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INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD

Report to the Agency for International Development

Period: January 1-June 30, 1972

During the six-month period, medical and social coding of the questionnaires have taken nearly all of the time of the staff. Work was begun on a final report. However, the tabulations for the second year revealed some deficiency in the data for the Colombian and Chile projects and thus efforts in those projects were renewed. Since the main objective of the program is for actions in the field, a meeting of the principal collaborators was held from 24 to 28 January 1972, for their leadership for effecting changes in their countries. Plans for the future are being developed and are given in summary form in a document for the Meeting of the PAHO Advisory Committee on Medical Research, 19-23 June 1972.

I. FIELD WORK

Serious difficulties have been encountered in the Colombian projects due in large part to a change in the registration system of DANE, Departamento Administrativo Nacional de Estadística. Local collection and supervision of registration was eliminated around January 1969 and replaced by regional direction. This registration problem is now reflected in the statistics for the country for 1969 and 1970. The population estimates of DANE for the three cities in the Investigation are likewise in doubt. Thus these problems were discussed with the officials of DANE by Dr. Abel Dueñas and Dr. Ruth R. Puffer on February 23, 1972, and their advice obtained on population estimates and births. It is unfortunate that this change in procedures occurred during the period of the Investigation.

Visits were made to Cartagena and Cali for additional searches for unregistered deaths in delivery books and obstetrics records. In Cartagena an additional 36 deaths were found and in Cali 60. The problem is serious in Cali because of the lack of use of the correct definition of abortion. Some so-called "abortions" result in live births. The principal collaborator of Medellín joined the group in Cartagena but he could not locate additional deaths due in part to the incompleteness of the information given by those delivering the baby.

The search by the principal collaborator in Santiago, Chile, has been productive with questionnaires for 242 unregistered neonatal deaths already transmitted. The questionnaires for deaths from one additional hospital are expected. Thus, about 10 per cent of the deaths in the Santiago Area are being added through the search of hospital records. In Chile, as opposed to some of

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the other projects, this search was successful due to the quality of the diagnostic information. Thus, interpretation of the results must be cautious, taking into account local situations.

All of the principal collaborators in the 13 Latin American projects have discovered unregistered deaths, with the level of success varying with the local registration procedures and the quality of records. Of the total of approximately 34,000 deaths in these 13 projects around 2,400 or 7 per cent were not registered. The additional deaths and questionnaires were principally for the neonatal period and thus the completeness of data for the postneonatal period and for the 1-4 year age group was much better.

This problem of registration of deaths in the first day of life and of those of low birthweight also is found in the European countries and to some extent in the United States. A WHO publication (Public Health Papers No. 42) shows death rates in the first day of life varying from 1.2 (Romania), 1.8 (Bulgaria), 2.0 (France) to 13.9 per 1,000 live births (Hungary). Even countries such as The Netherlands (4.3), Sweden (4.0) and England and Wales (6.5) have rates much lower than the United States where the rate was 9.6 per 1,000 live births in 1967.

A recent study in New York City (U.S. Department of Health, Education and Welfare, Series 2, Number 46) on Vital Signs Present at Birth shows the value of the WHO definition of a live birth and yet of the 40 identified deaths in the first week of life, "the understatement of four cases represents an understatement of 10 per cent of the mortality in the first week of life." These were reported as fetal deaths although the infants lived for a few minutes.

These differences in registration practices complicate comparisons of infant mortality. Our Investigation should contribute to clarification of the situation as well as providing more complete and comparable data for this critical age period and especially for neonatal mortality than has been released even for European countries. However, the solution of the problems requires leadership of health officials.

In order to process the questionnaires for the San Francisco project, Dr. Carlos V. Serrano spent 10 days with Dr. Helen M. Wallace and her staff reviewing nearly 400 of the questionnaires (898 for the one year to be included in the Investigation). A major problem in that area appears to be "sudden death" and consistency in assignments of the underlying cause is essential. Autopsies were performed on around 80 per cent of the deaths in that project.

II. MEETING OF PRINCIPAL COLLABORATORS

The principal collaborators in the meeting of 24-28 January 1972 in Washington, D.C., reported on accomplishments resulting from the Investigation, of which there are many, and made specific recommendations for actions on the following fields:

- A. Quality of Registration of Vital Events and Vital Statistics
- B. Hospital Records, Procedures and Statistics
- C. Maternal and Child Health and Nutrition
- D. Education in Health Sciences
- E. Conclusions and Recommendations for Future Research Programs

A copy of the report with the recommendations is attached.

The ultimate success of the Investigation depends on the resulting actions, especially for the health of children throughout the Continent, which requires the combined efforts of principal collaborators, health authorities and educators.

III. MEETING OF THE ADVISORY COMMITTEE ON MEDICAL RESEARCH

A progress report (attached) was prepared for the Eleventh Meeting of the PAHO Advisory Committee on Medical Research which was presented and discussed on June 19, 1972. Since the Chairman of the Committee requested that the results be presented in relation to the next steps that should be taken and that concrete recommendations be made for future activities, the report was prepared accordingly.

The results indicate the value of a broad approach and new policy of the Organization for community centered research as an essential part of the planning for health programs. Proposals for programs were described in several fields:

- Methodology for Maternal and Child Health Programs
- Study of Outcome of Pregnancies and Survival of Newborn
- Intensive Program to Improve Vital and Health Statistics in Latin America
- Effect of Malnutrition on the Immune Response to Infectious Diseases
- Patterns of Breast Feeding

The Advisory Committee commented on the value of the Investigation and included the attached section in their report.

On June 20, 1972, there was a symposium on "Epidemiological Studies and Clinical Trials in Chronic Diseases" in which Dr. Robert Q. Marston, Director of the National Institutes of Health, served as moderator. The first Inter-American Investigation of Mortality, published as Patterns of Urban Mortality, served as a basic document referred to by the participants because of the provision of data of quality and comparability for Latin American cities. The methods employed in that Investigation resulted in analyses which laid the

foundations for further epidemiological studies. It is probable that the forthcoming publication, Patterns of Mortality in Childhood, will serve in the same way as a basic reference for Latin America. One of the recommendations of the first Investigation was for the development of suitable methods of handling multiple causes and combinations of cause, that is for discovering associations of etiological significance. This is being implemented in the Investigation in Childhood. In addition, the inclusion of data for rural areas as well as those for cities will give added value to this second document as a basis for epidemiological studies and for health programs.

- ATTACHMENTS:
1. Report of Meeting of Principal Collaborators
 2. Progress Report for the Advisory Committee on Medical Research
 3. Section 5 of Report to the Director of the Eleventh Meeting of the Advisory Committee on Medical Research

28/VI/72



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INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD

Report of
Meeting of Principal Collaborators
24-28 January 1972

INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD

Report of Meeting of Principal Collaborators

Washington, D.C., 24-28 January 1972

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. SUMMARY OF PRELIMINARY RESULTS OF THE INVESTIGATION	2
III. PARTIAL ANALYSIS OF DATA ON SAMPLES FROM CALI AND KINGSTON .	3
IV. SPECIFIC ACCOMPLISHMENTS RESULTING FROM THE INVESTIGATION ..	7
V. RECOMMENDED ACTIONS IN UTILIZATION OF RESULTS	13
A. Quality of Registration of Vital Events and Vital Statistics	13
B. Hospital Records, Procedures and Statistics	15
C. Maternal and Child Health and Nutrition	17
D. Education in Health Sciences	20
E. Conclusions and Recommendations for Future Research Programs	21
VI. FUTURE PLANS	25
APPENDICES	26

INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD

Report of Meeting of Principal Collaborators

Washington, D.C., 24-28 January 1972

I. INTRODUCTION

A meeting of the principal collaborators of the projects of the Inter-American Investigation of Mortality in Childhood was held at the Pan American Health Organization from January 24-28, 1972. The purpose of the meeting was to review the progress made in the analysis of data, to insure its completeness, to make plans and recommendations for its full utilization in health and education programs and to recommend research needed for introduction of practical measures for solution of problems. The Investigation has laid a foundation in community centered research and in demonstrating measures to establish quality of data. The principal collaborators are the ones to give leadership for actions and research of the future.

