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**EPIDEMIOLOGICAL RESEARCH ON
CANCER IN LATIN AMERICA:
REPORT OF A PLANNING CONFERENCE**

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PAN AMERICAN HEALTH ORGANIZATION
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INTRODUCTION

By 1960 cancer already ranked as one of the first five principal causes of death in 11 of the 20 Latin American countries. Almost one-sixth of the deaths among the population 15 years of age and over are due to cancer. The high mortality in childhood and the relatively low life expectancy in most of Latin America have resulted in the assignment of priorities in health programs to diseases and conditions contributing to mortality of children. Because small proportions have survived in the past to older ages, absolute numbers of deaths from cancer have been fewer than those of deaths from many other causes. However, in the age groups in which the incidence of malignant neoplasms is high, the risk for most Latin American populations appears to be as great as for those in the United States, Canada or countries of Western Europe. With progress in the reduction of child mortality and the increase of population in the older age groups, increases in the numbers of cancer deaths in Latin America are to be expected. Moreover as facilities for medical diagnoses and treatment are improved and extended, additional cases will be discovered and more deaths will be attributed to cancer. Cancer control activities in Latin America are at present mainly concentrated on treatment and medical care for patients with the disease. In many countries there is a growing recognition that cancer control must be

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widened to include prevention and early diagnoses. Epidemiological study of cancer is a direct approach to this goal.

Marked differences in the incidence of various forms of cancer have been noted among Latin American countries and also between countries of this and other Regions. Variations existing in environmental conditions in the Americas would appear to offer a fertile area for epidemiological research on the occurrence and etiology of cancers of different anatomical sites.

Considerable interest in cancer morbidity and the related factors in Latin America is being expressed by international agencies and by health services and medical schools in the American countries. To establish a sound and coordinated approach to such investigations the Pan American Health Organization arranged a Planning Conference on Epidemiological Research on Cancer in Latin America which was held in Lima, Peru at the Instituto Nacional de Enfermedades Neoplasicas from February 25 to March 1, 1963. The meeting was supported by a research grant from the National Cancer Institute of the U. S. Public Health Service. Participants at the meeting included eleven specialists from eight Latin American countries, two from the United States, and in addition staff members from the National Cancer Institute of the U. S. Public Health Service, the International Union Against Cancer, the World Health Organization, and the Pan American Health Organization. Specialties represented included epidemiologists, pathologists, cancer surgeons, cancer administrators and statisticians. A list of the participants and the agenda of the meeting are included as Appendix A and B.

The discussion in the Conference was centered on three broad fields in cancer epidemiology and cancer control. The first pertained to methodology and criteria for obtaining reliable information on cancer incidence and cancer mortality in Latin America. The second related to the specific fields in which epidemiological research should preferably be carried out in Latin America because of unusual occurrence of the disease or special population characteristics to be investigated in relation to the disease. The third subject considered was the education and training of personnel of the various types required for epidemiological studies on cancer in Latin America. Recommendations were prepared by the Conference on all three fields to be submitted to the Pan American Health Organization.

REPORTS ON CURRENT STUDIES IN CANCER EPIDEMIOLOGY

To acquaint the group at the Conference with current activities in cancer control and epidemiology in the Americas, participants from each of the eight Latin American countries represented reported briefly on national programs for cancer. Other participants discussed international and other national programs in cancer control and epidemiology in the Americas, stressing the need for preparation of professional and auxiliary personnel.

A. In Latin American Countries

In the eight Latin American countries represented at the Conference, mortality rates from malignant neoplasms are increasing, and cancer is becoming one of the leading causes of death. For example, in Argentina and Jamaica malignant neoplasms are now the second principal cause of

death, in Costa Rica and Chile the third, in Venezuela the fourth and in principal cities of Brazil and Peru the fifth. In all but one of the eight countries the stomach and the cervix uteri are the primary sites for the largest proportions of all cancer deaths. In addition, cancer of the respiratory system stands out in Argentina as a heavy contributor to cancer mortality. In Brazil cancer of the esophagus is unusually high in the South (24.3 per cent of cancer deaths in the State of Rio Grande do Sul) and cancer of the penis is high in the States of Pernambuco and Alagoas. Cancer of the esophagus is also a frequent cause of death in Chile and Jamaica. In special areas of Colombia and Venezuela and in Jamaica cancer of the buccal cavity shows an unusual frequency.

In all the Ministries of Health cancer services form organizational units. Several have already started cancer registries to obtain morbidity data and others are making plans for them. In Argentina in 1963 an office was created to centralize information about cancer for the country. Records from hospitals of the Ministry of Health will provide the basic information using standardized records and procedures. Community-wide registers are being initiated or planned in three large cities and hospital registers already exist in many areas. In Brazil in 1963 a cancer register is being initiated for the State of São Paulo.

