8.07	7.02	13.0	2.95	63.5	8.66	7.21	−16.8
13	9.73	8.11	16.7	3.09	68.3	9.98	9.52	−4.6
14	10.94	8.90	18.6	3.64	66.7	12.00	11.08	−7.7
15	12.48	11.80	5.5	4.54	63.6	12.86	10.32	−19.8
16	13.50	11.83	12.4	5.19	61.6	14.07	12.51	−11.1

At Muskegon, the 1944–45 examinations included 462 six-year-olds; 408 seven-year-olds, 376 eight-year-olds, and 357 nine-year-olds, with a DMF experience of 0.81, 1.99, 2.81, and 3.81, respectively. The 1949 examination embraced 393 six-year olds, 30 seven-year-olds, 12 eight-year-olds, and 197 nine-year-olds, with a DMF rate of 0.63, 1.43, 2.58, and 3.88, respectively. As is apparent from the numbers shown, only the six- and nine-year-olds warrant comparison. The six-year-olds in 1949 showed a 22.2 percent reduction from the 1944–45 rate; the nine-year-olds, a 1.8 percent increase.

If one compares the rates of five-, six-, and seven-year-olds at Aurora in 1945 with the present Grand Rapids rates for children in these age groups, it is noted that the DMF experience is quite similar. When these rates are compared with the 1944–45 Grand Rapids rates, the percentage reductions also tend to be alike. However, a very limited number of erupted permanent teeth in five-year-old children



and a small sample of children in the seven-year-old group for Grand Rapids in 1949 are the basis for these rates.

The chart summarizes graphically the tabular data given in table 3. The lines show the dental caries experience for the permanent teeth of children aged 5 through 16. The upper solid black line shows the dental caries prevalence recorded for the 19,680 continuous residents in the Grand Rapids 1944–45 base-line study. The long dash line shows the prevalence rate, 1944–45, at Muskegon, the control city. As may be seen, these base-line prevalence rates are almost identical until about 12 years of age when Muskegon's rates are slightly higher than Grand Rapids. The lower solid black line is the Aurora curve, based upon 5,116 examinations made in 1945.

An examination of the 1949 prevalence rates computed for Grand Rapids and Muskegon shows that in the latter city the curve roughly follows the 1944–45 base line. Note that for the Grand Rapids 1949 trend line the points for the five-, six- and seven-year-old children fall on the Aurora line, but for older children, aged 8 to 16 years, the Grand Rapids 1949 trend line is appreciably above that of Aurora. The slope of the 1949 Grand Rapids line beginning with the eight-year-olds is very similar to that of the Grand Rapids 1944–45 line. This finding suggests that Grand Rapids children, ages 8 to 16, are accumulating new carious permanent teeth at the same rate in 1949 as children in this age range were accumulating them in 1944–45. In other words, the five-, six-, and seven-year-olds of Grand Rapids in

1949 are on the Aurora expectancy curve. The very limited number of permanent teeth in five-year-olds and the small sample of seven-year-olds, however, make caution mandatory in interpretation of results. On the other hand, although the permanent teeth in six-year-old children have a very limited exposure time to dental caries attack, the large sample, 697, examined in 1949 at Grand Rapids, justifies comparison with the 473 Aurora children in the same age group. The 1950 examinations in the lower age groups should reveal highly important data.

Summary

Fluoridation of the Grand Rapids public water supply began in January 1945. Analysis of the 1949 dental examinations at Grand Rapids shows a reduced amount of dental caries experience when compared with the pre-fluoridation rates of 1944–45. The findings indicate that the reduction is most pronounced in the younger age groups whose dentition was largely calcified following the addition of one part per million of fluoride (F) to the previously fluoride-free public water supply. Sufficient time has not elapsed to evaluate water fluoridation in the older age groups.

REFERENCES

(*1*) Moulton, F. R., ed.: Dental Caries and Fluorine. American Association for the Advancement of Science, Lancaster, Science Press, 1946.

(*2*) Moulton, F. R., ed.: Fluorine and Dental Health. Publication No. 19, American Association for the Advancement of Science, Lancaster, Science Press, 1942.