At this time the Provisional Report for the First Year of the Investigation was available in English and Spanish for review by collaborators. For this report, questionnaires on 17,198 deaths in the first year from the 13 Latin American projects were used for analysis. Additional questionnaires for unregistered deaths are being completed in several areas in order that the final report may be complete. The total number of deaths for the two years is expected to be around 34,000 for the Latin American projects and 1,000 for the United States and Canadian projects.

In addition to the Provisional Report, working drafts of analyses of other pertinent material in which the interrelationships of diseases and other factors were considered were available to the collaborators, namely, Birth Weight, Breast Feeding, Provision of Foods, Socio-economic and Related Factors and History of Communicable Diseases. For the subdivision and analysis of several variables, the data for the two years are needed.

Partial findings from the probability sample of households in Cali and the Kingston Area were presented.

During the general sessions, principles for future actions resulting from the experience gained during the Investigation were discussed, and these discussions served as the basis for recommendations formulated by five working groups.

*This research project was made possible by a contract with the Agency for International Development of the United States of America to the Pan American Health Organization.

II. SUMMARY OF PRELIMINARY RESULTS OF THE INVESTIGATION

Some of the highlights of the Report for the First Year of the Investigation of the 13 Latin American projects and of the exploratory analyses in five working drafts were given with the principal objective of planning the final report and of utilizing the results for actions and planning of future activities. For the meeting of the Advisory Committee on Medical Research of the Organization, a member of the Committee has requested that the results be presented in relation to the next steps needed and that concrete recommendations be made so that the Advisory Committee can consider support for future activities in these fields. A summary of the results of the Investigation follows:

- a. First, to establish quality in our projects for the inclusion of information regarding all deaths under 5 years, we have discovered a serious situation in hospital and registration procedures. In several areas significant proportions of deaths, particularly of those occurring in the first few days of life and of infants of low birth weight, were not registered. Although this is being changed with additional efforts, for example in San Juan and Santiago, concerted actions are needed to improve the quality of reporting of these events.
- b. Excessive mortality in childhood has been revealed - often in excess of the official statistics. The situation in rural areas is very serious with rates as much as twice those in the cities. These findings indicate the need for action in cities and especially in rural areas.
- c. The role of infectious diseases as underlying causes of death has been clarified, with diarrheal disease and measles the principal causes. The synergistic association of infectious diseases and nutritional deficiencies indicates that the susceptibility of the host as well as the specific agent must be considered in effective programs for control of infectious diseases. From 40 to 76 per cent of the deaths from infectious diseases had nutritional deficiency as an associated cause.
- d. Only through the study of multiple causes is measurement possible of the magnitude of health problems in infancy and childhood, such as nutritional deficiency and prematurity as well as the infectious diseases, certain perinatal causes, etc., and the interrelationships of these causes. Nutritional deficiency was the underlying or an associated cause of 38 to 69 per cent of the deaths from all causes of children under 5 years of age, excluding the neonatal deaths and immaturity was an associated cause of 47 to 72 per cent of the neonatal deaths.
- e. Nutritional deficiency constitutes the most serious health problem in infancy and childhood in Latin America. Death rates are very high in infancy and the situation is even more serious in the rural areas. Preliminary analyses of foods provided to deceased children indicate probable deficiencies in foods with proteins. Thus, the data serve to show the need for extended and improved nutrition programs.

f. Excessive reproductive wastage was found in several areas from the study of outcome of previous products of pregnancy. In all areas infant mortality among previous products was higher than in the Investigation. Mortality was greater among infants of higher birth orders and older mothers. Reduction of the birth rate as in the Province of Santiago with introduction of family planning practices results in a shift from births of higher birth orders to those of low birth orders and thus a lower death rate.

g. Limited breast feeding was found in several projects especially in those in Brazil and San Salvador. Since higher proportions of the deaths were due to diarrhea in infants with weaning started, further investigation of these relationships is advisable which in turn should lead to improvement in feeding of infants.

h. Socio-economic factors such as education and occupation are being analyzed and the interrelationships studied. The level of education of mothers varied widely from over one-half with no education in Recife (52.4 per cent) and in Rural San Salvador (61.6) and Viacha (62.3) to less than 10 per cent with no education in Kingston and the City of San Juan. In the analysis of deaths by occupation of father and education of mother, differences were noted in neonatal and postneonatal mortality. Educational level of the mother appears to be the best single index of socio-economic status as it measures the effect of several factors such as income, occupation, nutrition and environment in addition to education. Thus, the socio-economic aspects of these problems deserve consideration in planning health programs.

i. Piped water supplies were available to less than 20 per cent of the homes of deceased children in two cities and three rural areas with excessive mortality under 5 years of age. Prevention of spread of disease requires provision of water to the homes.

III. PARTIAL ANALYSIS OF DATA ON SAMPLES FROM CALI AND KINGSTON

Data have been processed for the two-year period for only two areas, Cali and Kingston. The opportunities for analyses are many, but for this meeting only those data which can be compared with those already available on deaths were presented.

Many differences between the sample and death populations stood out from review of tables provided. Some support strongly the hypotheses that the deaths of children come from very selected parts of the population. Other differences may have been produced by varying definitions and procedures between the sample survey and the death study.

Interview response

In Cali, about 5 per cent of 2,621 dwellings in the sample were vacant. For those occupied, the household interview was completed in 96 per cent, and in another 4 per cent, information was obtained from a neighbor. The experience in the Kingston Area was somewhat different. In Metropolitan Kingston and St. Andrew, 5 per cent of dwellings were also vacant, but interviews were completed with a household member for only 85 per cent and for another 2 per cent with a neighbor. The large number of households where no one was found at home in Kingston (12 per cent) creates problems in estimating total populations for the area.

Distribution of sample population

The age distributions of the population in the sample households in the two areas were shown. For the Kingston Area, these numbers, scaled up on the basis of the sampling ratio of 1/39.5533, provide an estimate of the population of the metropolitan area, 445,687 in mid-1969. Interpolation from data in 1960 and 1970 censuses gives a population for 1969 of 478,000. The sample result is 7 per cent under this. However, the non-response rate was approximately 12 per cent. Since this non-response was based primarily on families never at home, it may be reasonable to assume that the smaller-sized families are the non-respondents. In the Kingston Metropolitan Area, 18.5 per cent of the population are under 5 years of age and 44.9 per cent under 15 years of age, and an estimated 42.7 per cent are under 14 years. Preliminary census data show the population under 14 in the Kingston and St. Andrew Parishes to be 41 per cent.