Cancer activities in Chile have a longer history than in most other countries. The National Cancer Institute was organized in 1930, a Permanent Committee on Cancer in 1937 and the Chilean League Against Cancer in 1938. In 1959 a national cancer registry was started based on hospital reporting. The system was expanded in 1962 to include reporting from out-patient services, private physicians and pathologists.

A cancer control program has been in existence in the Ministry of Health of Colombia for four years (Comite Nacional Contra Cancer). This national program is directed to four fields - epidemiological studies, diagnosis and treatment, education of doctors, nurses and others in cancerology, and community organization for cancer education. The National Cancer Registry was started in January 1961 mainly from reporting by hospitals and on cases with histological confirmation. As yet no follow-up of reported cases has been made.

In Costa Rica activities in the Ministry of Health have centered around education and the establishment of outpatient departments to centralize treatment and registration. Since 1958 a small, carefully planned and continuing survey has been carried on in a small area of Jamaica with a population of 420,000 (Kingston and St. Andrews). Two hospitals with 900 beds serve the area and over 90 per cent of deaths are autopsied. In addition there are 150 beds in private nursing homes. Each week all institutions are visited to obtain information on cancer cases (including residence data) and notifications of cancer cases are also received from private physicians. Twenty-three hundred cases among residents have been registered during a five year period with histological confirmation in 80 per cent and strong clinical evidence for the remainder. Buccal cavity, esophagus, liver, penis and the cervix uteri are among the sites with higher rates than expected.

In the Ministry of Health of Venezuela emphasis has been placed on training of medical personnel including pathologists, cytotechnicians, etc., for cancer programs. Cancer registers have been set up in selected hospitals with the intention of extending the system and procedures to

the entire country. In September 1962 cancer was declared by decree of the Minister of Health to be a notifiable disease.

The reports on country activities included a few epidemiological investigations. Epidemiological studies of gastric cancer among Japanese in Brazil have shown death rates among the Japanese migrants to Brazil to be higher than those of the Brazilian population and to be similar to the rates of natives in Japan. There is some evidence that the same death rates among the Japanese born in Brazil will be lower than those of the preceding generations. An epidemiological investigation of cancer of the stomach in Chile is to begin in 1963 with the support of a research grant from the National Cancer Institute of the U. S. Public Health Service. A study of cancer of the stomach has already been initiated in San José Province in Costa Rica through the collaboration of the University of Costa Rica and Louisiana State University. Deaths of all persons over 10 years of age occurring in the hospital are to be studied for the validity of the clinical diagnoses of cancer and of stomach cancer. Distributions by age, sex, province, environmental, racial and other factors will be studied. In 1963, the first year of the program, all persons with a clinical diagnosis of cancer, who died in the San Juan de Dios Hospital and a 50 per cent sample of all deaths in the hospital over 10 years of age will be autopsied for research purposes. In Peru studies on the effects of high and low altitude on the development of cancers in animals have already been initiated.

To emphasize prevention and early treatment many countries have started surveys for detection of cancer of the cervix uteri using exfoliative cytology. Usually these have been carried out with hospital

populations or other selected groups, and in a few on a community basis. For example, in Brazil pilot projects have been carried out in communities in the State of Rio de Janeiro; in Venezuela a program in the State of Miranda on a pilot basis is to be extended to other areas.

B. Other

For orientation in cancer epidemiology for the participants from the various specialties, reports and discussions followed on the relation of epidemiology and the development and administration of cancer control programs. The activities of the cancer unit of the World Health Organization in Geneva were also described in three fields: (1) on nomenclature and classification of tumors; (2) on cancer epidemiology and (3) on cancer control as a public health problem. Of particular significance for nomenclature and classification are the International Reference Centers for standardization of nomenclature and descriptions of specific tumors. Special epidemiological investigations are in progress on lung cancer in Europe, breast cancer in Israel, oral cancer in India and bladder cancer in Egypt.

Training programs and research grants for foreign scientists of the National Institutes of Health of the U. S. Public Health Service were described, as well as certain demographic and epidemiological studies of the National Cancer Institute. These served to illustrate the methodological problems and approaches and the varied types of populations and data which are useful in epidemiological research. The extension of the interest of pathologists to participation into epidemiological studies was pointed out.

A report was presented to the Conference based on a preliminary analysis of proportionate mortality from cancer by site, age, and sex

in five cities of Latin America from the Inter-American Investigation of Mortality. These data confirm the higher risk of death from stomach cancer in these cities as compared with the United States and in several an increased risk of death from cancer of the cervix uteri. The study has already been valuable in showing that a large proportion of cancer deaths (59 per cent) has histological confirmation and that the quality of diagnostic evidence of cancer is obviously adequate to warrant collaborative epidemiological studies into etiology in many areas of Latin America.