(*3*) Harris, W. L.: Experience in the application of fluorides to a public water supply. Lectures presented at the in-service training course for water works personnel, University of Michigan, School of Public Health, Ann Arbor, Mich., May 1945.

Incidence 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 October 7, 1950

New cases of acute poliomyelitis reported in the United States during the current week numbered 1,816, a 9-percent decrease from the 1,994 cases reported for the preceding week. This is the second consecutive week since May 20 that a decrease from the preceding week has been reported. The figure for this week is higher than the corresponding number (1,585) for 1949. The peak incidence of this disease to date occurred the week ended September 23, the latest week in any year during the past 20 years, with the exception of 1932.

The cumulative total (22,219) for the current "disease" year was below the corresponding total (33,796) for last year, the highest on record. The "disease" year for acute poliomyelitis begins with the twelfth week of the calendar year.

The cumulative total for the calendar year was 23,351, compared with the total of 34,709 for the corresponding period last year.

Comparative Data for Cases of Specified Reportable Diseases: United States

[Numbers after diseases are International List numbers, 1948 revision]

Disease	Total for week ended—		5-year median 1945–49	Seasonal low week	Cumulative total since seasonal low week		5-year median 1944–45 through 1948–49	Cumulative total for calendar year		5-year median 1945–49
	Oct. 7, 1950	Oct. 8, 1949			1949–50	1948–49		1950	1949	
Anthrax (062)	------	------	(1)	(1)	(1)	(1)	(1)	33	41	(1)
Diphtheria (055)	155	228	287	27th	1,176	1,727	2,220	4,304	5,495	8,517
Acute infectious encephalitis (082)	29	18	18	(1)	(1)	(1)	(1)	736	613	506
Influenza (480–483)	1,557	1,163	1,171	30th	9,409	6,990	6,990	255,668	82,857	148,291
Measles (085)	683	641	737	35th	2,908	2,527	2,915	291,079	591,045	555,310
Meningococcal meningitis (057.0)	44	38	49	37th	157	140	140	2,956	2,656	2,776
Pneumonia (490–493)	1,029	999	------	(1)	(1)	(1)	(1)	65,885	61,699	------
Acute poliomyelitis (080)	1,816	1,585	1,142	11th	[2] 22,219	33,796	19,177	[2] 23,351	34,709	19,644
Rocky Mountain spotted fever (104)	9	4	6	(1)	(1)	(1)	(1)	431	535	516
Scarlet fever (050)	586	722	783	32d	2,917	3,088	3,815	43,087	60,754	65,872
Smallpox (084)	1	1	1	35th	1	3	3	27	44	150
Tularemia (059)	5	2	13	(1)	(1)	(1)	(1)	739	920	776
Typhoid and paratyphoid fever (040, 041)[3]	88	122	102	11th	2,256	2,718	2,718	2,766	3,206	3,206
Whooping cough (056)	1,577	1,520	1,589	39th	1,577	1,520	1,589	98,772	48,122	77,464

[1] Not computed.
[2] Deduction: Georgia; week ended September 30, 2 cases.
[3] Including cases reported as salmonellosis.

For the current week, eight of the total of nine geographic divisions decreased from the preceding week in reported cases of acute poliomyelitis. These decreases ranged from 77 (517 to 440) cases reported in the Middle Atlantic States to 7 (548 to 541) in the East North Central States. The increase in the East South Central States was 20 cases which included 12 (30 to 42) cases in Kentucky and 6 (6 to 12) in Alabama.

For the current week, the States reporting the largest numbers of cases were: New York (286), Ohio (157), Michigan (153), Illinois (125), Pennsylvania (106), and Iowa (89).

Alaska reported 16 cases compared with 11 last week. The cumulative total for the calendar year was 31. Hawaii reported 1 case for the week.

Rocky Mountain spotted fever was reported by 6 States with a total of 9 cases. The cumulative total number for the calendar year to date is 431 cases which may be compared with the 5-year (1945–49) median of 516.

The total number of new cases of infectious encephalitis reported for the current week was 29 which may be compared with 18 for the corresponding week last year. The 5-year (1945–49) median was 18 cases. For the calendar year, a total of 736 cases was reported which is the highest cumulative total reported during the past 5 years.

