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REPORT OF THE PAHO ADVISORY COMMITTEE ON HEALTH RESEARCH

The Advisory Committee on Health Research (ACHR) met 16-20 July 1985 in Havana, Cuba. Of the 15 Members of the Committee, 10 of the distinguished investigators from various health-related fields, as well as 30 observers were able to attend.

This year the Agenda of the Meeting addressed issues related to specific concerns of the Committee members.

Thus, in the first session, the members discussed certain aspects of the administration of research, such as:

- PAHO funds for research activities;
- The report of the Subcommittee for Restructuring the Advisory Committee on Health Research; and
- The report of the Study Group on Logistic Support for Research Activities at the Country Level.

The second session dealt with subjects which either have never been debated before or have been discussed only infrequently. These included:

- The current status, trends and perspectives of biotechnology research in Latin America, an area of increasing importance both from a scientific as well as an economic point of view;
- Environmental health problems, such as ongoing research priorities in air pollution, which constitute a progressively important subject within the Region; and

- The need for applied research and development priorities in the Expanded Program on Immunization. (This theme is of great interest to the Organization, because PAHO has established the goal of eradication of indigenous transmission of wild poliovirus from the Americas by the year 1990.)

In the third session, the strategies necessary to attain the goal of health for all by the year 2000 were discussed, including the role of the universities in the Americas.

Lastly, in the fourth session, the group examined and discussed:

- The report of the XXVI Meeting of the Global Advisory Committee on Medical Research; and
- The report of the actions carried out based on the recommendations of the XXIII Meeting of the Advisory Committee on Health Research.

The Committee strongly endorsed bilateral and multilateral technical cooperation activities among national research councils and institutions, including universities. In so doing, it recommended to the Director that he encourage the countries to increase their funding for scientific research in general and to health research in particular. The latter should be recognized as one of the pillars on which rests part of the solution of some of the most salient health and services problems that affect the wellbeing of the peoples of the American Region and thus will become an effective contributor to attaining the goal of health for all by the year 2000.

The Director is pleased to present to the Directing Council the "Report to the Director" from the Advisory Committee on Health Research, which is attached as an annex.

Annex

CD31/31 (Eng.)
ANNEX

**PAN AMERICAN HEALTH
ORGANIZATION
ADVISORY COMMITTEE
ON HEALTH RESEARCH**

**PNSP/85-25
TWENTY-FOURTH MEETING**

16-20 JULY 1985

HAVANA, CUBA

REPORT TO THE DIRECTOR

PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION

Washington, D.C.

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XXIV MEETING OF THE ADVISORY COMMITTEE ON HEALTH RESEARCH

I. INAUGURAL SESSION

1. Address by the Vice-Chairman of the Committee on Health Research

The inaugural session of the XXIV Meeting of the ACHR was chaired by the Committee's Vice-Chairman, Dr. Guillermo Soberón Acevedo, Secretary of Health of Mexico.

He was accompanied at the head table by Dr. Sergio del Valle Jiménez, Minister of Health of Cuba, Dr. Rosa Elena Simeón Negrín, President of the Academy of Sciences of Cuba, Dr. Carlyle Guerra de Macedo, Director of the Pan American Sanitary Bureau, and Dr. María Leite-Ribeiro, Chief of the Office of Research Coordination in PAHO/WHO and Secretary of the Committee.

Dr. Soberón welcomed all those present and announced that he would chair the proceedings during the first day until the arrival of Dr. Frederick Robbins, the Chairman of the Committee. He then gave the floor to Dr. Carlyle Guerra de Macedo, Director of the Pan American Sanitary Bureau and thereafter to Dr. Sergio del Valle Jiménez, Minister of Health of Cuba.

2. Address by the Director of the Pan American Sanitary Bureau

"It is a most distinct satisfaction to have the opportunity to say a few words to you in this Inaugural Session of the XXIV Meeting of the Advisory Committee on Health Research of the Pan American Health Organization. It is such because, among other reasons, we are meeting in this most hospitable country, and I can only join Dr. Soberón in the appreciation he has expressed to the Minister of Health, Dr. del Valle, for the welcome we have received and for his support in the holding of this meeting.

"Among all the observers and participants in this meeting whom I bid welcome as Director of the Pan American Sanitary Bureau, I want to mention particularly the two new members of the Committee who today for the first time join in the proceedings of this advisory group of the Organization: Dr. Aldo Neri, Minister of Health of Argentina, and Dr. Luis Fernando Duque, President of the National Institute of Health of Colombia. May they and all the other colleagues and companions who are with us on this day, be welcome.