Plans for regional training centers in Latin America to prepare specialists for research and teaching were presented. Included among the specialties for which it is hoped that centers can be developed are experimental pathology, microbiology and parasitology, biochemistry and biophysics, physiological sciences, epidemiology, medical statistics and the biosocial sciences.

MORBIDITY AND MORTALITY

Accurate morbidity and mortality statistics for cancer in Latin America will serve many purposes and both are essential for the complete picture of the cancer problem. Their uses include the following:

- (1) As a guide to delineate the magnitude of the cancer in each country.
- (2) To compare incidence, both total and site-specific, among various countries.
- (3) To guide the development of cancer control programs.
- (4) To evaluate control efforts.
- (5) To assist in the clinical management of cases (e. g. with follow-up data and survival studies).

- (6) To improve health practices.
- (7) To confirm reliability and skill of medical practice.
- (8) To provide teaching material.
- (9) To indicate further research projects.

A. Mortality Statistics

Mortality data on cancer when accurate are exceedingly useful by themselves. For cancer of certain sites in which the chances of survival are low, good mortality statistics may suffice as accurate measurements of the size of the problem. However, for other sites such as skin and cervix uteri for which mortality does not reflect morbidity, data on incidence are indispensable.

Improvements are essential for many areas of Latin America, which will not only benefit statistics on cancer but also on total mortality. Among these are the following:

- (1) Increasing medical certification to at least 90 per cent of all deaths.
- (2) Establishing more carefully the cause of death with special attention to the anatomical site of cancer.
- (3) Verification of diagnoses.
- (4) Obtaining residence information for deaths.
- (5) Accurate estimates of populations at risk.

B. Morbidity Statistics

Methodology to obtain morbidity data will vary depending on the uses for which the information is being collected and the particular problems and conditions in each country or area. Certain basic information should exist to make possible comparisons between areas of different countries. The following conditions are essential for developing

morbidity studies on cancer:

1. They should refer to limited areas about which good demographic and social information exists. Accurate information about the population at risk by age, sex, etc., must be available.

2. The suitability of the area should be assessed (e.g., adequacy of hospital facilities). Wherever general standards of medical care and medical education are poor, morbidity studies will be difficult to accomplish.

3. Statistical departments of hospitals should be adequate and staffed with qualified personnel. The existence of tumor committees or clinics in hospitals will facilitate the collection of data.

4. An area meeting the requirements in the preceding three conditions may be able to serve as an experimental or demonstration center to develop and test new methods of studies and be used for community investigations of other diseases.

The three usual approaches to obtain morbidity data on cancer are cancer registers, ad hoc morbidity surveys and studies of special population segments.

A cancer register is the collection of as detailed information as practicable about all newly recognized cases of cancer in a population of known size and characteristics. It is important that basic uniformity exist between registries but that should be adaptable to extension to fulfill individual interests or goals. Useful information from registers should be given back to physicians and institutions supporting them and on whom the success of the registers are dependent. Through the register should be emphasized to practicing clinicians the value of public health work and of their own contributions to it. Registers already exist in several areas of Latin America and plans are being developed for others,

usually at national or provincial levels.

Suggested criteria for establishing registers include:

- (a) A register should be for a discrete political unit such as a large city or other area for which medical and hospital services are unified.
- (b) Census data should be available for the area.
- (c) The largest desirable population to be covered is suggested as 2 to 3 million inhabitants among whom 5,000 to 8,000 cases of cancer might be reported annually. The smallest practical size may be 100,000 population since the number of reported new cases in a smaller group would be too few for study. The ideal population size may be around 500,000. Exceptions may be made in areas where the pattern of medical care makes it possible to obtain easily unified and complete morbidity reporting. Registers of high quality for limited population groups are preferable to registers of doubtful quality for large populations.
- (d) Data should be available and used from all possible sources - hospitals, clinics, private physicians, pathological laboratories, X-ray examinations, autopsy reports and death certificates.
- (e) Basic minimal information required for every register includes the following:

Personal identification;

name

residence (address)

sex

date of birth (or estimated age)

name and address of next of kin

name of hospital or physician responsible for the patient's medical care

hospital registration number

(race, occupation and marital status desirable)

hospital registration number

(race, occupation and marital status desirable)

Diagnostic information:

primary anatomical site involved

basis of diagnosis (histology, radiology, cytology, etc.)

date of first diagnosis.

These basic items apply only to cancer registers intended to gather incidence or morbidity data. Hospital registers or community registers established to evaluate results of treatment, length of survival and to facilitate supervision of the patient will require more extensive information on treatment, histological type, stage of disease at diagnosis, etc.