The total number of cases of diphtheria reported for the week was 155 compared with 131 last week and 228 for the corresponding period last year. For the calendar year, a total of 4,304 cases was reported, the lowest total number reported for corresponding periods in the past 5 years.

One case of smallpox was reported in Tennessee.

Deaths During Week Ended October 7, 1950

	Week ended Oct. 7, 1950	*Corresponding week, 1949*
Data for 93 large cities of the United States:		
Total deaths	8,893	9,012
Median for 3 prior years	9,012	----------
Total deaths, first 40 weeks of year	364,541	364,589
Deaths under 1 year of age	692	641
Median for 3 prior years	641	----------
Deaths under 1 year of age, first 40 weeks of year	24,674	25,915
Data from industrial insurance companies:		
Policies in force	69,537,367	70,091,442
Number of death claims	11,831	11,511
Death claims per 1,000 policies in force, annual rate	8.9	8.6
Death claims per 1,000 policies, first 40 weeks of year, annual rate	9.3	9.2

Reported Cases of Selected Communicable Diseases: United States, Week Ended Oct. 7, 1950

[Numbers under diseases are International List numbers, 1948 revision]

Area	Diphtheria (055)	Encephalitis, infectious (082)	Influenza (480–483)	Measles (085)	Meningitis, meningococcal (057.0)	Pneumonia (490–493)	Poliomyelitis (080)
United States	**155**	**29**	**1,557**	**683**	**44**	**1,029**	**1,816**
New England	**1**		**1**	**58**	**5**	**40**	**84**
Maine				3		7	8
New Hampshire							1
Vermont				3			1
Massachusetts	1			42	2		38
Rhode Island			1	1			1
Connecticut				9	3	33	35
Middle Atlantic	**5**	**13**	**1**	**145**	**4**	**235**	**440**
New York	4	13	[1]	62	4	161	286
New Jersey	1		1	33		34	48
Pennsylvania				50		40	106
East North Central	**13**	**2**	**17**	**179**	**10**	**111**	**541**
Ohio	3		1	20	3		157
Indiana	2		9	6		15	41
Illinois		1	1	17	2	55	125
Michigan	8		2	43	4	31	153
Wisconsin		1	4	93	1	10	65
West North Central	**6**	**4**	**26**	**29**	**4**	**168**	**188**
Minnesota	5		2	13		15	27
Iowa	1				2		89
Missouri			2	8	1	11	14
North Dakota		1				111	3
South Dakota		1		4	1		5
Nebraska			22	1		5	17
Kansas		2		3		26	33
South Atlantic	**62**		**322**	**55**	**2**	**114**	**227**
Delaware				3			3
Maryland	2		2	2		11	51
District of Columbia			1	1		9	4
Virginia	9		227	12	1	27	55
West Virginia	4		70	17		5	28
North Carolina	26			7			31
South Carolina	8		17	1		7	16
Georgia	9		4	7	1	47	25
Florida	4		1	5		8	14
East South Central	**35**	**1**	**32**	**16**	**6**	**36**	**91**
Kentucky	3			5		10	42
Tennessee	6	1	16	10	5		28
Alabama	20		12	1	1	17	12
Mississippi	6		4			9	9
West South Central	**25**	**1**	**1,040**	**64**	**9**	**241**	**95**
Arkansas	7		73	5		7	9
Louisiana	1		2	2	2	21	4
Oklahoma	5	1	68	7		18	18
Texas	12		897	50	7	195	64
Mountain	**4**	**2**	**100**	**34**		**34**	**28**
Montana	1		10	1			1
Idaho			11	8			5
Wyoming							
Colorado			9	10		26	12
New Mexico				2			4
Arizona	3	2	70	5		6	1
Utah				7		2	5
Nevada				1			
Pacific	**4**	**6**	**18**	**103**	**4**	**50**	**122**
Washington	1	1		25	1	3	30
Oregon	1		13	5	1	13	23
California	2	5	5	73	2	34	69
Alaska						3	16
Hawaii			10				1

[1] New York City only.

