

# INITIAL PHASES OF THE INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD<sup>1</sup>

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*The Inter-American Investigation of Mortality in Childhood will lead to a better understanding of the health problems in infancy and early childhood in the Americas, and will lay the bases for effective action "to reduce the present mortality rate in children under 5 years of age by one half"—one of the goals of the Charter of Punta del Este.*

## Introduction

The Inter-American Investigation of Mortality (1), carried out under the auspices of the Pan American Health Organization in the years 1962-1967, clearly demonstrated the value of coordinated continental research. Each city included in the studies appeared to have its distinct pattern of mortality in adult life (15-74 years of age). The Investigation indicated clearly that additional information was available in hospital and autopsy records which, when combined with the clinical data, made possible a more precise definition of the cause of death. The analyses of the data resulted in recommendations relevant to (a) preventive actions, (b) epidemiological research, and (c) development and improvement of standard procedures.

That first large collaborative project revealed excessive mortality in Latin American cities in the productive period of adult life, 15-44 years. It showed also that death rates in young adult life in these large cities, of which six were capitals of countries, were

much lower than in the rural areas of the countries. Thus, the results indicated that preventive actions were needed also in rural areas where more than half the population lives.

Mortality in infancy and early childhood is known to be responsible for excessive death rates in Latin American countries (2). One of the objectives of the Charter of Punta del Este (3) was "to reduce the present mortality rate in children under 5 years of age by one half." Also, the recent deceleration of the decline of the infant death rate in the United States of America has been a matter of increasing concern to national health authorities (4). Coordinated continental research was therefore proposed in order to gain a greater understanding of the problems in infancy and early childhood, in both urban and rural areas in the Americas. The development of such coordinated research was one of the recommendations made by the collaborators who took part in the Investigation of Mortality of adults.

The proposal for the Inter-American Investigation of Mortality in Childhood, which was submitted by the Pan American Health Organization to the U.S. Agency for International Development in January 1966, was approved by the Advisory Research Committee of that Agency and a grant for the planning phases was awarded in July 1966.

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## Objectives and Methods of Procedure

The over-all objective of the research proposal is to carry out in selected communities an Inter-American Investigation of Mortality in Childhood for the purpose of developing death rates in infancy and early childhood which are as accurate and comparable as possible, taking into account nutritional, sociological, and environmental factors. In order to analyze the underlying and associated causes of death and to study the interrelationships of infectious diseases, nutritional deficiency states, and sociological factors, complete data on deaths in children under 5 years of age are being collected in accordance with standard definitions and procedures. To study and compare biologic and social differences in those who died in early childhood and in those who live, data on living children under 5 years of age are being collected through probability sampling of households and of children under that age.

The deaths of infants and young children are being investigated through interviews in the homes, hospitals, and clinics and with physicians so as to obtain a complete record of the fatal illness, results of laboratory and other examinations, and autopsy findings. In order to evaluate the factors resulting in death of these infants and young children, information is being collected on the pregnancy history, condition of the infant at birth, breast feeding, growth and development, and social and environmental conditions. In each area selected for study, from 650 to 2,000 deaths will be investigated each year for two years (24 consecutive months). Rural as well as urban areas are being covered in many of the projects. The number of deaths included in the study in each area is dependent in part on the size of the death rate and in part on the density of population. High altitude areas, as well as those with serious nutritional problems, have been included.

Similar information on pregnancy history,

condition of the infant at birth, breast feeding, growth and development, and environmental conditions is being collected for a group of living children in the study areas on a sample basis. The two-year period is portioned into 24 one-month periods and in each of these periods a sample of households and living children will be drawn. Strict probability sampling techniques are being used for the selection of households and completion of questionnaires on all children under 5 years of age. The number of children included for each of two years will vary from 650 to 1,000.

In order that the research program may benefit both medical education and health programs, the projects are being developed in schools of medicine and public health with the collaboration of health services.

## Planning Phase

This Inter-American Investigation of Mortality in Childhood is far more ambitious than the previous study of mortality in adult life. An important feature has been the establishment of the planning phase for the pilot testing of the basic questionnaire and of procedures. The original proposal set a period of 18 months for the planning phase and funds for this period were provided by the Agency for International Development in July 1966.