Reporting of vital events

From the data obtained in the sample households on vital events, the death rates were estimated for the study areas. From total death rates in Cali and in the Kingston Area and age specific rates, together with rates for the two countries, Colombia and Jamaica, for the most recent year for which data were available, it was immediately obvious that in these two areas the samples have not provided adequate estimates of mortality. Birth rates, on the other hand, as estimated from the sample households, were 28.0 in Cali and 40.5 in the Kingston Area. The rate for Cali appears low and for Kingston elevated. Index cards are being prepared for all births and deaths reported in the household interviews and it is hoped that they can be checked against registration records to determine whether they have been registered or not.

Environmental conditions

In both areas, Cali and Kingston, as well as in rural St. Andrew, water was piped into the homes of the children who died far less frequently than to all families with children under 5 years of age. For example, the observed number with piped water inside the house among deaths in Cali was 365, but from the sample data, 553 of the 667 would have been expected to have piped water. Moreover, families with children under 5 years were less likely to have piped water in their homes than other families in the communities.

Medical care

Mothers of living children under 5 years of age included in the sample received more prenatal care than the mothers of deceased children in both Cali and the Kingston Area. Many fewer of the mothers in the sample were in the group with no prenatal care and many more in the group having four or more visits. Prenatal care began earlier in pregnancy for the mothers in the sample than for the mothers of the deceased children. Many more of the sample mothers in both Cali and Kingston first received attention in the second or third month of pregnancy.

Analysis of vaccination status of the deceased children and the living children in the sample suggests that the living children receive more protection. At one year of age, children in the sample were more frequently immunized against whooping cough, diphtheria, tetanus and poliomyelitis in both Cali and Kingston.

Socio-cultural and biological factors

Families of living children in Cali differed from those of deceased children with respect to the presence of parents in the home and their marital status. The greatest difference was related to the marital status of parents. In the sample, the proportion of households with parents married was greater than for the deaths, where common-law unions were more frequent. Similarly, in Kingston in the households with both parents present, common-law unions were more frequent for parents of deceased children than of the living. Also in Kingston, there was for the deaths, when compared with the sample, a great excess of households with only the mother present. The educational level of mothers of deceased children was significantly lower than that of mothers of children in the sample in Cali. In the Kingston Area, no differences were apparent.

It would appear that family size is not different for the living and deceased persons except in rural St. Andrew where the differences may be due to the small numbers.

Nutritional status

The average weights by month of age for children under 5 years of age from the samples for the two areas, Cali and Kingston, were shown graphically together with the range of weights. Also plotted were the curves for standard average weights used in the Investigation as a basis for assessment of nutritional status and the curves for 90 per cent, 75 per cent, and 60 per cent of the standard. For males in Cali, average weights are above the standard until 6 months of age, falling into the area of 90 to 100 per cent of the standard until 11 months. From then to 5 years of age, the points follow the 90 per cent curve reasonably well. The data for females in Cali suggest weights below the standard begin to occur earlier in life and that shortly after one year of age, the average weights are under 90 per cent of the standard and within the range of Grade I malnutrition.

In Kingston, the average weights for males are in general above the standard curve until 10 months of age. From 10 to 20 months, they are close to the 90 per cent curve. For the rest of the age span to 5 years, averages are usually above the 90 per cent curve. The average weights for females in Kingston are reasonably close to the 90 per cent curve.

Information on breast feeding as obtained in household interviews can be compared with similar information presented in the Provisional Report for deceased children. In Cali, of the deaths from 1 through 11 months of age, more were breast fed than would be expected from the sample data; for those children dying from 1-4 years of age, the proportion breast fed was similar to that for the sample. The findings for Kingston are similar with more breast feeding among the deaths than the sample. Extra effort may have been expended to obtain this information from mothers of deceased children than from the mothers in the sample. In fact, the mother may have more frequently been the source of information for the deaths than for the sample. It will be important to examine the results in more detail comparing the groups where information was provided by the mother.

The questions for the sample households with respect to food received by the child were the same as those in the interviews regarding the deceased children. For almost every food in all age groups, expected numbers in Cali are higher than those observed for the deaths, suggesting better nutrition in the sample group. In Kingston, it also appears that the living children at the younger ages have more foods introduced than those who are to die, but in the 2-4 year group, there is little difference.

Measurement of arm circumference was included in the sample as a possible second indicator of nutritional status. Average arm circumference in centimeters with ranges of values are given by month of age and sex, together with the standard measurements, which appear in The Assessment of the Nutritional Status of the Community by D. B. Jelliffe. In Cali as with weights, average arm circumferences are near the standard in the first six months of life, and fall to the 90 per cent level in the next 12 months. From 20 months on, the averages are usually between the 90 and 100 per cent level for both males and females. In Kingston, the average arm circumferences are near the standard in the first 4 months, falling to the 90 per cent level in the next 6 months, and in the second 10 months are below the latter level. They rise above the 90 per cent level from 20 months to 5 years. The arm circumferences of children in Kingston are higher than those in Cali in the 2-4 year age group

These data which are provisional indicate the need for further tabulations and exploration. The quality varies in the projects in part dependent on the training, experience and supervision of the interviewers. They indicate the value of the introduction of probability sampling which will give useful results, especially in socio-cultural and biologic data regarding the general population, but also they serve to point out the needs for improvements in utilizing these methods.

IV. SPECIFIC ACCOMPLISHMENTS RESULTING FROM THE INVESTIGATION

The accomplishments reported by the principal collaborators have been described briefly in five fields, followed by actions of a general nature in the final section.

Vital statistics

The lack of registration of deaths in early life in Santiago resulted in a well organized search in the six most important maternities for deaths under 28 days of premature births in accordance with the sampling ratio (one in each five for the first eight months and one in three for 16 months). The results in one institution indicated that the unregistered deaths were frequently those of low birth weight, and death occurred soon after birth. However, some full term births were not registered. The document prepared by the principal collaborator in Santiago had several recommendations for actions in Chile as well as in other countries. After the search is completed in other five institutions in March 1972, a report on the findings should be released for use in Chile and in other countries. It is expected that between two and three hundred deaths will be discovered and added to the Investigation so that the total for the Santiago project will be of the order of 2,700-2,800. Two measures were given for solution of the problem of non registration of deaths in Chile; actions by the National Committee on Vital and Health Statistics and the National Health Service by establishing standards and directly by the chiefs of maternities in Santiago.

An organized search for unregistered deaths was conducted in Cartagena which resulted in the discovery of 20 per cent of the deaths under 5 years of age in the first year of the Investigation. A pilot zone has been established in Cartagena, as well as in several other areas in Colombia, for developing procedures for collection of data in a National Information System.

In São Paulo, a search was made for birth certificates of the deceased infants included in the Investigation and 9.5 per cent of the deaths under 1 year of age were not registered as births, and 82.5 per cent of these births had occurred in hospitals. A document was published to alert hospital administrators to the problem of improving vital statistics.

In Chaco, a continuous improvement in registration procedure has been noted and standards of the National Plan for Health Statistics are being applied.

Hospital statistics

In San Juan, Argentina, a Manual for Procedures in Hospitals was developed in the first year and is in use in the Province. The principal hospital prepares a monthly list of the deaths by age in the maternity and in other services of the hospital which aids in the evaluation of their mortality and is also forwarded to the Vital Statistics Office of the Provincial Health Service.

In Kingston, the WHO definition of a live birth was introduced in the hospitals in the early phases of the Investigation and steps are being taken for improvement of records and procedures in hospitals.

Registration of live births is being established in the hospitals in Cartagena as well as in other areas in Colombia. This is an important development as previously records of baptisms were used for live birth statistics.

Hospital records and procedures are being improved in Recife.