Reported Cases of Selected Communicable Diseases: United States, Week Ended Oct. 7, 1950—Continued

[Numbers under diseases are International List numbers, 1948 revision]

Area	Rocky Mountain spotted fever (104)	Scarlet fever (050)	Smallpox (084)	Tularemia (059)	Typhoid and paratyphoid fever [1] (040, 041)	Whooping cough (056)	Rabies in animals
United States	**9**	**586**	**1**	**5**	**88**	**1,577**	**132**
New England		**30**			**1**	**240**	
Maine		2				20	
New Hampshire						5	
Vermont						39	
Massachusetts		24			1	66	
Rhode Island		1				81	
Connecticut		3				29	
Middle Atlantic		**69**			**12**	**314**	**13**
New York		[2] 24			6	129	13
New Jersey		8			2	101	
Pennsylvania		37			4	84	
East North Central		**143**		**2**	**12**	**471**	**33**
Ohio		56			5	160	
Indiana		17		1	1	30	[3] 27
Illinois		20			2	37	1
Michigan		36		1	3	167	5
Wisconsin		14			1	77	
West North Central		**36**			**2**	**62**	8
Minnesota		6			1	15	
Iowa		1				12	7
Missouri		18			1	5	
North Dakota		1				8	
South Dakota		1				7	
Nebraska		7				3	
Kansas		2				12	1
South Atlantic	**7**	**122**			**19**	**140**	**15**
Delaware					2		
Maryland	2	7				14	
District of Columbia						2	
Virginia	3	14			5	14	1
West Virginia		18			3	30	2
North Carolina	1	51			1	42	
South Carolina		6			3	10	6
Georgia	1	23			5	23	6
Florida		3				5	
East South Central	**1**	**83**	**1**		**6**	**50**	**23**
Kentucky		11			2	9	14
Tennessee		52	1		4	23	3
Alabama	1	19				25	3
Mississippi		1				2	3
West South Central		**29**		**2**	**17**	**146**	**29**
Arkansas		2		2	2	20	2
Louisiana		3			4	15	
Oklahoma		5			4	6	1
Texas		19			7	105	26
Mountain		**9**		**1**	**5**	**60**	**9**
Montana		1				17	
Idaho		1				14	
Wyoming					1		9
Colorado		2			2	8	
New Mexico					1	4	
Arizona		4			1	7	
Utah		1		1		10	
Nevada							
Pacific	**1**	**65**			**14**	**85**	**2**
Washington		13				20	
Oregon	1	5			1	14	
California		47			13	51	2
Alaska					2		
Hawaii		4					

[1] Including cases reported as salmonellosis.
[2] Including cases reported as streptococcal sore throat.
[3] Report for 4 weeks.

FOREIGN REPORTS

CANADA

Reported Cases of Certain Diseases—Week Ended Sept. 16, 1950

Disease	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Brucellosis					3	1				1	5
Chickenpox	1		15	1	13	64	13	7	17	25	156
Diphtheria					2			1		1	4
Dysentery, bacillary					7	6	3				16
Encephalitis, infectious					1			1	1		3
German measles					1	33		5	7	15	61
Influenza			18			7	3				28
Measles			1		53	50	7	7	10	9	137
Meningitis, meningococcal					1	2			1	1	5
Mumps			4		62	66	10	33	34	24	233
Poliomyelitis				1	2	17	1	10	13	4	48
Scarlet fever					14	12	8	4	8	1	47
Tuberculosis (all forms)	9		3	4	137	28	24	14		43	262
Typhoid and paratyphoid fever				1	35	2				11	49
Venereal diseases:											
Gonorrhea	4		8	3	72	77	46	20	60	111	401
Syphilis	5		6	3	37	13	3	25	4	7	103
Whooping cough			10		59	130	12		2	48	261

CYPRUS

Typhoid fever. An outbreak of typhoid fever was noted in Cyprus during the week ended August 19, 1950, when 64 cases were reported. More than half this number was stated to have occurred in the Famagusta district.

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

The following tables are not complete or final for the list of countries included or for the figures given. Since many of the figures are from weekly reports, the accumulated totals are for approximate dates.