Ad hoc surveys of morbidity (obtaining information through special surveys from all sources - private physicians, hospitals, clinics, pathology laboratories, etc. - on all cancer patients observed or diagnosed over a limited period of time) have been used with satisfactory results in a few countries. The advantage of this method lies in limiting the collection of information to a specific and reasonably short time period.

Data on special population segments, such as occupational and industrial groups, on military personnel or on social security groups, may be extremely useful for morbidity statistics and incidence rates when base population information is available. In every country or area it is worthwhile to explore the possibilities of this type.

The statistics prepared on morbidity and mortality from each area should include tabulations and analysis of incidence and mortality by age and sex groups for the categories (malignant neoplasms by site, 140-205) of the International Classification of Diseases. Source of reports

(hospital, clinic, physician, death certificate and autopsy) and the basis for diagnoses (histology, radiology, cytology, etc.) should be shown in relation to each diagnostic category. The preparation of other tabulations such as by occupation and by marital status would depend on availability of information on both morbidity and mortality and on the population at risk.

EPIDEMIOLOGICAL INVESTIGATION

Epidemiological research in Latin America should be directed towards provision of new knowledge which will assist health authorities in the establishment and improvement of cancer prevention and control (diagnostic, treatment and preventive services). Identification and control of etiological factors would in turn lead to improvement of the level of health. Moreover epidemiological research has added value in providing a basis for research training and for the stimulation and improvement of health services.

On the basis of reports and discussions during the meeting on mortality and morbidity from cancer in various parts of Latin America the following are considered the important sites for study.

A. Sites of high morbidity and mortality

Stomach

Cervix uteri

Skin

Lung

B. Other sites of unusual cancer interest and occurrence

Esophagus

Liver

Gall bladder and biliary tract

Urinary bladder

Oral cavity

Criteria used as a basis for recommendations were: a) size of the problem, b) reasons for approaching the problem in Latin America, c) relation to ongoing research, d) possible environmental and other factors involved, and e) availability of practical methodology for study.

Summarized below for the above sites are the criteria on which selection of these sites was made. The recommendations are intended to be applicable to international collaborative studies, local or national investigation or bilateral research and are not related to source of support. The geographical areas mentioned are included only as known examples for there may exist many other regions in the Americas with similar situations.

Factors which should influence selection of geographical areas for study include a) personnel with an interest and competence in cancer epidemiology, b) medical diagnosis of good quality, c) unusual characteristics of life which may be related to cancer occurrence, d) satisfactory record systems for incidence and mortality, or for measuring variables in special defined population groups.

1. Stomach

It has been well demonstrated by the already existent information that there is a high incidence of gastric cancer in large regions of Latin America. This high incidence is in sharp contrast with the low incidence existing in cancer affecting other areas of gastrointestinal tract, in particular, cancer of the large bowel and rectum. For example in Chile age adjusted mortality rates from cancer of the stomach are at least 6 times the rates for the United States. However, the U.S. rate for cancer of the intestines and rectum is almost three times that in Chile. The mortality rate from stomach

cancer in Metropolitan Caracas is at least 3 to 4 times that in most cities of the United States. Similarly a large amount of gastric cancer and little of the intestines and rectum have been discovered in Japan and among North American Indians and may be related with the common ethnic characteristics of all these populations. One would expect this difference to be less marked in the regions where the predominant population is of African origin, as is the case with certain areas of the Caribbean as well as in the regions where the predominant population is of European stock (South Atlantic America). It has also been suspected that food, alcohol, tobacco, etc., may have definite influence in the etiology of stomach cancer.

- a. Since the number of cancer cases in the general population is rather large, it is comparatively easy to collect a significant number of cases in small geographical areas.
- b. There exist favorable conditions in some places of Latin America for the control and follow-up of cases among the general population, such as in Chile (Santiago), Brazil (São Paulo), Argentina (La Plata).
- c. There exists sub-population groups of pure racial stock that would permit comparative studies: Negro, Japanese, European, as well as mixtures of all these races.
- d. Study by autopsy of hospital deaths from gastric cancer and a sample of other hospital deaths has already been started in Costa Rica. In later stages in this investigation, environmental factors will also be considered. An epidemiological study of cancer of the stomach is also being planned for Chile.

With respect to methodology, the first step would be to determine the reliability of existing information on stomach cancer. In well defined census tracts in cities the relation of stomach cancer cases to social

levels should also be studied, as has been done in England and the United States. Studies should be planned to try to find differences among social groups of the population. Also of great interest would be the testing of direct and indirect factors of possible etiological influence through both prospective and retrospective studies: food and alcohol habits, environmental factors, prevalence of acute and chronic diseases, particularly gastrointestinal.