"It is now almost trivial in meetings such as this to refer to the particular situation in which our Region now finds itself, and in particular to that of the developing countries in our Hemisphere. The economic crisis, whose roots and effects have proved deeper and more lasting than we could like, is still with us. Its implications in all

fields of human endeavor, including the provision of health services and the pursuit of research and technological development work, need no emphasizing here. However, I do think it is worthwhile to mention that one outcome of this crisis has been a realization that the development models we went by during the famous three development decades of Latin America and the Caribbean are proving insufficient and inadequate. Even the most orthodox in economics and development theory recognizes that in surmounting this crisis we must not repeat the solutions of the past but look for new arrangements along paths that tend to remove the injustices that have so far accompanied the development of our countries.

"A factor of utmost importance for the design of these new development models and the solutions we must adopt is the building up of knowledge about those problems and, in our case, about those in the health field.

"Since the last meeting of the Advisory Committee on Health Research in Washington last year, scientific research and technological development have reported fairly significant results of different kinds in the diverse fields connected with health. I will here cite some results of importance to health that are not within the sector or not directly connected with it, such as the great progress made in the sciences of communication and information management. The technological advances made in these two areas make it concretely possible for us to take an important step in the area of scientific information, which is one of the major obstacles to scientific activity and the improvement of health services in the countries of Latin America and the Caribbean. These advances also make it possible to improve the management of the scarce resources available to us for solving the health problems of our populations.

"We must also note the major gains made since our last meeting in biomedicine. The work to refine existing vaccines and develop new ones is bringing us ever closer to the prevention of such diseases as malaria, which is alarmingly on the increase in our populations. Though in the short run we may not yet have a vaccine, it is promising in itself that immunizing antigens against P. falciparum are already available for testing. In this short span we have also seen new drugs capable of inhibiting the reproduction of P. falciparum in vitro. There is no doubt that these gains are made all the more important by the resistance that P. falciparum has developed to conventional antimalarial drugs, even to mefloquine, a recent addition to our therapeutic armamentarium, and to which resistant strains may emerge in the medium term.

"Biomedical research has also continued to generate major findings about the degenerative diseases. We know much more about oncogenes, and particularly their precursors, the proto-oncogenes, the mechanisms that trigger them, the proteins they codify, and how they promote cell division. The implications of this knowledge for future cancer-treating

techniques are obvious. We now also have a more effective means for dissolving clots that obstruct vascular circulation, the tissue activator of plasminogen, whose production no longer poses any problem. The results of ten years of research in monoclonal antibodies have already found large numbers of applications in routine clinical diagnosis and even in molecule purification and recovery.

"There would not be enough time to cite all the advances made in biomedical research, much less if to them we add those made in the technology of apparatus and equipment for diagnosis and other forms of treatment.

"If we compare what I have just summarily referred to in biomedicine and technology with what is going on in the development of health services, the paradox is glaring. In almost all the countries of the Third World the most obvious fact is their inability to make proper use of this knowledge and technology for the benefit of their populations. Moreover, before the crisis, the three decades of development in Latin America and the Caribbean failed to overcome the injustice of the marginalization of one third of the population in Latin America and the Caribbean. This population still lives in acute poverty. In regard to health, more than that third, that is, more than 120 million inhabitants, still lack any proper and permanent access to services that are essential to the care of their health.

"The first conclusion to be drawn from this comparison is that efforts to generate knowledge in the organization and provision of health services and in the efficient use of the scarce resources available lag far behind the gains being made in biomedical and technological research.

"It is not my intention here to go into the causes of these differences, but for myself as Director of the Organization and as a health worker, it is clear that health services research must have priority in the years ahead. We must learn more about the ways of working out policies that are appropriate, realistic and workable. We have to learn about the ways and mechanisms by which the health technology process influences the organization of resources, the performance of workers, and even the behavior and demands of the population. We must determine more accurately the intimate relationships between health and the other sectors in the development process. We must analyze in depth the mechanisms by which health activities can be better financed. In short, we must lay a more solid foundation for the decisions and measures we must take to solve the problems of waste and misuse of resources, which in a situation of scarcity and crisis are no longer mistakes but almost social crimes in Latin America and the Caribbean, where the needs are so great.

"One of the salient developments of recent years, and particularly in the last year, is, I think, the clearer realization of this need that has emerged. This is why I think that conditions are right for the solving of some of these problems.