CHOLERA

(Cases)

Place	January–July 1950	August 1950	September 1950—week ended—				
			2	9	16	23	30
ASIA							
Burma	312	100	5	23	1		
Akyab	2						
Bassein	3						
Kyaukpyu		1					
Maubin	3						
Moulmein					1		
Pegu	1						
Rangoon	1	5					
Toungoo		1	6	1			

Place	January–July 1950	August 1950	September 1950—week ended— 2	9	16	23	30
ASIA—continued							
India	82,817	16,407	3,343	[1] 2,037	[1] 1,266	[1] 70	
Ahmedabad	7	1					
Allahabad	3						
Bombay	[2] 309	110	1	6	2	1	
Calcutta	[2] 8,555	340	49	29	29	30	
Cawnpore	1						
Cocanada	2						
Cuddalore	31			1			
Lucknow	12						
Madras	11	[3] 11	11	17	27	39	
Masulipatam	47						
Nagpur	4	27	1	1	11		
Negapatam	67	21	2	3	5		
New Delhi	61	56	1	4	3		
Port Blair (Andaman Islands)	[3] 2						
Tellicherry	27						
Tiruchirappalli	1						
Trichinopoly	1						
Tuticorin	25			1			
India (French)	819	252	26	27			
Karikal	381	1					
Pondicherry	438	251	26	27			
India (Portuguese)		17					
Indochina	16	3		1			
Cambodia	5						
Viet Nam	11	3		1			
Giadinh	3						
Rachgia	1						
Pakistan	21,954	1,206	322	[1] 77	[1] 17		
Chittagong	185	1					
Dacca	191		1				

[1] Preliminary figures. [2] Includes imported cases. [3] Imported.

PLAGUE

(Cases)

AFRICA							
Belgian Congo	17	11				1	
Costermansville Province	5	[1] 9					
Stanleyville Province	[2] 12	2				[1] 1	
Madagascar	48	4			[3] 1		
Rhodesia, Northern	2						
Union of South Africa	10	1					
Orange Free State	7	1					
Transvaal Province	1						
Johannesburg	[1] 1						
ASIA							
Burma	223	9			1		
Bassein	1						
Bhamo	[4] 4						
Henzada	14	1					
Kyaiklat	34						
Minhla	1	1					
Moulmein	[4] 3						
Myaungmya	5						
Myingyan	2						
Pegu	3	1					
Pyapon	3						
Rangoon	[4] 8						
Yenangyaung	58						
China:							
Chekiang Province	[5] 37						
Wenchow	[6] 4						
Fukien Province	706						
Amoy	10						
Kwangsi Province	[6] 63						
Kwangtung Province	527						
India	36,639	671	[7] 268	[7] 61	[7] 71		
Allahabad	[8] 19						
Bombay	[4] 5						
Calcutta	[4] 3						
Cawnpore	18						
Lucknow	[4] 9						

See footnotes at end of table

PLAGUE—Continued

Place	January–July 1950	August 1950	September 1950—week ended—				
			2	9	16	23	30
ASIA—continued							
Indochina:							
Annam	78	5	1			1	
Phanthiet	74	5	1			1	
Cambodia	[9] 46						
Pnompenh	3						
Cochinchina	12	3					
Saigon	1						
Laos	2						
Indonesia:							
Java	377	13	5	5	1		
Bandoeng	3						
Djakarta	[4] 2	1					
Jogjakarta	201	12	5	5	1		
Pakistan	1						
Karachi	[8] 1						
Thailand	56						
SOUTH AMERICA							
Brazil	5						
Bahia State	2						
Pernambuco State	3						
Ecuador	25	3					
Chimborazo Province	4						
El Oro Province	4						
Loja Province	17	3					
Peru	18						
Ancash Department	3						
Lambayeque Department	2						
Libertad Department	1						
Lima Department	5						
Piura Department	7						
Venezuela	5						
Miranda State	5						

[1] Pneumonic plague. [2] Includes 1 case of pneumonic plague. [3] Sept. 1–10, 1950. [4] Includes imported cases. [5] Includes 4 cases of pneumonic plague. [6] Deaths. [7] Preliminary figures. [8] Imported. [9] Includes suspected cases.