2. Cervix Uteri

The reported rates for cancer of the cervix are unduly high in many countries of Latin America. In one area in Colombia almost 40 per cent of all cancer deaths among women are attributed to this disease. The high rates are not surprising since environmental circumstances known to be associated with increased risk (such as low socioeconomic status and early age at first sexual contact) are usual in these areas.

It would be desirable to identify high risk groups to permit screening for early detection of cervical cancer among those most likely to develop the disease. Studies for etiologic research in Latin America should feature characteristics of life which are not common in other countries. Specific recommendations for Latin America with regard to factors for study will depend on knowledge available in the region. Attention, however, is called to the value of identifying characteristic factors which may protect women from such cancers even though they live under circumstances which favor high rates.

For etiologic research, case-control studies would probably be most economical and most effective to identify predisposing or protective factors. Mass examinations for cancer detection (exfoliative cytology) could be used for studies in cancer epidemiology to determine the general level of the

disease of the populations in the districts under study. Evaluation of the influence of ethnic characteristics, or living or working conditions must also be sought so that different harmful environmental factors may be brought to light.

3. Skin

A relatively high frequency of skin cancer has been reported for most Latin American countries. The various groups of population involved have many racial, occupational and environmental differences which offer a good opportunity for epidemiological investigation. Through such study better application of technical knowledge in the prevention, diagnosis and treatment of cancer of this site would be possible. Research activity applied to any of these population groups would bring to light factors which also could bear upon epidemiological research of cancer affecting other sites.

Cancer of the skin seems to be more common in the groups of population living under a tropical sun but with variations in relation to fairness or darkness of the pigment of the skin and frequency of exposure to the sunlight. There are groups of population living at sea level as well as others in highlands, the latter group with greater exposure to cosmic rays. There are also populations that follow typical habits such as using large hats which serve to protect in this manner from excessive exposure to sunlight. The frequency of skin cancer seems to be influenced by occupational factors such as in the case of agricultural workers exposed not only to excessive sunlight but to large amounts of dust contaminated with particles of fertilizers, herbicides and insecticides.

Epidemiological research on cancer of the skin should be directed first to determining if the high frequency reported for certain groups of Latin American population such as Colombia and Costa Rica, is actually true. If

the high incidence reported is confirmed, there should be an investigation of the possible causative factors and the distribution by body area. Variations of age and sex, racial extraction, length of exposure to sunlight, occupation in agricultural fields, dust contamination and altitude should be taken into account. Comparison of morbidity in groups of population living at different land levels will necessitate studies on measurements of cosmic and ultra-violet rays at these different levels. Analysis of dust in agricultural fields for chemical contents may also be important to investigate.

4. Lung and Bronchus

Among males, but not among females, lung cancer seems to be such more common in Argentina, than in other countries of Latin America. In most other countries low but increasing mortality rates are being registered. In Buenos Aires Province, Argentina, the rates have been higher in the last decade than those in the United States. In the capital city, La Plata, which is included in the Inter-American Investigation of Mortality 36 per cent of deaths of males from cancer were of the lung and bronchus.

The marked contrasts in lung cancer mortality might profitably be studied in an area in Argentina and Costa Rica in relation to the factors mentioned below:

- a) Smoking habits.
- b) Exposure to air pollutions.
- c) Racial composition.

Assuming real differences exist, the following might be investigated:

- a) Smoking habits, with particular reference to type of tobacco,
 - (i) of cases and controls
 - (ii) of population samples.
- b) Air pollution as regards intensity and chemical composition.
- c) Residence and occupation histories of cases and controls.

The resources needed would depend on the scope and design of proposed studies and could probably be accurately assessed in the light of the experience accumulated. The procedures and findings from studies in the United States and Europe should be considered in designing the proposed study of lung cancer.

5. Esophagus

Information on differences in incidence and mortality of esophageal cancer are available from several countries in Latin America. South Brazil, Uruguay, Argentina, Chile and some areas of Colombia have high rates of this form of malignant disease. In one state of Southern Brazil almost one fourth of cancer deaths are assigned to the esophagus. Other sections of the Continent have comparatively low rates.

Previous study of cancer of the esophagus has been mainly directed towards investigation of living habits such as consumption of alcohol, ingestion of hot drinks and foods and diet. Environmental factors also have been considered and studied.

It is recommended that studies be undertaken in several areas in Latin America with both high and low rates of cancer of the esophagus. Special attention should be directed to living habits and exposure to environmental agents. In some areas unusual habits are already known which are thought to be associated with the occurrence of cancer of the esophagus. It is essential in such epidemiological studies to establish clearly the proper diagnosis of this condition since it is frequently confused with cancer of the stomach. Patients with symptoms such as dysphagia and pain require reference to a hospital for X-ray examination and for other special procedures.

