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REVIEW OF RESEARCH PROGRAM IN DENTAL HEALTH

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Introduction

At the PAHO Advisory Committee on Medical Research held in June, 1962, a document was presented related to PAHO dental research philosophy and programs. The document (Res 1/5, 18 May 1962) approved by the Committee constituted the present policy and guidelines for the PAHO Dental Research Section.

The philosophy, as approved, is "essentially pragmatic and pointing directly toward the development and extensive use of economically feasible mass-preventive methods and of curative or restorative methods permitting a higher productivity."

According to this philosophy four basic areas were outlined:

- I. Epidemiological Research
- II. Research on Preventive Methods
- III. Research on Productivity in the Curative or Restorative Phase of Dentistry, and
- IV. Research on Distribution of Dental Services.

Background information on work done

First stage (1962-1963) in the document RES 3/3, 15 May 1964, the Committee was informed of the PAHO Dental Research activities conducted since 1962. They were:

- a) Salt Fluoridation (Related to the previous mentioned area II): (1)

PAHO developed a research project and assisted the University of Antioquia in getting financial support from the National Institutes of Health (NIH) to determine whether fluoridated salt, added to the diet, would halt dental decay as effectively as fluoridated water. This project is being conducted as programmed.

b) Training of research workers:

The document RES 3/3, 15 May 1964, stated that the University of Brazil had established a center for applied research in dentistry (CIEPO). PAHO implemented the program and provided the fellowships to train the staff of CIEPO. Also a program for an international course in dental epidemiology was outlined.

Second stage.(1963-1964) In the document 4/28, April 28, 1965, PAHO information **included the** following:

a) the continuation of the salt fluoridation study. Water fluoridation control in one community was begun, as well as an administrative plan for distribution of salt prepared. The necessary analysis of urinary excretion of fluoride for adjusting the fluoride intake to optimal levels was determined.

b) In February 1965, CIEPO started preparing the manuals for the international course, and the staff of this center completed their training at this time.

Third stage.(1965-1968) At this 8th Meeting of the Research Committee on Medical Research PAHO reported on the following dental research activities (the four previous mentioned areas):

I. EPIDEMIOLOGICAL RESEARCH

a) In Venezuela a national study of prevalence of dental disease was prepared. By the end of 1968, the clinical examination of the 16,000 persons scientifically selected as representatives of the nation were completed. Plans for coding, editing, programming, and tabulating are now in progress. By the end of 1969, results of the dental conditions will be available. Household interviews were

performed using a sampling of 6,400 families (approximately 32,000 persons) in order to observe the interrelated roles of socio-economic conditions and the dental findings.

It is planned that this national survey will provide a methodology in dental epidemiology for other Latin American countries. These oral health indexes will ensure comparability of distribution of dental diseases in different countries.

b) An international course in dental epidemiology was held in 1965 at the University of São Paulo in Brasil. Twelve leading public health dentists from seven Latin American countries attended this course. They received special training and calibration on dental epidemiological indexes. They were also trained in research design and received special assistance in designing individual protocols to do research in their countries of origin. Several of these students attending the International Course in 1967 are now actively engaged in the National Health Survey in Venezuela.

c) In Colombia a national dental health survey was performed. The findings are now in the process of analysis and there is a resolution to use these findings for preparing a national dental plan. All these studies as well as the plan are considered as part of the National Health Survey.

d) Another Center of Applied Research and Training in Dentistry is also being planned at the Dental and Public Health Schools at the University of Antioquia. This Center can be considered as a result of the International Course at São Paulo. If this Center is established, it would be functioning as a regional training center for research in certain needed areas of dentistry.

II. RESEARCH IN PREVENTIVE DENTISTRY

a) Approval in 1969 by NIH to continue with economic assistance assured the continuation of the salt fluoridated research project being conducted at Medellín, Colombia. The communities included in the study are continuously receiving table salt fluoridated. The dosage of fluoride mixture is maintained constantly and the people in the communities are accepting the added fluoride to the salt. Several papers are ready for publication in the Bulletin at the Panamerican Sanitary Bureau. One of the objectives of this research project is to evaluate the feasibility of using kitchen salt as a vehicle for providing fluoride to population groups in dental caries prevention. This is already a reality.