SMALLPOX

(Cases)

AFRICA							
Algeria	90	7					
Angola	144						
Bechuanaland	38						
Belgian Congo	2,039	787	117	170	245		
British East Africa:							
Kenya	10						
Nyasaland	246	2		7			
Tanganyika	2,725	434			5	1	
Uganda	3			1			
Cameroon (British)	344	48					
Cameroon (French)	93						
Dahomey	217	53			[1] 4	[2] 34	
Egypt	[3] 4						
Eritrea	1						
Ethiopia	23	3					
French Equatorial Africa	446	3					
French Guinea	12						
French West Africa: Haute Volta	205						
Gambia	5						
Gold Coast	173	50	6				
Ivory Coast	553	60			[1] 10		
Libya	2						
Mauritania	1						
Morocco (French)	9	1					
Mozambique	180	28					
Nigeria	13,817	452	[4] 7	[4] 5	[4] 4		
Niger Territory	1,059	10			[1] 5		
Rhodesia:							
Northern	4						
Southern	458						
Senegal	2						

See footnotes at end of table

Place	January–July 1950	August 1950	September 1950—week ended— 2	9	16	23	30
AFRICA—continued							
Sierra Leone	30	1					
Sudan (Anglo-Egyptian)	72	1					
Sudan (French)	108	60					
Togo (French)	48	24					
Tunisia	1						
Union of South Africa	614	18	2				
ASIA							
Afghanistan	291	17					
Arabia	331	2			[5] 3		
Bahrein Islands: **Bahrein**	34	2					
Kamaran Island: **Kamaran**			[5] 2				
Burma	4,987	17		2	1		
Ceylon	[5] 1	1					
China	746						
India	111,977	5,971	[6] 979	[6] 624	[6] 309		
India (French)	172	70	18	26			
India (Portuguese)	83	7					
Indochina	[7] 335	27			4		
Indonesia:							
Borneo	480	80	28	38			
Java	3,618	946	185	212	190		
Sumatra	342	2					
Iran	212	26	1				
Iraq	139	[5] 5	2	1			
Israel	16						
Japan	6						
Korea (Republic of)	1,331						
Lebanon	2						
Netherlands New Guinea	3						
Pakistan	14,201	1,054	202				
Palestine	95						
Straits Settlements:							
Singapore		[5] 2					
Syria	15						
Thailand	460						
Transjordan	35						
Turkey (See Turkey in Europe.)							
United Nations Relief and Works Agency for Palestine Refugees	12	3					
EUROPE							
Great Britain:							
England: **Liverpool**	[5] 1						
Scotland: **Glasgow**	21						
Greece	[8] 15						
Athens	1						
Piraeus	1						
Xylokastron	1						
Portugal	1						
Spain: Canary Islands	1						
Turkey	9			1			
NORTH AMERICA							
Guatemala	3						
Mexico	506						
SOUTH AMERICA							
Argentina	517						
Brazil	48	12	3	4			
Chile	[7] 3,565	[9] 11			[10] 7		
Colombia	557	7	6				
Ecuador	117	14	2	5	2		
Paraguay	1	3					
Peru	1,691						
Venezuela	1,216						
OCEANIA							
Australia: **Freemantle**	[5] 1						

[1] Sept. 1–10, 1950. [2] Sept. 11–20, 1950. [3] Includes imported cases. [4] In Lagos only. [5] Imported. [6] Preliminary figures. [7] Corrected figure. [8] Includes suspected cases. [9] Aug. 1–12, 1950. [10] Aug. 13–Sept. 16, 1950.

TYPHUS FEVER*

(Cases)