The project in Ribeirão Preto designed a record for use in the maternities so that the product of each delivery would be known and so that all deaths of live born infants would be included in the Investigation.

Definitions of WHO are being introduced in institutions in Santiago for correct procedures with live births, fetal deaths and neonatal deaths.

Maternal and child health

The actions in Recife as a result of the Investigation are outstanding. The principal collaborator was appointed Secretary of Health of the State of Pernambuco on March 15, 1971, and some members of the staff of the project were incorporated into the Ministry of Health. The results of the first year of the Investigation are being utilized as the basis for the program in the new ministry. A document "Plano de Saúde" for 1972-1975 has been developed based principally on the Investigation, since the research program provided the first accurate statistical data on mortality in childhood in Recife. Copies of the document were provided to the group. The seriousness of the nutrition problem is the basis for supplementary supervised feeding of infants and children 1-4 years.

Vaccination programs against measles were undertaken in Recife and La Paz during the second year of the Investigation. In La Paz, 35,427 vaccinations to children 1-4 years of age were given in three years, 1969-1971. As the result of early findings of high fatality from measles which were reported to the Meeting of Ministers of Public Health in 1968, a recommendation was made for continent-wide use of measles vaccine. Vaccination programs are underway in Argentina and the State of São Paulo and other parts of Brazil. The vaccination program against measles is continuing in La Paz and has been extended to the rest of Bolivia.

Committee action has been taken in São Paulo for planning for utilization of the findings in maternal and child health and planning of the Ministry of Health.

In Bolivia, the results are being used in the new integrated maternal and child health program in which AID and UNICEF are participating. This program in which national standards will be carried out is planned for four local areas, Santa Cruz, La Paz, Chuquisaca and Cochabamba. The establishment of the structure of services, medical education and operational research in demography, applied nutrition and epidemiology of abortions are incorporated.

In Kingston, findings have been reported to a Nutrition Committee of the Ministry of Finance and to the Maternal and Child Health Committee of the Ministry of Health for actions.

In the San Francisco project, a weekly case-conference system was set up to review each death and this was used as a teaching device for staff, students of maternal and child health and residents in pediatrics. These conferences were attended at times by a pathologist and neonatologist and physicians from the community. Also, there were several meetings with physicians in the community to discuss the problem of sudden infant deaths, which represent about 10 per cent of the total deaths.

In Santiago, a paper has been published on acute bronchopneumonia as a contribution to the knowledge of the problem in the program of the National Health Service against broncopneumonia. Also, a working group of specialists in maternal and child health and planning is responsible for the design of a clinical record for the newborn.

Education

The Investigation is being utilized continuously in teaching programs in schools of medicine and public health and nearly all of the principal collaborators described specific activities in this field.

In California, students are utilizing material collected in the Investigation for theses and special studies. In São Paulo the methodology and the results are being used in the courses of preventive medicine in the school of public health and special courses on demography. Also, they were used in an intensive course on demography of the Department of Sociology of the Catholic University of Rio de Janeiro on April 1971. Also in São Paulo, the basic data are serving for theses and special studies. In Sherbrooke, in a medical school oriented toward community based research, subjects for research projects for medical students, residents and graduate students have been selected from the Investigation of mortality and probability samples. Important components of the master of science program in epidemiology derive from the research in childhood.

In Recife, the public health nurse who participated in the Investigation has utilized the material in the teaching as professor of nursing and in her participation in meetings in other areas of Brazil, thus giving leadership to promotion of research and its utilization in education of nurses.

Research

In São Paulo, the sample of living children was used for a more intensive study of nutrition.

The findings on breast feeding have interested a research group in England to develop research on breast feeding in Recife as well as in Ibadan, Nigeria.

The principal collaborator in Ribeirão Prêto presented certain aspects of the methodology and results in the meeting of the International Epidemiological Association held in Ibadan, Nigeria, in April 1970. Also the data from the Investigation served as the basis for a study of seasonal variation in mortality from diarrheal disease and malnutrition. Results were used by the pediatrics departments as well as in departments of preventive medicine for conferences and meetings and will be presented to the Medical Association of the Region of Ribeirão Prêto in 1972.

Plans have been made for inclusion of Chaco Province in an investigation on nutrition in the northeast of Argentina considering medical, biological and socio-economic aspects. These are tentative plans for a study on provision of and demand for medical attention and on subregistration of vital events.

In Sherbrooke, the probability sample of households has served as a framework for several special regional studies, among which are those on dietary habits, on the role of maternal nutrition on the products of pregnancy, on the familial distribution of obesity on population patterns of health practices, on fertility characteristics of women of reproductive age, on the role of distance to hospitals on mortality patterns, and on the aggregation of arthritic diseases. On a more global aspect, the Investigation has aided in promoting the orientation of the department toward population based epidemiological research.

In California, a new research project has received financial support for the study of the patterns of delivery of community health care to children under 5 years of age in Alameda County, one of the counties included in the Investigation.

Other actions

The World Health Organization has adapted the methodology of the Investigation in order to obtain accurate measures of infant and child mortality in areas of the world without satisfactory statistics. This activity of WHO utilizing funds from the United Nations Population Program is a direct result of our Investigation. A period of six months is being used for training of national personnel. The four projects with the approximate dates of establishment are in the following countries:

- | | |
|-------------------------------|--------------------------|
| 1. Afghanistan - January 1972 | 3. Algeria - March 1972 |
| 2. Sierra Leone - March 1972 | 4. Indonesia - July 1972 |

Because of the importance of this research, the Head of Demographic Statistics Section of WHO participated in our meeting.

The principal collaborator in California presented material from the Investigation at a conference in Uganda, and has participated in discussions of possible applications of the methods used in the Investigation for studies by medical schools in Africa and India.

Material from the Investigation was used by the principal collaborator in San Salvador in a meeting on medical education held in Guatemala for the medical schools of Central America. In Mexico, a large meeting of the "Jornadas de Salud Pública" was held in the National Medical Center for Social Security on July 9, 1971. The material from the Investigation was presented by four persons with the principal collaborator of Monterrey giving an analysis of the data for Monterrey. This meeting created great interest in the health problems revealed.

At a Maternal and Child Health Conference sponsored by the Ministry of Health and the University of the West Indies on June 3, 1971, in Kingston, Jamaica, several papers were presented using data from the Investigation and the discussions centered on the needs for extending prenatal care and preventive measures to a higher proportion of the mothers, infants and young children.

On March 10, 1969, a meeting was held in Buenos Aires, Argentina, with representatives of the Ministry of Health, Association of Faculties of Medicine, pediatricians, the two principal collaborators in Argentina and Central Office staff. One of the direct results was the provision of greater pathological services in San Juan.

In Sherbrooke, Canada, the results of specific phases of the Investigation have been presented to meetings of the Canadian Genetics Society, the Canadian Association of Teachers of Social and Preventive Medicine, Canadian-French Association for Advancement of Science, Symposium on Perinatology and Canadian Pediatrics Society.

Several meetings have been held in Brazil. The first was held on March 7, 1969, in the Ministry of Health in Rio de Janeiro. On October 1971, two meetings were developed by the principal collaborator in São Paulo; the results of the first year of the Investigation were presented to a large group at the School of Public Health which included leaders in maternal and child health and nutrition as well as vital statistics. Several meetings were held in Recife, and a seminar for the Northeast Area of Brazil is scheduled for which the results of the Investigation will be utilized for planning. The principal collaborator in Recife presented some of the findings at a national seminar on maternal and child health in Salvador sponsored by the University of Bahia and the Association of Faculties of Medicine. Great interest is developing throughout Brazil.