"Before closing I would like to comment quickly on two other matters. One of them is scientific activity itself and how it is organized and conducted. I think that we are moving increasingly away from the idea--or perhaps prejudice--that science and research are above all or almost solely the result of the efforts and individual initiatives of geniuses and near-geniuses. It is becoming increasingly evident that, although we understand the importance of stimulating the creativity of the individual, it is more than imperative that we marshal resources, determine objectives, establish policies and strategies, and make more efficient use of the powerful means for observation and analysis and for the management of information now available to us. However, when we view the countries of Latin America and the Caribbean, and particularly in the health field, what we see is that very few have been able to propose policies, programs, and plans for technological research and development geared to the solution of their own health problems. We could assign this failure to, and perhaps even excuse it by, the prejudices that have so long held us back in this absolutely essential effort. The other matter we should reflect upon is the part that the Organization should play in this situation I have summarily outlined. We are convinced that the main task is up to the Member Governments, but both this Committee and the Secretariat have the duty of accompanying very closely and of supporting as much as we can the efforts being made to change this situation.

"In closing I appeal to all the Member Governments, the Secretariat of the Organization and this Committee to take up with real, lasting and, we may hope, successful resolve the difficult challenge and stimulating task of organizing and developing science and technology in the health field for the benefit of the peoples of our Region."

3. Address by the Minister of Public Health of Cuba

"Distinguished participants in this XXIV Meeting of the Advisory Committee on Health Research: We are deeply honored by the choice that this Committee and its prestigious members have made of Cuba as the venue for the present gathering.

"On behalf of our Government and of President Fidel Castro in particular, I am gratified to bid you all most cordially welcome. We hope you will find conditions favorable to your proceedings, and your stay in our country as pleasant and interesting as we wish. You may also be assured of all the collaboration and support you may need both collectively and individually to satisfy any professional concerns that may be awakened by this visit to Cuba.

"Aside from the proceedings of the Meeting, we have scheduled a few activities designed to bring you into contact with medical research and practice aspects of the development of our health system which we are sure will engage your attention.

"One of our Vice Ministers will explain our policy on science and technology in the health field, and you yourselves will be able to judge it directly in visits to research centers and in exchanges with the Cuban specialists that work in them.

"Now, I am sure that what is most novel and perhaps most interesting in the Cuban health experience you will find in the primary care model we have started to introduce and which we have called the "Community Physician" or the "120-Family Physician."

"Since you are outstanding researchers in health systems and in the problems of organizing efficient primary care, particularly in the poor countries that make up the immense majority of humankind, I think you will find grounds for reflection in this experience, which will show how a country of limited resources can still obtain highly satisfactory results based on a consistent policy of priority to individual and public health care, economic and social development, and making the population itself an agent of its own health care.

"I must say that in our country this health policy is inseparably bound up with the ongoing guidance and personal involvement of Comrade Fidel, the leading standard-bearer of medical care for the people and the development of health.

"Of course, we are able to apply a concept such as that of the "Community Physician" today primarily thanks to the country's gains in the health field over the last 26 years.

"We could not even have dreamed of something like this at the beginning of the revolution, when about half of our physicians deserted the country for the United States of America, leaving only some 3,000, while, at the same time, we lacked the infrastructure needed to provide care to the entire population and medicine practiced predominantly on a private basis.

"Today we are able to set out on this road because we now have about 20,500 physicians, and we intend to graduate 50,000 more over the next 15 years, which will enable us to apply the criterion of primary medical care to the citizen wherever he lives, studies and works.

"Starting next year our country will graduate more than 3,000 physicians a year. Our medical schools now have 25,000 students enrolled on the basis of high ethical, academic and vocational standards. Thus, by the year 2000 we will be able to assign 20,000 physicians to urban and rural residential areas where they will provide regular care to the immense majority of our families, 30,000 physicians to the hospitals, polyclinics, and teaching and research centers, 5,000 physicians to schools, factories, ships and other places of works, several thousand to periodic tasks for the improvement of medical knowledge and refresher training, and, lastly, another substantial number that could go as high as 10,000 physicians to missions of collaboration for health in different countries of the Third World.

"This plan for the training of physicians and the requisite proportions of dentists, nurses and technicians is fully guaranteed.

