

This outline of the nature, basis, and method of eight interrelated surveys calls attention to the wealth of published material applicable to an evaluation of oral health needs and resources.

Planning Surveys To Assess a State's Oral Health Status

By DAVID F. STRIFFLER, D.D.S., M.P.H.

THE PUBLIC HEALTH dentist proceeds to assess the oral health status of his "patient," the State and its people, along much the same lines as does the dentist in private practice (1). First, he listens to his patient's chief complaint, and then he sizes up the patient and questions him. Next, he makes a clinical examination, using all the necessary diagnostic instruments. Finally, he records his findings so that he can analyze them and arrive at a diagnosis.

The survey, whether formal or informal, is the method the public health dentist uses to make his assessment. Surveys can serve many specific purposes. They can provide an accurate basis for identifying the real, as opposed to the apparent, oral health problems (2); guide the assignment of priorities in program planning and budgeting (3); provide baseline data for future program evaluation (4-8); supply data needed in anticipation of new pro-

grams, such as prepayment dental care plans (9-11); "determine the epidemiological characteristics of a dental disease . . . establishing the manner in which the disease is manifested in population groups . . ." (7).

We shall outline specific objectives and practicable procedures for eight types of interrelated surveys, all directed toward the assessment of the oral health status of a State and its people. We shall give attention also to special problems, for, as in the private dental office, emergencies frequently intrude to upset the best of planning. Finally, we shall consider plans for analyzing and interpreting the findings of these interrelated surveys.

General Rules

The following 6 rules apply to the planning of all 8 surveys:

1. For background information, study the literature on oral health needs and resources and on survey principles and procedures (1, 7, 12-15).

2. Consult with a statistician concerning sampling, coding, record forms, analyses of data, and how to present the findings.

3. Consult with another public health dentist, perhaps the regional Public Health Service consultant.

Dr. Striffler is director of the division of dental health, New Mexico Department of Public Health, Santa Fe. This paper is a condensation of one he presented at the Fourth Workshop on Dental Public Health, conducted by the Schools of Public Health and Dentistry of the University of Michigan, April 2-6, 1956. Copies of the proceedings of the workshop are distributed by the publications distribution service of the University of Michigan.

4. Whenever possible, conduct a pretest or pilot survey.

5. Utilize every opportunity to gain pertinent information.

6. Write out what you plan to do, how you plan to do it, and what you are going to do with the data after they are obtained. In particular, write out definitions for terms; for example, what exactly is meant by DMF or malocclusion. In the process, hazy definitions can be clarified and methods described so that the survey can be repeated at a later date.

Survey One: Subjective Impressions

Despite the difficulty of recording and analyzing subjective impressions or opinions, an attempt to do so may provide valuable information. A social scientist has said that "it is not so much what the facts actually are, but what people believe to be the facts" (16). Knowledge of what people believe to be the facts should help in planning how results of other surveys can be used so that they will be accepted. Also, it may provide leads to what other surveys should be undertaken, and it may be used to some extent in program evaluation.

The opinions of at least three groups are important: the dentists of the State, who not only may be the sole sources of particular information but who also may hold the key to the solution of certain problems; the public, to whom the public health dentist owes first allegiance; and the public health dentist's co-workers.

A written questionnaire is one way of conducting this type of survey. It can be mailed to all the dentists in the State, for example, or handed out at meetings of community organizations. The questionnaire may be a checklist of common oral health problems, or it may contain open-end questions. Parten's book (13) is particularly helpful in designing and using questionnaires. It points out, for instance, that appealing for information as a personal favor has been more productive than offering a reward or stressing some advantage to the respondent.

Another method of learning people's opinions is the workshop (17). *Adult Leadership*, especially the May 1953 issue (18), offers many suggestions for planning such meetings.

Still another method, the least practical but the most accurate, is the personal interview survey in which a well-planned question schedule is used (13). Sometimes a graduate student at a State university will conduct such a survey as work toward an advanced degree.

Whatever the method selected, a social psychologist should help in planning the survey (19).

Survey Two: Knowledge, Attitudes, Practices

A survey of dental health knowledge, attitudes, or practices may be combined with survey one. All that was said about that survey applies to this type.

A recent survey conducted in New Mexico illustrates the why and how of a knowledge survey. Its purpose was to learn the status of dental health information so that a dental health education program could be concentrated on the areas needing attention. Also, the findings would serve as baseline data for measuring the effects of a dental health education program.

A trial questionnaire of 18 questions was developed. It sought to cover the major areas of dental health information, particularly those in which it was suspected that the public is poorly informed. On the basis of a pretest, four questions were eliminated and several were revised. The final form was checked by the department's psychologist for vocabulary level (fifth grade) and format and by the director of vital statistics for machine punchcard tabulations. The test, given to any group interested in it, has been taken by more than 4,000 persons.