6. Liver

The available evidence suggests that there is no excessive frequency of liver cancer in Latin America with the possible exception of Peru, parts of Ecuador, Brazil, Mexico and Jamaica. However, the picture is obscured by the fact that in some studies no distinction has been made between primary and secondary hepatic tumors and cancers of the extra hepatic biliary system.

The pathology and frequency of liver cancer should be clarified as well as its epidemiology. In many parts of Latin America, certain conditions exist which are reputed as possible predisposing factors - notably, childhood and adult malnutrition, viral hepatitis, schistosomiasis, and exposure to certain hepatotoxic agents. Cognizance should be taken of published studies and the collaborative investigation on cirrhosis of the liver and cancer in Cali, São Paulo and Mexico City. General pathological studies must be stressed for they are indispensable not only in indicating morphogenic pathways but also in determining the frequency of the disease. On such studies depend the interpretation of mortality and morbidity rates.

7. Biliary tract

Carcinoma of the biliary tract among women is reported to be higher than usual in certain areas of Latin America. Similar observations have been made among American Indian women and Mexican-born women living in the United States.

Clinical and pathological studies are needed to study the relationship of this cancer to gall stones and to the area of residence of affected women. Epidemiologic research into the etiology of gall bladder cancer is generally handicapped by low incidence. In areas with high frequencies, there is an unusual opportunity for a case - control approach with places emphasis on

studying medically the patients and controls to determine what historical and physiological factors are associated with the occurrence of cancers of the gall bladder. In addition to resources needed for epidemiological study, medical facilities and personnel should be available for detailed studies of body chemistry and physiology.

8. Urinary Bladder

There seems to be an unduly high mortality from this type of cancer in parts of Argentina but not, apparently, elsewhere in Latin America. If the existence of a focus of exceptional incidence is proved as further data are collected, it would seem highly desirable to investigate the occurrence in view of the possibility of identifying causative factors which has already been successfully achieved elsewhere with this form of cancer.

9. Oral Cavity

Statistical evidence exists that in some groups of population in Colombia and Venezuela cancer of the oropharynx has a high incidence. This malignant neoplasm also has a high incidence in India, Ceylon and Pakistan. These groups of population in South America have special habits, such as smoking with the lighted end of the cigar inside the mouth and chewing "coca leaves" with some calcium stone mixture or tobacco with lime. Similar habits have been described in other affected areas of the world.

These considerations justify a detailed study on the relationship between special habits and cancer of the oral and pharyngeal mucosa. Establishment of four geographical areas for investigation is proposed, each of approximately 100,000 inhabitants distributed as follows:

- a) One area in Colombia, a homogeneous population of mulattoes with similar living conditions, habits and environmental circumstances. In this area the cigar is smoked with the

- lighted end inside the mouth.
- b) A second similar area in Venezuela, different in race, environmental conditions, etc., but where the population has the same habit of smoking as in the Colombian area.
 - c) A third area at a high altitude, with Indian population living under completely different conditions, but with the habit of chewing "coca leaves". This area could be located in the Peruvian or Ecuadorian Andes, or in the southern part of the Colombian Andes.
 - d) A control area of homogeneous white or mestizo population in one of the departments of Colombia or Venezuela. (It could be located in some other country, but for purposes of administration of the project it is better to have it close to the other investigation centers.)

Possible environmental and other factors to study in the populations and among the cancer cases are the following:

- a) Ethnological characteristics.
- b) Age and sex.
- c) Nutritional factors.
- d) Living conditions.
- e) Addictions: Alcohol, smoking, etc., with detailed information of the age at which these habits began, the intensity, etc.
- f) Chemical studies of the composition of the materials used in these special habits.
- g) Dental hygiene.
- h) Histology and number of precancerous and malignant conditions found in the oropharynx.
- i) Concomitant pathology found in a single general examination.
- j) Mortality rates in these groups of population.

EDUCATION AND TRAINING

Throughout all parts of the discussions, the subject of education and training was often inserted as an indispensable element for developing epidemiological research. It was agreed that there was a great need in all Latin American countries to raise the level of knowledge and understanding of epidemiology and cancer among faculty members of medical schools, medical students, specialists, and general practitioners and to increase the awareness of the cancer problem on the part of responsible governmental authorities. Education for three groups was discussed - first, for medical (and dental) personnel including faculty members, medical students, specialists and general practitioners; second, for analysts including epidemiologists and biostatisticians; and third for medical record librarians, interviewers and other staff.

It was recommended that a conference of representatives of all Medical Schools in Latin America consider the best means of integrating the teaching of cancer in the curriculum, stressing the epidemiological approach. It was further proposed that the Schools of Public Health should also be encouraged to give more emphasis to cancer and other chronic diseases as public health responsibilities and as problems to be faced on a community basis.