The three principal collaborators in Colombia participated in a meeting in the Ministry of Health of Colombia on October 22, 1971, in which the health problems revealed were discussed and solutions sought.

Preliminary results of the Inter-American Investigation of Mortality in Childhood in La Paz were presented by the principal collaborator in a seminar on education on maternal and child health directed to the community in Sucre, Bolivia, in June 1971 and by the professor of pediatrics at the meeting of the Bolivian Society of Pediatrics in Cochabamba in October 1971.

The pathological findings on deaths were presented by the principal collaborator in Chaco in an Argentinian-Paraguayan Meeting on Pediatrics.

In São Paulo, the provisional results have been presented in three congresses, namely, Congress of the Paulista Association of Medicine, Brazilian Congress of Hygiene and the Medical Congress of the State of Espirito Santo.

A Workshop on Pediatric Pathology was conducted in São Paulo, Brazil, from 23 March-10 April 1970, in which eleven pathologists from the projects of the Investigation participated. Another workshop is planned for early 1972 to be conducted in San Salvador, El Salvador.

Members of the Central Office staff have participated in international meetings which included the following:

- Consultation on Growth and Development, Consultation on Multiple Cause Analysis, Study Group on International Classification of Disease, WHO, Geneva, October 5-25, 1969.
- Consultation on Fetal, Infant and Childhood Mortality, WHO, Geneva, March 14-22, 1971.
- Meeting for Planning of Socio-economic Studies of Perinatal Mortality, WHO, Geneva, January 10-14, 1972.
- Internal Meeting on Nutritional Aspects of the Investigation, PAHO, Washington, D.C., March 16-18, 1970. Recommendations were made for the Section on Nutrition in the 1975 Revision of the International Classification of Diseases.
- Regional Meeting on Revision of International Classification of Diseases, PAHO, Caracas, December 7-11, 1970.
- Protein Advisory Group, FAO/WHO/UNICEF, Washington, D.C., October 26, 1971. A paper was prepared for this meeting as the basis for discussions and some of the provisional findings were included in the report of the meeting.
- Regional Advisory Committee on Health Statistics, PAHO, Washington, D.C., December 6-10, 1971.

V. RECOMMENDED ACTIONS IN UTILIZATION OF RESULTS

Working Groups formulated several principles and recommendations which resulted from the experience gained during the course of the Inter-American Investigation of Mortality in Childhood. These are given in the following five sections of this report.

A. Quality of Registration of Vital Events and Vital Statistics

On the basis of the experience acquired in the Investigation on quality of the registration of vital events, the group considers of highest priority and urgency that the countries develop programs designed to improve and maintain the quality of registration of births and deaths in early life so that more complete and accurate vital statistics may be available for the countries. To this end, the following recommendations are formulated.

1. Registration

1.1. The definitions* of live birth and fetal death of the World Health Organization should be disseminated widely for universal application. The physicians, obstetricians and pediatricians, as well as hospital administrators, midwives, nurses, and others attending births should know these definitions in order to collaborate efficiently in their uniform application. The group believes that periodic studies should be conducted for verification of the extent to which these definitions are respected.

1.2. The governments should adopt measures and legislation to facilitate the prompt registration of all vital events. An example of such measures is the establishment of offices or agents of Civil Registration in hospitals in order to insure that all the births and deaths are registered.

1.3. The officials of Civil Registration should insure that the birth of each child who dies at less than one year of age is included in the registry of births as well as in the registry of deaths and that the services of Civil Registration establish procedures for the control of the quality and completeness of registration.

1.4. The institutions and persons who provide health services can contribute efficiently to improvement of the quality of vital statistics. The education of the parents during prenatal care and following delivery on the importance of registration and the requirement of registration for obtaining health services (care of the well child, etc.) are examples of the mechanisms which can be utilized. In the case of deliveries attended by professionals (physician or midwife) a certificate should be prepared for the family to present for registration. This will improve the quality of the registered information as well as facilitate the procedure.

* Definitions in Appendix III.

2. Data on Certificates and Reports

2.1. The principal users of the information should be consulted regarding the types of data to be included as a minimum in reports on births and deaths. Such data ought to be applicable to all the country but for the development of special programs and of research certain additional data could be incorporated in specified periods and regions.

2.2. For consideration of items to be included on birth and death certificates, those listed in Principles for a Vital Statistics System of the United Nations are recommended as a minimum. In addition to the minimal data on births, that is date of birth, date of registration, type of birth, sex, legitimacy and person who attended the delivery, the group suggests adding hour of occurrence, weight at birth and order of birth. In addition to the minimal data regarding characteristics of the mother, that is date of birth or age, number of previous deliveries to the mother divided into fetal deaths, live births currently living and live births that are dead, place of usual residence of the mother, the group recommends adding education and occupation of the parents.

The minimal data for deaths include date of death, date of registration, date of birth or age of decedent, place of occurrence, causes of death, person who certified the death, place of usual residence and sex. The group recommends the following additional data for infant deaths (less than one year of age): for the infant exact age at death and weight at birth; age, occupation and education of the parents and the number of previous deliveries to the mother divided into fetal deaths, live births currently living and live births that are dead.

For the data on fetal deaths, early or late or both in accordance with the requirements, the minimal and additional data would be similar to that for infant deaths.

3. Vital Statistics

In order to improve the quality of vital statistics, educational programs, studies and tabulations are recommended.

3.1. Schools of medicine, public health and others in the health sciences should teach students the correct utilization of vital statistics in order to improve the health services for the population and that teaching be introduced into the curriculum of students of medicine and in postgraduate programs; correct use of the international model of the medical certificate of cause of death including the concept of the underlying cause of death and the correct form of completing the certificate. Also, personnel responsible for coding causes of death should be taught the use of the rules of selection and classification of the underlying cause of death of the World Health Organization.

3.2. The tabulations recommended in the International Classification of Diseases of WHO will be made for deaths and those of the Principles for a Vital Statistics System of UN for live births. For neonatal and infant deaths additional tabulations are needed by age of mother, birth order and weight at birth.

3.3. The health services should make prospective studies through periodic visits to the homes of samples of the population to record the occurrence of vital events with subsequent verification in the offices of Civil Registration and samples should be taken of children attending public health clinics to verify the registration of their birth.

3.4. Deaths in hospitals should be studied by age with emphasis on the death rate in the first 24 hours of life, neonatal deaths, etc. The inclusion of neonatal deaths should be checked using sampling of clinical records and deaths with autopsies to insure the registration of all. In addition, maternities and emergency services should use a record (card for example) for recording minimum data regarding all products of conception and these records could be sent periodically to the offices of Civil Registration in order to improve registration.

4. Multiple Causes of Death

The group recommends that selected areas begin coding multiple causes of death using the medical certificates of cause of death or special forms. For deaths of children under 5 years of age, uniform tabulations should be made, especially those which have proven valuable in the Inter-American Investigation of Mortality in Childhood. The value of utilizing multiple causes in the study of morbidity and mortality should be taught in courses in schools of medicine and public health.

B. Hospital Records, Procedures and Statistics

On the basis of identification of difficulties encountered in the Investigation in hospital procedures with records of live births and deaths occurring in those institutions, recommendations are given regarding certain aspects of the records, procedures and hospital statistics, including education and training, with special emphasis on births and infant deaths.

1. Records and Procedures Regarding Births and Infant Deaths

In order that information is recorded and available for these vital events, principles are given for four types of records.