Measurement of attitudes and practices is somewhat more difficult than measurement of knowledge, but it can be done. Metzner's article (20) provides excellent background information for this type of survey. Crude estimates of attitudes and practices may be derived from such items as the extent to which candy and sweetened beverages are sold in schools, the number of toothbrushes sold each year, the F component of the DMF rate, and the number of referral cards returned signed by a dentist.

Survey Three: Review of Surveys

Surveys pertinent to a particular facet of oral health may already have been conducted or may

be in process. If well executed, they may contribute effectively to the public health dentist's project. Such surveys sometimes appear in unexpected places, in State agricultural colleges (21-23) for example. Records from industrial plants, dental schools, or clinics often can be collated and the findings used profitably. Also, the Public Health Service may have conducted surveys in your State.

An example of a survey which was conducted for one purpose but served another is Wishik's survey of handicapped children (24). It brought into focus the particular oral health problems of congenital clefts and malocclusion in addition to other handicapping problems.

Survey Four: Characteristics of the State

The following story illustrates the importance of a survey of the general characteristics of the State and its population:

A few years ago a million-dollar foundation was established to promote the health of the citizens of a certain State. To bring medical and dental care to rural people, several beautiful health centers were built in isolated areas, and the million dollars was soon spent. Today only one of these centers is open, and that one only part time. The population decreased from about 6,000 to less than 1,000 for each health center. There was scarcely anyone left to use the health centers and no one to man them.

A team of cultural anthropologists have stated, "Knowledge of the people is just as important in many aspects of a public health program as is knowledge of medical [dental] science" (25). They listed what should be surveyed from a cultural and socioeconomic standpoint: folkways, income and cost of living, social organization of families, level of education and literacy, political organization, and religious factors. To this list might be added percentage of people receiving public assistance, rural and urban characteristics, and sources of income.

As far as population per se is concerned, the following might be considered: the distribution of the population by geographic area, by age, and by ethnic group, and trends in population growth and movement. The fluoride content of water supplies and climatic factors that

might influence water consumption are other characteristics to be investigated (26).

Many of these characteristics can be surveyed simply by examining the latest Federal census report. Up-to-date population estimates often can be obtained from the State's vital statistics division and verified against estimates by public utilities. In New Mexico, the State university's bureau of business research has provided pertinent information. In some States, commissions or bureaus dealing with economic development can supply useful data.

A survey of the fluoride content of water supplies can be conducted in various ways. In New Mexico, water samples were collected by dentists, pharmacists, and science teachers who volunteered their services. Cooperation was excellent, and considerable interest in fluorides was aroused. Two chemistry teachers made class projects of their part in the survey.

Survey Five: Oral Diseases

Paraphrasing a well-established concept, Knutson gives the reason for a survey of the prevalence and incidence of oral diseases (7): "Effective application of measures for the control of disease depends to a great extent upon knowledge of the manner in which disease occurs in population groups."

Generally, those oral conditions which are most prevalent or which contribute significantly to mortality rates should be surveyed. Specifically, the following hazards, conditions, and diseases should be considered (6, 8, 27, 28):

1. *Dental caries*: The greatest portion of the workload for dentists is the direct or indirect result of dental caries (29).

2. *Periodontal diseases*: Periodontal diseases are a prominent cause of tooth loss in middle and later life (28), and more information on these diseases is needed (30, 31).

3. *Malocclusion*: The inclusion of orthodontic care in dental public health services and surveys of the extent of the problem of malocclusion have been recommended (32).

4. *Congenital oral defects*: The need for early detection of oral clefts has been delineated (24, 32, 33).

5. *Oral cancer*: The need for early detection of oral and related cancer is set forth by Patterson (34), Lloyd (35), and Russell (28).

6. *Other diseases and hazards*: Other diseases and hazards pertinent to a particular State may be included; for example, chronic endemic dental fluorosis (6, 26, 36-38), the sequellae of oral trauma (particularly fractured (39) and avulsed incisors), the dental stigmata of congenital syphilis (40, 41), and occupational hazards and diseases (28).

In planning how to conduct the survey, the standard types of survey inspections or examinations may be reviewed and the most pertinent type selected (42). Consideration should be given to the universal record form (43) or, at least, to the possibility of recording data so that they can be translated into terms of the universal form.

Next, whom and where to survey has to be decided. Of necessity, sampling must be considered. Sampling by age, geographic area, socioeconomic level, occupation, cultural pattern, rural and urban area, climate, fluoride content of water, and other characteristics is easier if such characteristics have been delineated for the State by survey four.