Methodology suggested for teaching in the medical school curriculum includes the following: the establishment of cancer committees composed of professors of pathology, medicine, surgery, radiology and preventive medicine; establishment of tumor boards; increased teaching of epidemiology of chronic diseases in Departments of Preventive Medicine; opportunities for students to participate in field epidemiology and in epidemiological research under supervision of a medical school or school of public

health; intensive training during internship on a cancer service or in a tumor clinic or institute.

Among specialist personnel in short supply in Latin America are pathologists (including cytologists and hematologists), radiologists and internists and surgeons trained in endoscopic techniques. Establishment of regional centers for specialty training in Latin America is recommended as a direct method of attack on the training problem.

Refresher courses emphasizing methods of diagnosis, the need for referral and consultation team work, periodic medical examinations, the value of early detection and collaboration with cancer control activities are suggested as methods for improving the level of knowledge of general practitioners in the field of cancer. Improvement in coordination of cancer work in general hospitals through development of cancer clinics and units for consultation on diagnosis and treatment is urged. The preparation and distribution of cancer information and visual aid material are to be encouraged.

RECOMMENDATIONS

In summary, the participants of the Planning Conference made the following recommendations to the Pan American Health Organization for developing cancer control activities and epidemiological research on cancer in Latin America.

1. As soon as resources are available, the Organization should begin to provide consultation services in the field of epidemiology and cancer control.
2. The Organization should assist in the identification and assessment of suitable experimental or demonstration areas for study of special problems in cancer.
3. The criteria suggested at the meeting for improving mortality statistics and for developing morbidity statistics should be used by the Pan American Health Organization as guidelines.
4. The Pan American Health Organization should obtain on a periodic basis a minimum amount of comparable information on morbidity and mortality from cancer, and circulate reports of special interest. The need for international data for comparative purposes should be stressed.
5. In developing epidemiological investigations the Pan American Health Organization should help to establish definitions, standards of clinical and pathological diagnosis, and epidemiological methodology to produce comparability among the study areas.
6. Collaborative epidemiological investigations into the incidence and causes of cancer of four sites with high morbidity or mortality should be designed and initiated in several areas in Latin

America. The four sites recommended for study are the stomach, cervix uteri, skin and lung.

7. Investigations should be planned in selected areas on cancers of five sites of unusual interest or unusual geographical distribution. These include the esophagus, liver, gall bladder and biliary tract, urinary bladder and oral cavity.
8. An Inter-American reference center for pathology should be established in connection with the centers in Latin America for research training in pathology now being proposed by the Pan American Health Organization. Such a center would assist epidemiological investigators by setting up standards and assessing the comparability of pathological material.
9. A meeting for faculties of medical schools in Latin America should be convened to plan for integration of the teaching of cancer throughout the curriculum of schools of medicine, stressing the epidemiological approach.
10. The Organization should encourage schools of public health in Latin America to give more emphasis to cancer and chronic diseases as health responsibilities to be faced on a community basis.
11. Research training centers for epidemiology and biostatistics should be established in Latin America in close association with schools of public health and health services.
12. The plans of the Organization for training medical record librarians in Latin America should be expedited to improve as rapidly as possible the quality of hospital morbidity data.

Appendix A

PLANNING CONFERENCE ON EPIDEMIOLOGICAL RESEARCH ON CANCER IN LATIN AMERICA

Lima, Peru
February 25 - March 1, 1963

List of Participants

- Dr. Augusto Buendía Ferro, Executive Secretary, National Committee of the Campaign Against Cancer, Ministry of Health, Bogota, Colombia
- Dr. Walter Burdette, Head, Department of Surgery, College of Medicine of the University of Utah, Salt Lake City, Utah, U.S.A.
- Dr. Eduardo Cáceres, Director, National Institute of Cancer, Ministry of Health and Welfare, Lima, Peru (Chairman)
- Dr. Robert Dyar, Chief of the Division of Research, California State Department of Public Health, Berkeley, California, U.S.A.
- Dr. Mario Gaítan Yanguas, Director, National Cancer Institute, Ministry of Health, Bogota, Colombia
- Dr. Carlos Luis González, Technical Advisor, Ministry of Health and Social Welfare, Caracas, Venezuela
- Dr. Edgar Grossman, Medical Chief, Cancer Division, Ministry of Health and Social Welfare, Caracas, Venezuela
- Dr. Carlos Gutiérrez, Director of the Campaign Against Cancer of the Ministry of Public Health, San José, Costa Rica
- Mr. William Haenszel, Chief, Biometrics Branch, Office of Field Studies, National Cancer Institute, Bethesda, Maryland, U.S.A.
- Dr. J. R. Heller, President, Memorial Sloan-Kettering Cancer Center, New York, N. Y., U.S.A.
- Dr. John Higginson, Chairman, Geographical Pathology Committee, International Union Against Cancer, Kansas City, Kansas, U.S.A.