b) At the International Center for Dental Epidemiology at the University of São Paulo, Brazil, a research project on the prevention of dental caries is in its second year of operation. This project was developed by the University, the United States Public Health Service, Division of Dental Health, (USPHS) and PAHO. The objective is to evaluate the effectiveness of a self-applied topical fluoride on the teeth of school children. The topical fluoride is an acidulated phosphate gel that the children apply daily to their teeth when they brush their teeth. The study is for a three year period having started in 1967. The early results (after one year) are that the children applying the fluoride have mean incremental DMF^a surface scores considerable lower than those of children in the control groups.

c) Microbiological studies. There is an opinion that dental caries

^a Decayed (D), missing (M), filled (F) surfaces of all the teeth of one individual.

may be an infectious and transmissible disease. In 1954, Orland, Blayney, Harrison, Reyniers, Trexler, Wagner, Gordon, and Luckey (2) provided evidence that experimental caries do not occur in the absence of micro-organisms. Later in 1955, Orland, Blayney, Harrison, Reyniers, Trexler, Ervin, Gordon, and Wagner (3) reported the production of dental caries in gnotobiotic rats infected with combinations of an enterococcus and a proteolytic bacillus or an enterococcus and an anaerobic pleomorphic. The production of caries in gnotobiotic rats was accomplished in animals carrying an enterococcus, plus one other micro-organism. Orland (4) demonstrated caries with a pure culture of this same enterococcus. Fitzgerald et al., (5) demonstrated that a single strain of an oral streptococcus has been shown to produce extensive caries in the molar dentition of gnotobiotic rats in the absence of other demonstrable micro-organisms.

PAHO, considering the importance of training researchers in this field, initiated a series of international courses on oral microbiology:

a) With the technical assistance from the National Institute of Dental Research (NIDR) and the University of Brazil's Institute of Microbiology, an intensive training course was held in July 1965. The objective of the course was to train students in newer developments in oral microbiology and to apply some of these new research findings to practical and feasible research projects; and to seek ways of incorporating these newer concepts into the teaching program for dental students. In this course 28 full time teachers of oral microbiology from 14 dental schools of Brazil and one from the Dental School of El Salvador participated. The following quotation shows the impact of this course:

"... I would like to present some concrete evidence of the beneficial effects that such courses have on the dental activities of a

Latin American country. In 1965, I participated in a similar course in Rio de Janeiro which was sponsored by PAHO. As a direct result of this course at least two doctoral dissertations were produced and at the Conference of the Grupo Brasileiro de Microbiologia Oral, held in Belo Horizonte in July of 1968, eleven of the thirteen research papers were devoted to studies of topics pointed out in the 1966 course, and in all eleven papers one or more of the authors had participated in the course. I think this is a record which PAHO and those of us who have taught at the PAHO sponsored courses can be justifiable proud and which should inspire confidence in the value of continuing such courses in the future."(6)

b) The University of Antioquia's School of Public Health in Medellín, Colombia conducted (October 31 to December 7, 1968) the second of a proposed series of international courses in Oral Microbiology. Three leading microbiologist from the U.S.A. participated as instructors, as well as members of the oral microbiology staff at the University. Coordinator of the course was a Colombian dentist. Nine dentists, two physicians, and teachers of oral microbiology in dental schools from nine countries, attended the course: Argentina, two; Chile, one; Colombia, two; Guatemala, one; Nicaragua, one; Ecuador, one; Dominican Republic, one; and Venezuela, two.

These series of courses are providing the following results:

- a) the immediate revision and updating of the teaching curriculum in oral microbiology at dental schools.
- b) Participants will be encouraged to undertake research projects of their own or at least be able to participate in collaborative studies with more experienced investigators.
- c) Development of a Panamerican-wide epidemiological survey of

cariogenic streptococci. The participants in the series of courses will be trained in standard technics and methods for this survey.

d) Iniciation of research dealing with:

1. the use of antibiotics for control of cariogenic microorganisms.
2. the aforementioned epidemiological studies on the geographical distribution of cariogenic streptococci, and
3. the supplementation of unrefined brown sugar ("panela") with enzymatic or chemical agents which would interfere with plaque formation.

III. PRODUCTIVITY IN THE CURATIVE OR RESTORATIVE PHASE OF DENTISTRY

In Porto Alegre, Brazil (with PAHO assistance) a center for the study of factors to supply and demand for dental care and the development of care programs was established in 1967. This Center is a joint effort involving the state government in Rio Grande do Sul, and Porto Alegre's two dental schools. Several investigations in the aforementioned were conducted.