1.1. Admission Information

The admission record provides the name of the patient and his address in sufficient detail so that the home may be reached if necessary. In addition, this record indicates the socio-economic status, that is, the classification for the social service department when there is one in the hospital. If prenatal and postnatal care are provided in an outpatient service, suitable notations are needed for coordination of these services.

1.2. Clinical Obstetrical Record

This clinical record provides the evolution of the pregnancy, the delivery and the puerperium, lactation, conditions and characteristics of the product of conception with the number of the corresponding clinical record. Again it is important to establish on the record the exact address with reference to the patient.

1.3. Clinical Record of Newborn

This basic clinical record requires the application of the definition* of WHO for a live birth. The following are essential data for inclusion:

- For the mother, her name, age, exact address, prenatal care and number of her clinical record.
- Sex of the infant, date and exact time (hour and minute) of the birth. If a multiple birth occurs, a clinical record is required for each product with clear indication of the order of birth.
- Weight and length at birth.
- Number and order of the previous pregnancies with additions for multiple births.
- Clinical data including condition at birth, breast feeding, evolution, congenital anomalies.
- If death occurs, day and exact time (hour and minute), underlying and associated causes of death and whether an autopsy was performed.

1.4. Individual Card or Sheet for Each Infant Death and Fetal Death

This card or sheet includes the identifying data with adequate information regarding the mother, her address and the underlying and associated causes of death.

1.5. Manual of Procedures and Rules

Each hospital develops and places in use a manual which serves to guide the routine activities in respect to records and procedures. A team of hospital staff, responsible and trained, collects and records data on these clinical records which are to be preserved for at least one year after death.

2. Hospital Statistics

It is important that the hospital administrators have at all times exact knowledge of births and deaths in the hospital. Specifically, the hospital administrators should receive information daily, weekly and monthly on live births, fetal deaths and deaths by age with a periodic evaluation of mortality.

* Definition in Appendix III.

Each hospital ought to prepare and issue certificates of birth, fetal death and death for the prompt registration of these events in the office of Civil Registration. It is advisable that the office or an official of Civil Registration works within the hospital in coordination with the health personnel in order to carry out effectively this task. When conditions permit, it is advisable that the hospital be responsible for the inscriptions in the office of Civil Registration.

3. Education and Training

The effective conduct of actions on hospital records requires the satisfactory preparation of responsible personnel. This includes training in several fields and the first is the training of the professionals and students in health sciences at the pre- and postgraduate levels, including the administrative personnel. Emphasis is recommended on concepts of multiple causes of death (underlying and associated) and completion of death certificates with utilization of the data in statistical analyses and in research. Inservice training is indicated of personnel in charge of the record system with attention to procedures, clinical records and reports. The training of auxiliary personnel is likewise important for their future responsibilities in the system.

Other groups for training are the technical personnel in statistics, voluntary workers assisting in activities in the hospital and officials of Civil Registration. Also the education of the mothers is important, especially regarding the value and benefits of registration.

It is most important to use various methods of dissemination of information in order to establish communication with persons of all levels of the community.

C. Maternal and Child Health and Nutrition

The Inter-American Investigation of Mortality in Childhood is providing the most exact measurement possible of the magnitude of problems of child health in the study areas. Knowledge of the size of the death rates, of the causes and factors which determine the excessive mortality in the areas of the Investigation is indicating the need for development of actions for solving the high priority problems within an integrated and coordinated context of maternal and child health.

The group of principal collaborators considers that the information obtained is, in general, applicable to the situation of Latin America and thus the findings of the Investigation should be considered in the determination and programing of activities in maternal and child health.

The group considers of greatest importance the following general principles in the planning of a program of maternal and child health:

1. It is absolutely necessary to rely on information of quality for evaluation of the programs and to develop research programs leading to the knowledge of the magnitude of the high priority problems and the most appropriate mechanisms of solutions.

2. A program of medical attention to the mother and child ought to have clearly defined objectives. The results of the Investigation indicate the need for promoting optimal nutrition in children and in pregnant and lactating women. They also indicate the need for prevention of infectious diseases and for promotion of adequate patterns of reproduction as high priority goals in order to reach optimal levels of growth and development.

3. The planning and conduct of a program of maternal and child health care ought to have a multidisciplinary and intersectorial approach. The services ought to take into account the concept of risk at the level of the community, family and individual for establishing a better distribution of resources.

4. The total program of maternal and child health ought to be an integral part of a general health plan. The establishment of goals of coverage of the components of the program and the establishment of operational procedures for the development of activities are considered important. Also it is necessary that in each central level in the health services there are personnel highly qualified in the field of maternal and child health.

5. The scarcity of resources as well as the size of the vulnerable groups and the urgent need for extension of health services to the rural areas require the maximum use of personnel and the active participation of the community with the focus on well supervised, delegated and simplified medicine. On the other hand, the services of maternal and child health ought to be continuous, that is, with coordination of prenatal, delivery and postpartum and postnatal care.

6. The adequate orientation, the efficient conduct and the readjustment of programs require operational research and continuous inservice training of personnel.

Recommendations

On the basis of the previous fundamental principles, the following specified recommendations are made:

1. The prevention and recuperation from nutritional deficiency in mothers and children are considered by the group as activities of the highest priority. The following actions are recommended:

1.1. Intensive promotion of breast feeding, insisting with the students of medicine, nursing and public health on the advantages of breast milk and developing massive programs of community education including the schools.

1.2. Development of effective programs of health and nutrition education particularly using practical methods and means accesible to the vulnerable population. Such programs may or may not include components of recuperation and supplementary feeding of the groups of high risk (mothers and children) and ought to include aspects of hygiene and of adequate techniques of preparation of food.

1.3. The prevention of malnutrition and its recuperation require effective control of infective and parasitic diseases. The prevention of infant diarrhea and diseases as measles are obligatory.

1.4. Orientation and education in aspects of reproduction such as concept of high risk of very young mothers and the older mothers is an essential component for optimal health for mothers and their products.

1.5. Because of the seriousness of malnutrition in rural areas, the group recommends the extension of programs of prevention and recuperation in nutrition to the suburban and rural areas.

2. In order to seek an increase in the coverage of services of maternal and child health, the group recommends the application of three basic principles of health administration.

2.1. Regionalization of health services with the criteria of establishment of graduated levels of medical attention with a double flow of service and advisory services.

2.2. Integration of preventive and curative services in a functional and programmed manner, and not only by physical linkage of services, in such a way that there is continuous care to mothers and children.

2.3. Medical attention delegated to auxiliary personnel with elementary preparation in order to extend at least in a minimal level the health care to all the maternal and child population.

It is undeniable that the promotion of maternal and child health in the community especially at the level of the groups at high risk is also an essential reason for increasing the demand for timely services.

3. The group recommends that the schools of medicine and public health and other schools of health sciences conduct research and also give advice on research (in coordination with health services) oriented to knowledge of high priority problems of groups of the population at great risk for defining of the most effective methods of application of resources for the solution of the problems. Equally, it is highly recommended that teaching institutions participate in inservice training programs of all components of the health group and in integrated programs and community education.

4. The Workshop on Pediatric Pathology promoted by the Investigation was very successful and the group recommends that a training program in this important discipline be developed in one or more centers.

5. The high mortality due to measles indicates the need that all countries carry out the recommendation already made of the meeting of the Ministers of Health in Buenos Aires (1968) in the development of programs of vaccination against this disease.