- Dr. Daniel Joly, Chief, Department of Surgery, National Cancer Institute,
Buenos Aires, Argentina
- Dr. Robert Miller, Chief, Epidemiology Branch, Office of Field Studies,
National Cancer Institute, Bethesda, Maryland, U.S.A.
- Dr. Antonio Mirra, Director, General Cancer Register, Association Against
Cancer, São Paulo, Brazil
- Dr. Juan Moroder, Chief, Division of Cancer and Chronic Diseases, National
Health Services, Santiago, Chile
- Dr. Gregory O'Connor, Laboratory of Pathology, National Cancer Institute,
Bethesda, Maryland, U.S.A.
- Dr. Antonio Prudente, Director, Cancer Section, Ministry of Health, Rio
de Janeiro, Brazil
- Dr. Margaret H. Sloan, Special Assistant to Director, National Cancer
Institute, Bethesda, Maryland, U.S.A.
- Dr. Donald Watler, Medical College of the University of the West Indies,
Kingston, Jamaica

PAHO - STAFF

- Dr. Raymond B. Allen, Chief, Office of Research Coordination, Washington,
D.C., U.S.A.
- Miss Mary H. Burke, Statistician, Health Statistics Branch, Washington, D.C.,
U.S.A.
- Dr. A.V. Chaklin, Chief, Cancer Unit, Geneva, Switzerland*
- Dr. José Coll, Statistical Consultant, Zone IV, Lima, Peru
- Dr. G.W. Griffith, Epidemiologist, Health Statistics Branch, Washington,
D.C., U.S.A.
- Dr. Ruth R. Puffer, Chief, Health Statistics Branch, Washington, D.C., U.S.A.
- Dr. Raúl Vargas, Statistical Consultant, Zone VI, Buenos Aires, Argentina

* WHO

Appendix B

PLANNING CONFERENCE ON EPIDEMIOLOGICAL RESEARCH ON CANCER IN LATIN AMERICA

Lima, Peru

February 25 - March 1, 1963

Agenda

I. Current Epidemiological Activities on Cancer in Latin America
(Reports by Participants from Latin American countries)

II. Relation of Epidemiological Research and Cancer Control Programs

Dr. J.R. Heller, President, Memorial Sloan-Kettering Cancer Center,
New York, N.Y.

III. Present Research Activities of the World Health Organization

- A. Incidence Studies
- B. Ad hoc Epidemiological Studies
- C. International Reference Centers for Histological Nomenclature
and Classification

Dr. A.V. Chaklin, Chief Medical Officer, Cancer Unit, World Health
Organization, Geneva

IV. Epidemiological Research by the National Cancer Institute of the
United States Public Health Service

A. Epidemiological Research Supported through the Extramural Program
of the National Cancer Institute

Dr. Margaret Sloan, Special Assistant to the Director, National Cancer
Institute

B. Epidemiological Research Supported by the Intramural Program
of the National Cancer Institute

1. Demographic Studies

Mr. William Haenzel, Chief, Biometrics Branch,
Office of Field Studies, National Cancer Institute

2. Epidemiological Studies

Dr. Robert Miller, Chief, Epidemiology Branch, Office of Field Studies
National Cancer Institute

3. Role of Pathology Laboratory in Epidemiological Studies

Dr. Gregory O'Connor, Laboratory of Pathology, National Cancer Institute

- V. An Example of a Health Department's Role in the Cancer Research Program
Dr. Robert Dyar, Chief of the Division of Research, California State Department of Health
- VI. Activities in Geographical Pathology of the International Union Against Cancer
Dr. John Higginson, Chairman, Geographical Pathology Committee, International Union Against Cancer
- VII. Inter-American Investigation of Mortality of the Pan American Health Organization
Dr. G.W. Griffith, Epidemiologist, Health Statistics Branch, Pan American Health Organization
- VIII. Needs for Training of Research Personnel
 - A. Training in Epidemiology and for Epidemiological Research in Venezuela and Other Areas of Latin America
Dr. Carlos Luis González, Technical Advisor, Ministry of Health and Social Welfare, Caracas, Venezuela
 - B. The PAHO Proposal for Training of Research Workers
Dr. Raymond B. Allen, Chief, Office of Research Coordination, Pan American Health Organization
- IX. Discussions in Working Groups
 - A. Morbidity and Mortality
Dr. Robert Dyar, Chairman
 - B. Epidemiological Investigation
Dr. J.R. Heller, Chairman
 - C. Education and Training
Dr. Carlos Luis González, Chairman
- X. Recommendations for Cancer Research Program to be Presented to the Advisory Committee on Medical Research of the Pan American Health Organization.