In Chile, with PAHO and Kellogg assistance, the School of Dentistry in Concepción is developing a pilot clinic for delivering low cost comprehensive dental care to the community. The clinic will also serve as a continuing education and applied research center for the school. The successful development of this project can serve as a model to other regions and countries in Americas.

In Colombia, the dental association is carrying out a research program for developing "popular clinics," to deliver low cost dental care to the community. It is planned that this Organization will assist in the further implementation of this concept on a departmental or national basis.

In Venezuela, the University of Zulia is planning the development of a Center for Teaching and Research in Dental Productivity in Maracaibo. The first protocol for testing simplified materials for large groups of populations was prepared and the research program will be initiated in 1969. The personnel for this project are receiving adequate training.

In addition, assistance is being provided to the Central University of Venezuela in establishing an International Center for Standardization, Quality Control, Teaching and Research in Dental Materials. This Center will assure the quality of dental materials being used in Venezuela as well as developing and test other materials that can be used more efficiently and effectively in health service programs. The Center's other activities include coordinating dental materials and teaching and research in the country. Of the total cost of this Center (US\$500,000), the W. K. Kellogg Foundation contributed US\$153,000. The dedication of this Regional Center will be made in July 1969.

The utilization and education of dental auxiliary personnel is one of increasing interest and activity in Latin America. In order to support a long range and effective plan for development of auxiliary education programs as well as programs for use of auxiliaries in providing dental services, this Organization conducted a survey of dental auxiliary utilization and education in Latin America. The results of the survey will be published in 1969 and will be distributed throughout the Hemisphere.

As a second phase, PAHO is assisting one country in the establishment of an International Center for Training of Teachers and Administrators of courses for auxiliary personnel. Two research projects on expansion of duties for auxiliary personnel are underway.

The delivery of curative dental services also is a priority area of activity and PAHO is providing support to programs that are developing new systems, personnel and equipment to deliver dental care.

In Jamaica and Colombia, assistance has been given to projects for the training of dental auxiliaries that will provide routine dental care for children. The training of the auxiliaries is already underway in Colombia at the University of Antioquia. In Jamaica, plans call for the construction of a dental nurse school with classes to begin in 1970.

IV. EFFICIENT DISTRIBUTION OF DENTAL SERVICES

The aforementioned research projects are related to clinical care. The following are is related to community types. The aim is to increase the efficiency of coverage of dental programs in the public or private sectors.

Following the philosophy recommended in 1962 by the PAHO Advisory Committee on Medical Research in the area of better distribution of dental services; that the Organization promote the development of models for national planning in dental health as part of the national health plan. Two countries, Venezuela and Colombia, are collecting the necessary information for their national dental plans. The Venezuelan experience garnered the efforts of the three schools, the National Dental Association, and the Government for the studies of 1) the Status of Dental Education; 2) epidemiological conditions; and 3) availability of human and physical resources.(7)

Preventive services have been given a high priority as evidenced by the program to promote the fluoridation of water supplies throughout Latin America. This program, begun in 1967, is a collaborative effort between PAHO and the W. K. Kellogg Foundation. The focus is on the education of

sanitary engineers and others concerned with water supplies, and the active promotion of lfluoridation by both dentists and sanitary engineers. Two international courses and one national course have been held thus far. The first international course was held in Cincinnati, Ohio in 1967 for high level engineers from Latin America, the United States and elsewhere. The second international course was held in Puerto Rico in 1968 for high level engineers from the Caribbean area. A special short seminar on fluoridation was held for Cabinet Ministers and other policy makers during the Puerto Rico course. The third international course was held in Guatemala in 1968. The first national course was held in Mexico in 1968, and additional courses were held in Venezuela and Colombia.

In summary, the philosophy of the PAHO Dental Research Program as recommended by this Expert Committee on Medical Research is now being applied in all of the four accepted fields: epidemiology, preventive methods, increase of clinical productivity and establishing better distribution of dental services in private or public sectors. In this document some research activities are reported. The next five years will show the impact of this pragmatic approach pointing constantly toward the development and extensive use of economically feasible mass-preventive methods and of curative or restorative methods permitting a higher productivity.

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