Practicality often precludes the use of the best sampling procedures. Since budget and time usually demand that a clinical survey be conducted where people congregate, the dental survey often takes place in a school or industrial establishment. Despite these handicaps, careful planning can still yield worthwhile results. For example, a consolidated school system makes possible the sampling of both rural and urban populations.

Variables that may influence the findings should be reviewed. For example, a physician in New Mexico was sincerely convinced that the contrast in the dental caries prevalence between a fluoride and a nonfluoride city was due to income. When per capita income was shown to be the same for the two cities (38), he capitulated and supported fluoridation for the non-fluoride city.

Planning the actual mechanics of the field survey is the next task. Practices in one State are described in Baker's article (44) and in another in the California manual (45). A general review is given in "A Dental Health Inventory for Maintown" (46). Items to be considered range from dental instruments to wastebaskets. Impression materials and a

clinical camera are among the items that might be included.

An advance trip to the area where the survey is to be conducted is almost essential. Usually, despite voluminous correspondence, an on-the-spot planning meeting with all people concerned is indicated. The public health dentist has the obligation of providing those people with a brief written outline of the purposes and other pertinent information. In surveys of school populations, educational approaches, materials, and aids should be suggested.

The various indexes of oral diseases should be appraised carefully, especially from the standpoint of objectivity, reliability, and reproducibility, before final selection. Too often surveys have been wasted because the examiner used an index that had meaning only to him.

Who should perform the clinical examination is debatable. Some public health dentists conclude that whenever possible local dentists should be asked to participate. Others decide that insofar as possible only one examiner should be used. Circumstances may dictate the answer. If the survey is elaborate and detailed, perhaps only one or two examiners should participate. Otherwise, the benefits accruing from the use of local dentists may outweigh the disadvantage of less comparability.

Data for certain oral diseases can be obtained by other methods than the clinical survey. Morbidity and mortality rates for oral cancer and congenital defects, for example, are available from most State offices of vital statistics, subject, of course, to errors of diagnosis and inadequate reporting. The State crippled children's service usually maintains a register of cleft lip and palate cases.

Survey Six: Dental Resources

When the oral health problems have been measured, logically the findings should be compared with the findings of a survey of the resources available for meeting those problems. Then the most effective methods for utilizing and supplementing the resources can be determined.

Dentists are the chief manpower resources, but not to be forgotten are the auxiliary per-

sonnel: dental hygienists, dental assistants, and dental laboratory technicians.

Factors about dentists to be investigated include age, mortality, specialty, postgraduate training, and type of practice (full or part time; public, private, or industrial). Dentist-population ratios should be calculated by trade areas or, where this is not feasible, by city, county, and State. Many of these data can be obtained by a mail questionnaire. Other sources are census reports, the American Dental Directory, and records of State board examiners. Frequently, dental supply houses and dental laboratories can supply up-to-date information on the location of dentists and the type of practice in which they are engaged. In small States, the day-to-day contacts of the public health dentist may elicit such information. Also, many national surveys, particularly those conducted by the American Dental Association, have a sufficient sampling from the more populous States to be directly applicable to those States.

"A Study of Oklahoma's Dental Manpower Requirements" (47) is an excellent guide to surveying a State's dental manpower resources. In particular, it considers the age of dentists as a prime factor in productivity, a point often overlooked. In addition to dentists and dental hygienists, which the Oklahoma study surveyed, one may wish to include dental assistants and laboratory technicians.

Physical facilities to be surveyed include the various types of dental clinics, Federal, State, and local, voluntary and official, mobile and fixed, industrial, school, hospital, and institutional, as well as private offices.

Training facilities for dentists, hygienists, assistants, and technicians also should be taken into account. Finally, facilities such as those for examination of biopsy specimens, treatment of cancer, making of lactobacillus counts, and rehabilitation of oral clefts should be searched out and evaluated.

Survey Seven: Auxiliary Resources

Frequently, there are other resources than strictly dental that will contribute to the solution of dental health problems. Already mentioned are the State agricultural colleges,

which sometimes are engaged in research related to dental health. Colleges and universities may also provide such services as vocational counseling and postgraduate courses for dentists.

Other auxiliary resources are to be found within the official health agency itself. The environmental sanitation division, for example, can supply data on community water supplies and can help in the engineering aspects of fluoridation. The industrial hygienist can provide valuable leads to occupational hazards and to groups available for dental surveys.

The voluntary agencies, too, often can contribute materials or services. Foundations often have funds and personnel waiting for a worthy project. Why shouldn't that project be a dental one?

These resources are usually found by an informal survey; that is, by contacting the right people and asking the right questions.