After exploration of areas for pilot testing and possible collaborators, an initial Working Group was convened from 17-20 October 1966 to review a draft questionnaire and discuss procedures for pilot testing. Twelve participants from Brazil, Colombia, Guatemala, Jamaica, the United States, and Venezuela attended the Working Group.

Pilot testing was undertaken in five areas in Latin America beginning in January 1967—in Recife and Ribeirão Preto, Brazil, and in Colombia, Guatemala, and Jamaica. Also, the interviewers of the National Morbidity Survey of the United States tested

the questions in North Carolina. Tabulations of data were prepared from the first 700 completed questionnaires from five Latin American projects. The inclusion of two rural areas was not justified, owing to the lack of diagnostic evidence and medical attention. The tabulation of deaths by age group revealed incompleteness of registration of deaths in the first day of life in two areas, which indicated the failure to follow the World Health Organization definition of a live birth. In several areas relatively high proportions of the deaths and also of births of those children who died occurred in hospitals and thus medical data should be available. However, deficiencies in the hospital records indicated the need for improvement of the record systems in hospitals and short courses have been or are being provided for the personnel in charge of medical records. The information being collected on piped water service and toilet facilities was adequate. On the whole the pregnancy histories of the mothers were completed well, a fact which indicated the competency of the public health nurses and social workers in this field. A large proportion of previous pregnancy losses either as abortions, fetal deaths or death of a child born alive, were found in the mothers of dead children studied. In one city 42 per cent of the previous pregnancies resulted in death either before or after birth. Birth weights were recorded for more than three-fourths of the births of those children who died under 5 years of age in Recife and Ribeirão Preto, Brazil, and the records were incomplete in other areas. Thus efforts should be made to establish weighing of infants as routine practice.

Data were obtained on the duration of breast feeding, and for those babies who lived 6 months or longer the duration of breast feeding was analyzed. In Recife breast feeding was discontinued frequently within the first three months (56 per cent) and in only 15 per cent was it continued as long as 6 months. In contrast, in Jamaica

in slightly more than half of the group breast feeding extended for 6 months or longer and in only 14 per cent was it discontinued in the first 3 months of life. The information on this item was incomplete in more than 10 per cent of the deaths studied. Since nutritional assessment is an important aspect of this Investigation, complete information on breast feeding and the introduction of other milk and food is essential.

The proportion of the deaths with autopsies was relatively high in three areas: Recife (36 per cent), Ribeirão Preto (40 per cent), and Jamaica (48 per cent). The pilot project indicated the need not only to improve the quality of pediatric pathology but also to extend it to higher proportions of deaths of infants and young children.

Information on the degree of malnutrition is very useful and in two areas (Recife and Ribeirão Preto) data on this item were lacking in only one-fifth of the deaths. However, standard procedures were needed and greater attention should be given to assessment of nutritional status. The underlying and associated causes of death were classified in accordance with the 1955 Revision of the *International Classification of Diseases*. In the age group from one month through 4 years, nutritional deficiency was the underlying or associated cause of death in from 19 to 56 per cent of the deaths in five areas. Thus the role of nutritional deficiency as a contributor to mortality in early childhood will be clarified in this Investigation. In areas with relatively satisfactory autopsies, congenital anomalies were shown to contribute heavily to mortality. The original plans for the control group were revised and a more practical sampling program than the one originally visualized was developed. Thus the planning phase and the pilot testing have indicated the steps necessary to establish a satisfactory research program.

In 1967 staff of the Pan American Health Organization searched for suitable areas and collaborators for participation in the Investigation. Applications were received and

specific plans made for the research project in Latin America. A project in a Central American country was included in the proposal. In July 1968 an application of El Salvador was received and immediate plans were made to include this area in the Investigation. An application for support of the program for the four years 1968-1972 was submitted to the Agency for International Development on 28 July 1967.

The results of pilot testing were reviewed by a small Working Group from 4-8 December 1967 and revised questionnaires were developed for further testing in January, February, and March 1968. Also, several sections of the proposed Manual of Procedures were discussed in order to prepare for the rapid development of the field work when funds became available.