6. The group considers of great importance the extension of services of environmental health particularly of piped water to all sectors of the population including rural areas. This measure is an indispensable component in the control of gastrointestinal diseases.

D. Education in Health Sciences

On the basis of the experience during the Inter-American Investigation of Mortality in Childhood, the group considers important the establishment of the following principles and recommendations:

1. The universities and especially the faculties of medicine and sections of health sciences in general are valuable instruments of change among which the principal objectives are to stimulate community development.

Toward this end, teaching and research combine their objectives and procedures, constituting an inseparable whole whose influence on the attitude of the student will be reflected in the future in the quality and extension of the provision of services. To consolidate this gain, the action ought to include all personnel in the health team, placing particular emphasis on types of personnel insufficient in number and training. In some areas it will be necessary to diversify the types of professions, creating, for example, groups of technicians in such fields as electronic computation, which is indispensable for the requirements of our programs in the immediate future. The training of health manpower to provide services in the rural areas is a clear necessity in our countries.

Biosocial research, conducted with similar methodology and principles used in this Investigation, contributes to the diagnosis of the health situation in a region or country. Such research is valuable to orient policies; it is useful in the development of health plans and programs. Furthermore, it allows universities to design and adapt curricula and plans of studies in the area of health, according to the needs and real problems of a population. The contribution of the results obtained are particularly important in emphasizing the coordination which should exist between obstetrics and pediatrics, and also in demonstrating its methodology as a useful tool for general application.

2. The preparation of students in health sciences requires their full knowledge and utilization of the scientific method in order for them to acquire a sound and critical judgment and an investigative attitude. For the foregoing a focus is needed on statistical methods which provide in practice quantitative medicine and epidemiology as an indispensable foundation in education in the field of health. The physician, as the principal producer of data, ought to have knowledge of their handling, utilization and significance and to know with precision the principles of the natural history of disease and the multiplicity of causation. This last will enable him to understand the real contribution of causes of death, on the basis of the concept of association including the role of biological, social and environmental elements inseparable from certain morbid conditions. Through the use of the concept of multiple causation, the application of integrated medicine with emphasis on prevention can be obtained.

3. The limiting concept of the "patient-physician" relationship has been transformed into the broader one of "community-health team". The preparation of health personnel ought to be such as to maintain community medicine, with training of auxiliary personnel capable of performing adequately their delegated functions and broadening the health services progressively to all segments of the population.

4. For satisfactory utilization of resources, it is necessary that the medical student receive training in basic principles of health planning and administration.

5. In order to obtain team approach, the health sciences faculties within the universities ought to be coordinated.

6. The relationships between universities and health services should become closer and to this end the following three mechanisms are recommended. First, the students of health sciences ought to use for instruction not only the university hospital but also the regional hospitals and health centers and posts. In this way the student will know the type of medical attention which he will have to provide later. Second, the members of the health services ought to perform teaching functions and members of the university should be members of the sectional councils and technical committees of the health services. Third, the results of research and studies carried out by the universities in the community favor coordination for the utilization of this information by the members of the health services for the development of concrete actions for the benefit of the population.

7. Adequate continuation of the efforts undertaken by the different participating teams in the Inter-American Investigation of Mortality in Childhood should be gained through the creation of teaching centers in the different schools and faculties in which knowledge of the instruments and procedures utilized during this Investigation is projected and multiplied by all means possible. All the experiences, including the negative ones which were encountered, are useful to accelerate knowledge of the solutions to health problems of the population. The possibilities of developing an active interchange of undergraduate students and professionals through fellowships and programs with adequate assistance ought to be studied.

E. Conclusions and Recommendations for Future Research Programs

The Inter-American Investigation of Mortality in Childhood is pointing out important health problems such as the excessive mortality in nearly all the areas, the serious deficiencies in the systems of health statistics and the important role of the various social, biological and environmental factors which are related to health problems.

Many of the conditions described and the problems revealed need to be characterized more completely and it is also necessary to find adequate solutions in order to attain the greatest efficiency with the existing resources.

The group of collaborators considers that future research on various aspects of community health should have high priority and that development of such research would constitute one of the most important results of this Investigation. The following principles were pointed out to serve as the basis for a research policy for the future.

1. Coordinated epidemiological research of the collaborative type carried out in the Inter-American Investigation of Mortality in Childhood ought to be stimulated widely since it leads to the discovery and measurement of health problems in different regions and thus enables comparison of their relative magnitude and greater comprehension of these problems. In view of the fact that the factors which affect the health of mothers and children are multiple and complex and thus require a multisectorial and multidisciplinary approach for solution, it is advisable that the health agencies, both national and international, and the respective universities exercise joint responsibility. Emphasis is given to the important role of the Pan American Health Organization as the agency for promotion and coordination of research in the Americas.

2. Research of an operational type oriented to the search for effective solutions to the most serious health problems ought to receive the highest priority. In general, agencies such as the Pan American Health Organization ought to promote the type of epidemiological research which can benefit more than one area and, ideally, more than one country. Similar data can be obtained from studies in several areas which will benefit entire countries and even regions; in other words, knowledge acquired at one site can often be applied in other areas. The value of these additional investigations depends largely on the efforts exerted and the success in obtaining data of the highest quality. Since one of the most common problems is the lack of quality in basic data for health planning and other uses, it is necessary to establish various types of mechanisms for obtaining improvements in the quality of the information in both demographic and health aspects.

3. It is considered indispensable that all coordinated research of a collaborative type include a phase of careful planning with a stage of pilot testing. The aspects related to determination of samples, methods and procedures, plans for processing and analysis of results, administration, financing and training of personnel ought to be carefully planned before initiation of the principal phase of an investigation. The experience acquired in these community centered research programs ought to be made known and utilized for the best direction and management of future epidemiological investigations.

4. The Inter-American Investigation of Mortality in Childhood and the similar investigation of mortality of adults have demonstrated that studies of community health of high quality can be conducted in Latin America. Due to the great impact that this type of research can have on teaching of the health sciences and in the orientation of programs, it is highly desirable that

future studies be conducted through coordinated efforts of the universities and health services. Furthermore, the group considers it of major importance that the countries and the Pan American Health Organization establish programs for the preparation of personnel for development of epidemiological research.

Recommendations

Based on the previous principles as well as on the contributions which the two continental investigations of mortality in adults and childhood have made, the following recommendations are formulated:

1. The group of principal collaborators recommends that the Pan American Health Organization exercise as a high priority and permanent function not only the promotion but also the conduct and coordination of research of the collaborative type in basic health aspects of the community so that the results of such research may serve for guidance for specific measures. In this connection, the group requests that the principles and recommendations on research which were agreed on in this meeting be transmitted for consideration by the Advisory Committee on Medical Research of the Pan American Health Organization.

2. The group recommends the creation of a center or program for training of personnel in epidemiological research. Likewise, it recommends that the important component of training in research on community health be introduced. The creation of a system of fellowships for training personnel who would participate in the development of the several stages of a research program such as the present one would be a highly effective mechanism for the promotion of epidemiological research.

3. On the basis of the provisional results of the Investigation, the group considers the following broad fields to have high priority for future research especially as related to maternal and child health.

3.1. Operational Community Studies on Provision of Health Services in Maternal and Child Health.

Within this field the following aspects of research are recommended to be studied either separately or combined:

- Identification and stratification of the population groups of high risk (mothers, children, families, etc.), taking into account biological, socio-cultural and environmental factors.
- Measurement of the coverage and quality of health services at the prenatal, delivery and postpartum levels as well as of those related with infant health control.
- Determination and evaluation of systems for extension of health services to suburban and rural areas.