Survey Eight: Blocks to Solutions

Blocks to the attainment of optimum oral health have been classified as follows: psychological, educational, professional, economic, social, and geographic (48). In public health, a seventh block might be added: administrative. The job of surveying these blocks will have been largely completed if the other surveys described have been made. For example, a survey of the State and its characteristics may reveal hindrances of distance, economics, or cultural patterns (49). Direct surveys of these blocks may, of course, be indicated. For best results, the aid of a social scientist should be enlisted.

Special Problems

It may well be necessary to undertake a special research study during the course of an investigation of a State's oral health status. Often, however, such a study can be dovetailed with other surveys. In New Mexico, for example, a special study (38) was necessitated by the State dental society and the health department's request for an immediate answer to the question, how much fluoride is optimum for New Mexico's climate? To determine preva-

lence of fluorosis, the first survey was conducted among junior high school students in communities which, according to previous routine chemical analyses of the water, differed as to fluoride level. This study was integrated with a survey of other dental diseases.

Analysis and Interpretation of Data

Since all the surveys outlined in this paper are interrelated, some of them even being carried on simultaneously, plans for statistical analyses of the data should be laid early in the project. Sometimes findings from one survey will contradict the findings of another, and the differences must be resolved. Conversely, the results of one survey may reinforce those of another. It is here that the help of an expert statistician is invaluable.

Planning for the interpretation of the results to the profession and the public also should begin early, and the health educator should participate. Phair has challenged public health dentists to get away from the traditional technical interpretation of data and to explain findings in simple, meaningful terms (15). Unless plans are made to report and utilize the findings in a profitable manner (16, 19, 50), the surveys might as well not be done.

Summary

If one is to plan, execute, and evaluate State dental health programs in a logical manner, comprehensive information concerning the State's dental health needs and its resources is indispensable.

What do the people consider to be the oral health problems? What do the members of the dental profession see as the problems?

What is needed in the way of health education? What do people know about dental health? What do they do about it?

What is the distribution of the population by geographic area, by age, and by ethnic group? What are the trends in population growth and movement? What about the fluoride content of the water supplies?

What is the prevalence of the major oral diseases?

How many dentists are there in official agen-

cies? in private practice? in industry? How many auxiliary personnel?

What is the status of physical facilities?

Are there blocks to the attainment of optimum oral health?

Some of these questions can be answered simply by a search and study of existing source materials. Others require more formal surveys, such as questionnaires, personal interviews, or even clinical examinations. Then the data obtained in answer to specific questions must be analyzed and integrated to provide a complete picture of the State's dental health status.

At first glance the job may appear to be too overwhelming to tackle, but the State dental public health director and his staff can, with the help of others, accomplish it, bit by bit. Actually, of course, surveying is a continuing process, for conditions next year will inevitably differ from conditions this year.

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Converts to Hospital Delivery

When the health center opened in the Arab village of Tira, public health nurses met with little success in inducing pregnant women to have their babies in the hospital. Women in the Little Triangle villages have always been delivered at home by *dayas*, women who practice midwifery under hazardous conditions.

When a woman went into labor recently, she called for help from the midwife licensed by the Tira Health Center. The midwife delivered the baby at home in the presence of the local *daya* because she was unable to persuade the mother to come to the center hospital.

A second woman went into labor shortly thereafter, and she too called for the licensed midwife. This time the midwife refused to deliver the child at home and succeeded in convincing the husband that his child should be born in the hospital. The center first had to agree that the *daya* would be present, the male physician would be absent, and the husband and others in the family could remain in the center for the birth.

Pleased with the care and treatment given to his wife and child, the father made an unprecedented

concession. He agreed that the mother and baby and all the family members could be photographed.

Word of the experience spread. Within the next 2 weeks, 12 women were delivered in the hospital. The task of the nurses in inducing women to have hospital deliveries has been easier ever since.

—JACOB H. LANDES, M.D., *acting chief, Health and Sanitation Division, United States Operations Mission, Israel.*

Sanitation School

The Palasht Sanitation School fulfills a basic sanitation need in the Middle East by providing practical training in the villages. Among the 170 sanitarians trained for the Ministry of Health, other government departments, and private agencies since the opening of the school in 1952 are 6 Afghans who are putting their education into practice in their own country.

Students attend classes in the morning, work outside in the afternoon. Half of their classtime is devoted to work in the laboratory. Among the subjects covered in the 7-month curriculum are bacteriology and parasitology, excreta disposal, refuse collection and disposal, milk and food sanitation, insect and rodent control, camp and swimming pool sanitation, vital statistics, and government organization in Iran.

—ALBERT P. KNIGHT, M.D., *formerly chief, Public Health Division, United States Operations Mission, Iran.*