On 30 January 1968 the document supporting the Investigation for four years was signed in the Agency for International Development and on 11 March the Director of the Pan American Sanitary Bureau signed the agreement for funding the first 15 months of the project.

#### Planning Conference of Principal Collaborators

The Planning Conference was held in the Department of Preventive Medicine and Public Health, School of Medicine, of the University of Valle in Cali, Colombia, 25-29 March 1968. In addition to principal collaborators, medical interviewers from six projects and two potential collaborators from the United States attended the meeting. There were also several participants from the School of Medicine and the health services in Colombia and from the Pan American Health Organization.

One of the reasons for holding the Conference in Cali was that the procedures used in the pilot testing program could be demonstrated to the group. Also, the Preventive Medicine Department had made such community-centered research an important part

of the training program of residents. A third reason was that the procedures and the findings of the Study on Health Manpower and Medical Education (5), recently completed in Colombia, were pertinent for this group of investigators. One of the Study's important phases was a national health survey of the same type as the probability sampling of households and of children under 5 years of age included in the present Investigation.

One of the directors of the Study on Health Manpower and Medical Education, from the Ministry of Health, attended the Planning Conference and described the national health survey, explaining the objectives, characteristics, sampling methodology, operational procedures and completeness achieved, as well as some of the results. This was a pilot study and its success demonstrated the usefulness and feasibility of employing sampling methods in Latin America and gave support to the sampling methodology recommended for the present Investigation. A deep understanding of the purposes and objectives of the study had been acquired by the professional groups through their involvement. Medical and nursing students and resident physicians had participated in various phases. The importance of the involvement of both groups—medical education and health services—was emphasized because in this new Investigation similar close relationships of personnel, including specialists in several fields of medical education and health services, will strengthen the program and ensure use of the products and subproducts.

A recent publication (6) of the Ministry of Health, *Hechos demográficos*, illustrated well the use of data on fertility from the health survey. This report also showed the incompleteness of current registration of births and of baptisms in Colombia. Only 62.0 per cent of the children born were recorded as baptisms in the country in 1965-1966, and on the basis of registrations, only 62.2 per cent. Thus the deficiency in current registration of live births is great and

methods of obtaining information on each birth currently are essential. Even when total baptisms including those of births which occurred in previous years were compared with the household survey, an 8 per cent deficiency remained.

The plans for sampling of households and of living children under 5 years of age were outlined by the consultant on sampling. For probability sampling in each area detailed maps are necessary, showing boundaries and estimates of households in each block of the study area. Fortunately, satisfactory data are available in nearly all of the study areas.

In accordance with the program of the Conference, the questionnaires for collection of data regarding deaths and samples of households and living children under 5 years of age were reviewed. As a result, revised questionnaires and instructions for their use were prepared and released in early May. Also, the Manual of Procedures was discussed and in its final form was released to the principal collaborators in May.

In addition to the principal collaborators, specialists in pathology, pediatric pathology, pediatrics, nutrition, preventive medicine, epidemiology and statistics (from the faculty of the University of Valle and from the Pan American Health Organization) participated in the discussion of specific phases of the program and stressed the contributions of their fields to the Investigation as well as the benefits.

An example was given of local collaboration in connection with births and deaths. The Director of the Municipal Health Department in Cali, Colombia, who attended the Conference, will have local responsibilities in regard to the records of births and deaths and also he will benefit from the program.

Assessment of nutritional status is an important phase of the Investigation. Although nutritional deficiencies contribute to morbidity and mortality they are not reflected in the official statistics. However, in this Investigation in which the underlying and

associated causes of death are analyzed, the pilot testing has indicated that the role of nutritional deficiency will be clarified. Also, data covering dietary histories, including breast feeding, and anthropometric measurements will be obtained. The living children are being weighed and their arm circumferences measured. Also, the degree of malnutrition based on weights and clinical observations will be classified using the scale proposed by Gómez (7,8) and the weight standards from Harvard (9). The *Assessment of the Nutritional Status of the Community* (10) by Jelliffe is a useful reference and a copy has been provided to each collaborator.