3.2. Community Centered Research Oriented to Improvement of Nutritional Status.

- Studies of factors which determine the patterns of breast feeding with emphasis on causes of early weaning, taking into account the nutritional status of the mother, her reproductive history and other biological and social factors.
- Studies of methods of developing integrated and efficient programs in applied nutrition which include health education in general and nutrition education in particular and supplementary feeding.
- Study of the causes and characteristics of malnutrition in young children taking into account factors such as nutritional status of the mother, birth weight, breast feeding, morbidity, environmental and socio-cultural factors.
- Comparative basic studies on the patterns of births by birth weight and on the causes of differences, considering biological and environmental factors. Such studies should lead into comparative studies on growth and development.

3.3. Epidemiological Research in the Field of Human Reproduction.

- Studies, ideally of longitudinal type, on the outcome of pregnancies taking into account biological factors in the mother as age, nutritional status, reproductive history, practices of family planning as well as social and environmental factors. Studies of this type can provide information on the factors which determine differences in the patterns of reproduction apparent in the provisional results of the Investigation and also for implementation of programs oriented to optimal health of mothers and children.
- Studies on knowledge and attitudes of the parents in relation to aspects of reproduction, such as the size of the family, the acceptance of pregnancies and spacing, utilization of methods of family planning, etc., and evaluation of programs involving human reproduction.

4. The group recommends that each collaborator describe the solutions applied to operational difficulties encountered in the development of his project. The experiences could be combined and edited with the addition of recommendations on organization and administration of this type of community centered research. Such a document would aid greatly in the development of future epidemiological studies and in the training of research staff.

VI. FUTURE PLANS

In considering future plans, reference was made first to actions recommended by the PAHO Regional Advisory Committee on Health Statistics which met on December 6-10, 1971. A strategy was recommended for the rapid improvement of vital and health statistics in the Americas. As background, the administrative problems in the countries were pointed out as well as the deficiencies in the preliminary findings in the Inter-American Investigation of Mortality in Childhood - especially in lack of registration and unsatisfactory procedures in hospitals regarding deaths in early life. The Committee recommended an intensive program - a crash program - to stimulate the countries to solve the deficiencies.

The principal collaborators in the Investigation can be of great assistance in the new intensive program by pointing out the difficulties encountered and the recommended solutions to the problems. Also they can be of assistance in the program in several other ways, for example, in training programs.

The publication of reports from the Inter-American Investigation of Mortality in Childhood was discussed briefly with emphasis on coordination between the central office and the projects in order to utilize the same bases for rates and to release the same findings. In addition to the publication of the overall comprehensive report in English and Spanish which must be completed as soon as possible, other special publications would follow. Excerpts from the first report could be published, as was done in the adult study, which could be utilized for wider distribution of the findings and for use with students. Each principal collaborator was asked to contribute a report utilizing the material of his project.

For adequate distribution of the reports within the countries, the principal collaborators are the ones to assist through recommendations and local distributions.

The ultimate success of the Inter-American Investigation of Mortality in Childhood depends on the resulting actions, especially for the health of children throughout the Continent, which requires the combined efforts of principal collaborators, health authorities and educators.

- APPENDICES:
- I. List of Participants
 - II. Working Groups for Formulation of Recommendations
 - III. Definitions

INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD

Meeting of Principal Collaborators

Washington, D.C., 24-28 January 1972

LIST OF PARTICIPANTS

Principal Collaborators of Field Projects:

Cali, Colombia:	Dr. Francisco Villadiego*
Cartagena, Colombia:	Dr. Abel Dueñas
	Dr. José Rojas, Medical interviewer
Chaco Province, Argentina:	Dr. Rubén A. Castro
Kingston Area, Jamaica:	Dr. Kenneth Standard*
	Dr. Halmond Dyer, Associate
La Paz Area, Bolivia:	Dr. Gregorio Mendizábal
Medellín, Colombia:	Dr. Julio León Trejos
Monterrey, Mexico:	Dr. Dionisio Aceves
Recife, Brazil:	Dr. Fernando Figueira
	Dr. Roberto Nunes, Medical coordinator
Ribeirão Preto Area, Brazil:	Dr. José Romero Teruel
San Francisco Area, U.S.A.:	Dr. Helen M. Wallace
	Dr. Hyman Goldstein, Associate
	Dr. Ethel Barnoon, Associate
San Juan Province, Argentina:	Dr. Valois Martínez
San Salvador Area, El Salvador:	Dr. Eduardo Suárez
Santiago Area, Chile:	Dr. Adela Legarreta
São Paulo, Brazil:	Dr. Ruy Laurenti
Sherbrooke Area, Canada:	Mr. Louis Munan
	Dr. Anthéa Kelly, Associate

Agency for International Development, U.S.A.:

Dr. Joe Davis
Mr. Alfred J. Davidson

World Health Organization:

Dr. Harold Hansluwka

Pan American Health Organization:

Dr. Hans Bruch
Mary H. Burke
Ann Dillon
Dr. Ruth R. Puffer
Dr. Carlos V. Serrano

*Unable to attend.

INTER-AMERICAN INVESTIGATION OF MORTALITY IN CHILDHOOD
Meeting of Principal Collaborators
Washington, D.C., 24-28 January 1972

WORKING GROUPS FOR FORMULATION OF RECOMMENDATIONS

Wednesday, January 26, 2:00 PM

A. Birth and Death Registration and Vital Statistics

Dr. Ruy Laurenti, Coordinator	Dr. Anthéa Kelly
Dr. Rubén A. Castro	Dr. Adela Legarreta, Rapporteur
Dr. Halmond Dyer	Dr. Harold Hansluwka

B. Hospital Records, Procedures and Statistics

Dr. Valois Martínez, Coordinator	Mr. Louis Munan
Dr. Abel Dueñas, Rapporteur	Dr. José Romero Teruel
Dr. Gregorio Mendizábal	

C. Maternal and Child Health and Nutrition

Dr. Fernando Figueira, Coordinator	Dr. Julio León Trejos
Dr. Dionisio Aceves	Dr. Helen M. Wallace
Dr. Roberto Nunes	Dr. Ethel Barnoon
Dr. Eduardo Suárez, Rapporteur	

Friday, January 28, 9:00 AM

D. Education in Health Sciences

Dr. Abel Dueñas, Coordinator	Dr. Gregorio Mendizábal
Dr. Dionisio Aceves, Rapporteur	Mr. Louis Munan
Dr. Rubén A. Castro	Dr. Eduardo Suárez
Dr. Halmond Dyer	Dr. Helen M. Wallace
Dr. Fernando Figueira	

E. Research Programs

Dr. José Romero Teruel, Coordinator	Dr. Adela Legarreta
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DEFINITIONS*

The following definitions have been adopted by the World Health Assembly under Article 23 of the Constitution of the World Health Organization (Off. Rec. Wld Hlth Org., 1950, 28, 17 and 1967, 160 11 and Annex 18).

1. Live birth

"Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born."

2. Foetal deaths

"Foetal death is death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles."

3. Causes of death

"The causes of death to be entered on the medical certificate of cause of death are all those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries."

4. Underlying cause of death

"The underlying cause of death is (a) the disease or injury which initiated the train of events, leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury."

*International Classification of Diseases, 1965 Revision, World Health Organization, Geneva, 1967, Vol. 1, p. 469.