Place	January–July 1950	August 1950	September 1950—week ended— 2	9	16	23	30
AFRICA							
Algeria	100	6					
Basutoland	22	2					
Belgian Congo	[1] 78	[2] 5		3			
British East Africa:							
Kenya	23						
Uganda	1						
Egypt	82	4	1			1	
Eritrea	[3] 19	1					
Ethiopia	513						
French Equatorial Africa	5						
Gold Coast	7	1					
Libya:							
Cyrenaica	27						
Tripolitania	70						
Madagascar	[1] 2						
Morocco (French)	6	2			1		
Morocco (International Zone)	1						
Morocco (Spanish Zone)	6						
Mozambique	5						
Nigeria	1						
Rhodesia, Southern	6						
Sierra Leone	[2] 5						
Sudan (Anglo-Egyptian)	4						
Tunisia	53	1					
Union of South Africa	76	P					
ASIA							
Afghanistan	[3] 1,292	5					
Burma	[3] [4] 15						
China	[1] 20						
India	275	1					
India (Portuguese)	22	8					
Indochina	[3] 29	2	1				
Indonesia:							
Java	6						
Sumatra	1						
Iran	171	5					
Iraq	124	4		1		1	
Japan	[1] 927						1
Korea (Republic of)	1,183						
Lebanon	1						
Netherlands New Guinea	2						
Pakistan	92	5	1				
Palestine	3						
Straits Settlements: Singapore	[1] 5	1	[2] 1				
Syria	[1] 37			1	1		
Transjordan	17	3					
Turkey (see Turkey in Europe).							
United Nations Relief and Works Agency for Palestine Refugees	4						
EUROPE							
France	1						
Germany (British Zone)	[1] 2						
Germany (French Zone)	2						
Germany (United States Zone)	2						
Great Britain:							
England: Liverpool	[2] [5] 1						
Island of Malta [2]	16	10			1		
Greece	27	1					
Hungary	4						
Italy	37						
Sicily	29						
Poland	37						
Portugal	2						
Spain	25	[6] 2					
Turkey	170	12	1	1	2	5	2
Yugoslavia	247						
NORTH AMERICA							
Costa Rica [2]	12	2					
Guatemala	20						
Jamaica [2]	24	3	2				
Mexico [1]	313	8	2		1		
Panama Canal Zone	[2] 3						
Puerto Rico [2]	15	1		1	1		

See footnotes at end of table.

TYPHUS FEVER—Continued

Place	January–July 1950	August 1950	September 1950—week ended—				
			2	9	16	23	30
SOUTH AMERICA							
Argentina	2						
Chile	93	14		6	5		
Colombia	470	10	1				
Curacao	[3] 1						
Ecuador	[1] 173	[1] 23	[3] 2	[3] 1		[3] 2	
Peru	677						
Venezuela	114						
OCEANIA							
Australia [2]	92	7	2	1			
Hawaii Territory [2]	7						

* Reports from some areas are probably murine type, while others include both murine and louse-borne types.

[1] Includes murine type. [2] Murine. [3] Corrected figure. [4] Includes 7 deaths reported as cases (in Rangoon). [5] Imported. [6] In Madrid.

YELLOW FEVER

(C—cases; D—deaths)

Place		January–July 1950	August 1950	September 1950—week ended—				
				2	9	16	23	30
AFRICA								
French Equatorial Africa	C	1						
Port Gentil	C	[1] 1						
Gold Coast	C	12	1					
Accra	D	1	[1] 1					
Ankobra Ferry	D	1						
Bogoso	C	[1] 1						
Kade	C	1						
Oda Area:								
Akwatia	C	[2] 7						
Atiankama	C	1						
Nigeria	D	1	1					
Calabar	D	[3] 1						
Ibadan	D		[1] 1					
Sierra Leone	C	2						
Koinadugu District	C	[4] 2						
NORTH AMERICA								
Panama:								
Colon	D	1						
SOUTH AMERICA								
Bolivia	C	867						
Chuquisaca Department	C	[5] 850						
La Paz Department	C	[6] 17						
Brazil	D	2						
Bahia State	D	1						
Ipiau	D	1						
Maranhao State	D	1						
Colinas	D	1						
Colombia	D	4						
Magdalena Department	D	1						
Los Angeles, Rio de Oro	D	1						
Putumayo Commissary	D	3						
Mocoa Locality	D	3						
Peru	D	6						
Cuzco Department	D	2						
Quincemil	D	2						
Huanuco Department	D	1						
Tingo Maria	D	1						
Junin Department	D	1						
San Ramon	D	1						
San Martin Department	D	2						
Juanjui	D	1						
Lamas	D	1						

[1] Suspected. [2] Includes suspected cases. [3] Imported. [4] Includes one suspected case. [5] Estimated number of cases reported (230 deaths) in an outbreak in Azero Province Jan. 1–Mar. 14, 1950. [6] Outbreak in North and South Yungas Provinces (8 deaths).