A half day of the Conference, arranged by the professor of pathology of the School of Medicine of Cali, was devoted to a discussion in which emphasis was placed on the importance of pathological findings in this research program. There was common agreement on the need to include the largest possible number of autopsies. The situation in regard to pathologists in each area was described and will receive further study by the principal collaborators.

Since the hospitals and health centers are sources of information on the medical care rendered to the children and also sources of data on births and deaths, the development and improvement of hospital and clinic records received attention. Courses for personnel responsible for hospital records have been or are being given in Cali, Recife and Ribeirão Preto, and in La Paz, Bolivia. Staff of the Pan American Health Organization render consultant services in this field.

The methods of coordination of the projects at local, national, and continental levels are being developed. Local coordinating committees are already in operation in the pilot testing areas and have been recommended for all areas. There is need for national coordination when there is more than one study area in a country—such as in Argentina, Brazil, and Colombia—and it should involve the Ministries of Health and

Associations of Faculties of Medical Schools. The Pan American Health Organization, through its central and field staff, is assisting with coordination.

In Colombia, the Minister of Health and personnel of the Ministry, the Executive Director of the Colombian Association of Medical Schools, the Director of the National Institute of Nutrition, the principal collaborators of the three projects in the country, and personnel of the Central Office of PAHO, participated in a meeting called by the Minister with the purpose of defining the mechanisms of coordination at the national level. Significant collaboration has been obtained from the participant institutions as a result of this meeting. Similar meetings are planned for early 1969 in Argentina, Brazil, and Jamaica.

Medical interviewers from six projects attended the Planning Conference in Cali and interviewers from five other projects and three collaborators were present at a meeting especially planned for medical interviewers in the Department of Preventive Medicine of the University of São Paulo in Ribeirão Preto from 3-9 April 1968. The principal collaborators and medical interviewers were greatly concerned with their responsibilities in conducting the research program. Both meetings proved to be very profitable, serving to familiarize the staffs with the several objectives of the investigation and with methods of study of deaths and samples of living children and of establishing complete files of births and deaths.

#### Principal Collaborators and Projects

Thirteen principal collaborators and areas in Latin America have been selected for inclusion in the investigation. A brief description of each area follows:

*Argentina, El Chaco.* Ten Departments of Chaco Province which include both urban and rural areas will be included in the investigation. This Province, in the northern part of Argentina, lies in the River Plate

Basin and the results of the research program will contribute statistical data, as complete and accurate as possible, for an understanding of the problems in childhood in that area. Dr. Rubén A. Castro, statistical adviser to the Ministry of Health in the Province and professor of hygiene and social medicine of the University of the Northeast (Corrientes), is the principal collaborator.

*Argentina, San Juan.* The entire Province of San Juan, located in the central-western region of Argentina bordering with Chile, is included in the study. Of the estimated population of 400,000, 55 per cent live in urban areas and around 57,000 inhabitants live in four small valleys in the Andes at a high altitude. Dr. Valois Martínez C., the director of health of the Province, will be the principal collaborator and Dr. Neri Romero the assistant collaborator. Dr. Romero is also a professor in the Department of Preventive Medicine of the University of Cuyo in Mendoza, the medical center for this area of Argentina.

*Bolivia, La Paz.* The project in Bolivia at a high altitude will include approximately 2,000 deaths per year from La Paz and from Viacha, a small community of 6,000 inhabitants. Dr. Gregorio Mendizábal, professor of public health at the San Andrés University and director of the Office of Planning of the Ministry of Public Health, will be the principal collaborator.

*Brazil, Recife.* The project will be carried out in three urban zones, Casa Amarela, Encruzilhada, and Beberibe, with a total population of 430,000. The project headquarters will be in the new Institute of Infant Medicine of Pernambuco (IMIP). Pilot testing has already been successfully carried out in Recife. The principal collaborator is Dr. Fernando Figueira, professor of pediatrics of the School of Medicine of the Federal University of Pernambuco.

*Brazil, Ribeirão Preto.* The area for the investigation will include the small city of Ribeirão Preto, situated in the interior of São Paulo State, and five municipalities

surrounding the city, with about 650 deaths per year. Dr. José Romero Teruel, the principal collaborator from the Department of Preventive Medicine of the School of Medicine of Ribeirão Preto, has conducted pilot testing using residents in preventive medicine and social workers.

*Brazil, São Paulo.* The area for the Investigation will be the city of São Paulo, where a sample of deaths will be obtained. Dr. Ruy Laurenti of the Department of Applied Statistics of the School of Public Health, and also of the Internal Medicine Department of the School of Medicine of the University of São Paulo, will be the principal collaborator.

*Chile.* The area for the Investigation will include both urban and rural populations of Santiago and nearby zones from which a sample of deaths will be selected. Infant mortality has remained high in Chile (101.4 per 1,000 live births in 1966). Thus efforts will be directed to a thorough investigation of the situation (with some additional questions) as the basis for orienting the program to the vulnerable groups. Dr. Adela Legarreta, the principal collaborator in the earlier Investigation, will also serve as principal collaborator in this one. She is on the faculty of the Department of Biostatistics of the School of Public Health.

*Colombia, Cali.* Dr. Guillermo Llanos of the Department of Preventive Medicine of the School of Medicine, University of Valle, who also participated in the previous Investigation, will be the principal collaborator and will assist also in the development of the projects in Cartagena and Medellín. In Cali, one out of every two deaths will be included in the Investigation, as will all deaths in Florida, a rural area with 24,000 inhabitants. The residents in preventive medicine and in pediatrics will participate in the program. The involvement of three medical schools in Colombia—in the Pacific, Atlantic, and Central Regions—was planned in order to have an effect on medical education and health programs similar to that

produced by the recently completed Study on Health Manpower and Medical Education. The projects are relatively small (in cost as well as in numbers of deaths investigated) but they should make an important contribution to both medical education and health services in Colombia, a country in which there is great interest in such research.

*Colombia, Cartagena.* The small coastal city of Cartagena, which has 275,000 population, will be the area for the study. Dr. Abel Dueñas, Dean of the Medical School of the University of Cartagena and also Chief of the Department of Preventive Medicine, will be the principal collaborator.

*Colombia, Medellín.* A sample of one out of every 5 deaths in Medellín, or approximately 700 deaths per year, will be included in the study. Dr. Julio León Trejos, chief of health administration of the School of Public Health of the University of Antioquia, will be the principal collaborator.

*El Salvador.* The project will be carried out in the city of San Salvador with a population of 317,570, of which about 53,350 are children under 5 years of age, and in three small rural communities (Apopa, Nejapa, and Quezaltepeque) with a population of 55,677, of which 15,325 are under 5 years of age. All deaths of children under 5 years of age occurring in the area will be studied; these amount to approximately 1,100 per year. The principal collaborator is Dr. Eduardo Suárez, professor of pediatrics of the School of Medicine of El Salvador, and the associate collaborator is Dr. Carlos A. Sagastume, director of the Division of Statistics of the National Health Department.

*Jamaica.* The area for the Investigation will have two major divisions, Metropolitan Kingston and rural St. Andrew, in which the number of deaths to be investigated will be nearly 2,000 per year. Dr. Kenneth Standard, Head of the Department of Social and Preventive Medicine of the University of the West Indies, will be the principal collaborator.

*Mexico, Monterrey.* The plan in Monter-

rey is to study all deaths in the city. Dr. Dionisio Aceves, professor of preventive medicine of the University of Nuevo León, will be the principal collaborator for this project.

*Other Areas.* In several other areas interest has been expressed in the inclusion of projects in this collaborative continental study. However, financial support would be needed from an agency other than the Agency for International Development, which provided the funds for the 13 projects in Latin America. A project in California has received financial support from the U.S. Children's Bureau and has been included in the Investigation. The principal collaborator is Dr. Ira Gabrielson of the Division of Maternal and Child Health of the School of Public Health of the University of California, which is under the direction of Dr. Helen Wallace. Six counties—San Francisco, San Mateo, Alameda, Contra Costa, Solano, and Marin—with a population of about three million, of which 10 per cent are children under 5 years of age, will be used for the study of 500 deaths per year (excluding deaths in the first week of life). This project will be started in 1969.

The areas of the 14 projects are shown on the accompanying map of the Hemisphere. All of these field projects have been designed so that they involve and will benefit medical education and health services.

### Field Investigations

In each project the principal collaborator directs a small team consisting of at least two physicians, two public health nurses or social workers, and secretarial staff. For each death under 5 years of age included in the Investigation a home visit is made by the public health nurse or social worker to obtain information (1) regarding the illness leading to death, facts about birth, breast feeding, weaning and foods added to the diet, medical attention received; (2) regarding the mother, her pregnancy history, medi-

cal attention, and complications of pregnancy and birth; (3) regarding both parents, age, education, occupation; and (4) regarding housing and the household in which the child lived (or of the mother).

The medical interviewer completes pages 4 to 8 of the questionnaire utilizing hospital, clinic and autopsy records and interviews of physicians, and for deaths without medical attention conducts interviews in the home to obtain data regarding the fatal illness in order to determine the underlying cause and associated causes of death. Efforts will be made to obtain the weight at birth, any additional weights of the child, and a clinical evaluation of nutritional status.

The last page of the questionnaire is designed for a summary of the diagnostic information leading to the assignment of the underlying and associated causes of death. The medical interviewer prepares such summaries. These in turn are reviewed at staff conferences in which the principal collaborator, medical interviewer, nurse interviewer, pathologist, pediatrician, statistician, and other members of the team participate.

The field investigation also includes visits to a sample of living units selected in advance according to the probability sample design for the same area. A consultant on sampling visited the pilot testing projects in 1967, prepared the plans for sampling, attended the Planning Conference, and visited 12 areas in Latin America to assist in the selection of samples. Additional consultant services have been rendered to the projects in Argentina, Bolivia, Chile, Colombia, and São Paulo, Brazil, by experts trained at the Sampling Training Center of the University of Michigan. All of them have followed the same standardized methodology.

During each month, 60-100 living units are being visited by the public health nurse or social worker. Page 1 of the questionnaire for the sample has spaces for recording the members of the household, housing, occupation of those employed, and vital events in the past year, that is, during the



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12 months prior to the interview. This record includes live births, fetal deaths, and pregnancies of each woman 15-49 years of age and deaths of members of the household.

For each living child under 5 years of age in the sample, page 2 of the questionnaire is being completed with data regarding the parents, pregnancy history of the mother, place of and attendance at birth, weight at birth, breast feeding, weaning, addition of foods to the diet, and medical attention received—that is, data similar to that obtained for the dead child. For the living

child two measurements for evaluation of nutritional status, weight and arm circumference are obtained at the time of the home visit.

In order to obtain accurate data on infant mortality each area will establish files of births, deaths, and fetal deaths. In addition to the official records of births and deaths (the certificates), all possible sources will be used to find additional births and deaths, such as hospitals, midwives, health departments, church records, baptisms, cemeteries, etc. All areas will use the World

Health Organization definition of a live birth, irrespective of local practice. Careful checks will be made to secure birth records of all infants who die shortly after birth and also records of fetal deaths of those who show no signs of life in accordance with the WHO definition. Perinatal mortality, that is, the combination of fetal deaths (28 weeks of gestation and over) and deaths under 7 days, will be analyzed.

For calculation of infant death rates a complete count of births is required. If facilities for tabulation of data from birth records are not available locally they will be processed in the PAHO Central Office. Consultant services are being and will be provided in order to ensure satisfactory local procedures for finding births, deaths, and fetal deaths and for maintaining these files.

Another important phase of the field work involves the extension of autopsies to as large a portion of the deaths as possible and the obtaining of complete pathological information. The availability of pathologists varies but it is hoped that during the period of the Investigation special efforts will be made to have residents in pathology assigned to pediatric pathology.

#### Procedures in the Central Office

Completed questionnaires are being transmitted monthly for processing in the PAHO Central Office. They will be reviewed at once and the information coded for transfer to punch cards and tape for processing by electronic computer. The assignment of the underlying and associated causes of death will be carried out in accordance with procedures developed by the medical referee (Dr. Darío Curiel). These assignments will be made in accordance with the 1965 Revision of the *International Classification of Diseases*. This phase of the Investigation is receiving special attention as rules for assigning multiple causes are being developed. Through this extensive study of deaths in infancy and childhood, it is expected that the Investigation will contribute to international

rules which will be considered for the 1975 Revision.

#### Second Meeting of Principal Collaborators

From 6-10 October 1968 a meeting was held in Caracas, Venezuela, with the participation of the principal collaborators of the 13 projects in Latin America, the director of the Latin American Center for Classification of Diseases, the medical referee of the Investigation, and personnel of the Pan American Health Organization. The main purpose was to discuss the provisional rules for classification and coding of multiple causes according to a basic Manual prepared for this purpose. During the meeting additional principles and recommendations were stated. The basic document is in the process of revision for use in the Investigation.

Through these discussions the importance of complete diagnostic information became clear to all principal collaborators. The progress reports of all projects revealed several common problems in the collection of data and the meeting offered an opportunity to discuss solutions to such problems.

Preliminary findings in the initial stage of the Investigation reported by the collaborators from Recife and La Paz revealed high mortality due to epidemics of measles in these areas. These findings constituted the basis for recommendations made at the Special Meeting of Ministers of Health of the Americas (11), in Buenos Aires in late October 1968, in the sense of establishing vaccination programs against measles in the Latin American countries. Also, a resolution for support of the Investigation and use of the results in maternal and child health programs was approved by the Ministers of Health.

#### Timetable of Activities

For the 13 areas in Latin America described earlier, agreements were signed by the Director of the Pan American Sanitary Bureau, by the Ministers of Health, and by

the Deans of Medical Schools in the participating countries. The projects are planned for the collection of data covering 24 months. It was agreed that all areas should begin the collection of data at the same time, namely, 1 July 1968, following a period of training of staff in June. However, because of various circumstances the initiation of training and of collection of data varied in the different areas of the Investigation as follows:

Argentina:	Chaco	September
	San Juan	August
Bolivia:	La Paz	July
Brazil:	Recife	June
	Ribeirão Preto	June
	São Paulo	June
Chile:	Santiago	June
Colombia:	Cali	June
	Cartagena	June
	Medellín	June
El Salvador:	San Salvador	August
Jamaica:		May
Mexico:	Monterrey	July

Processing of data will be carried out currently and each project will forward completed questionnaires of deaths and of samples monthly. Tabulations and analyses of data for the first year should be available in 1970 and for the two years in 1971.

Two characteristics of this research project are important for its success. First, the collaboration and participation of specialists in several fields such as pediatrics, nutrition, pathology, preventive medicine, epidemiology and statistics will strengthen the project and will benefit both medical education and health programs. Second, the establishment and maintenance of high standards

of operation of every phase of the project are essential in this Investigation.

### Summary

The over-all objective of the Inter-American Investigation of Mortality in Childhood is to develop death rates in infancy and early childhood which are as accurate and comparable as possible, taking into account nutritional, sociological, and environmental factors. Complete data on deaths in children under 5 years of age are being collected in accordance with standard definitions and procedures in order to analyze the underlying and associated causes of death and to study the relationships of infectious disease, nutritional deficiency states, and sociological factors. To study and compare biologic and social differences in those who died in early childhood and in those who live, data on living children under 5 years of age are being collected through probability sampling of households.

The deaths of infants and children under 5 years of age are being investigated through interviews in homes, hospitals, and clinics and with physicians so as to obtain a complete record of the fatal illness, results of laboratory and other examinations, and autopsy findings.

In each area selected for study, from 650 to 2,000 deaths will be investigated each year for two years. The number of deaths included in the study is dependent in part on the size of the death rate and in part on the density of the population.

On 30 January 1968 the document supporting the Investigation for four years was signed at the U.S. Agency for International Development and on 11 March 1968 the Director of the Pan American Sanitary Bureau signed the agreement for funding the first 15 months of the project. Thirteen principal collaborators and areas in Latin America have been selected for inclusion in the Investigation. Also, a project will be conducted in six counties in California in the United States.

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