"You will be able to visit areas where the "120-Family Physician" is already in place. You will be able to converse with the physicians and local inhabitants. I can tell you that we have found that this idea is literally revolutionizing our health services. We ourselves are discovering every day new advantages and possibilities that we never even suspected a few years back. As the primary link in the system, the community physician is becoming a social activist of enormous authority who tends the population, teaches it to take care of its own health, and influences social and family hygiene, habits of hygiene, and the provision by local inhabitants of the specialized medical treatment indicated by health institutions for the elderly, the chronically ill, gynecological patients, breast-feeding women, and others.

"In medical research the role of this physician is decisive, for it provides a linkage between theory and practice, direct verification of results and their application in social practice, and the accumulation of basic information for any study or program.

"Moreover, the presence of the physician by the side of the family makes it possible to coordinate and integrate much more effectively the efforts of all the social organizations which in our country cooperate resolutely in health work.

"Based on this model of medical and social care to the people, which will be such a source of strength to us, over the next 15 years the country proposes to advance to a qualitatively higher level of health services characterized by high quality, scientific and technological development, and research, which will enable us to prevent and treat more effectively the chronic diseases that pose the highest risks, accidents, aging, occupational injuries and diseases, and to improve the understanding of nutrition and other aspects of social hygiene, while at the same time encompassing the elimination of diseases preventable by vaccination, and access for all the population to immediate medical and dental care.

"By following this road we are certain of making new leaps in the level of health of our population, which will place us abreast or ahead of any industrialized country regardless of its economic development or wealth.

"In future, health education, health promotion and the prevention of diseases with the participation of society as a whole will acquire increasingly prominence. This is the end to which our basic objectives are geared.

"We ardently hope to be able to carry out these plans in a world of peace, communication and collaboration among the peoples and governments of the different countries without discrimination or exceptions. We want to profit from the advances made in the more developed countries and, at the same time, to be as helpful as possible to needier peoples. This, as you well know, brooks no delay.

"Advisors and guests, in the world of today the arms race squanders not less than US\$800,000 million every year. If we take as a standard my country, with an annual health budget of about 740 million pesos, that is, 74 pesos per capita since we have a population of 10 million, we come to the conclusion that only one third of those military expenditures could bring the entire Third World population--4,000 million persons--up to the Cuban level of care. So much for expenditures on armaments. If we turn to the economic problem--another of the very grave challenges facing mankind today--we find similar situations. The unprecedented crisis created by the astronomical soaring of the foreign debt of the Third World countries, with those of Latin America in the forefront, tragically affects the health status, medical care, and feeding of hundreds of millions of human beings. Returning to the Cuban indicators as a point of reference, the payments that Latin America and the Caribbean must make in the course of one year for interest and other debt-servicing charges alone, which come to US\$40,000 million, would provide every year for every man, woman, child and elderly person in this Region about one and a half times as much in resources as Cuba allocates for the health of its citizens.

"These are facts which, unfortunately, cannot be ignored as we address the problems of health services research.

"In closing, I want to repeat once again that all the modest fund of experience built up by Cuba in this field is at the disposal of yourselves and of the international health agencies you represent, with which we are collaborating closely and whose objectives we wholly share. I wish you success in your proceedings and a useful and pleasant stay in our country."

II. WORKING SESSIONS

Dr. Soberón requested that Drs. Luis Fernando Duque and Aldo Neri serve as Rapporteurs.

Organization and Administration of Research in PAHO

4. PAHO Funds for Research Activities

As an introduction to her presentation on the funds that the Organization assigns to research, Dr. Leite-Ribeiro gave a brief review of PAHO's research activities, which, she said, were mainly for promotion, coordination and support purposes.

It has been decided that, as a matter of policy, responsibility within PAHO for the pursuit of research in specific subjects, including technology evaluation, lies with the several technical programs, which are charged with:

- Identifying gaps of knowledge which it is essential to fill for the solution of health problems.
- Promoting and supporting the generation of knowledge to fill these gaps, with due regard for the needs and possibilities of each country.
- Identifying local researchers and institutes that can cooperate in the Organization's research activities, and promoting the formation of research networks and research training.
- Promoting training in research.
- Compiling, analyzing and disseminating information on research activities for use in decision-making.

The Research Coordination Unit has the following functions:

- Supervising the implementation of research policies.
- Exchanges of information among programs and the coordination of their activities.
- Monitoring research efforts and their trends throughout the Region and strengthening these functions in the countries.
- Cooperating with Member Governments in the development of an infrastructure to make it possible for knowledge to be used effectively in the formulation of health policies and programs; determining which gaps of knowledge should be filled by encouraging multidisciplinary research and, in consequence, setting research priorities.
- Supporting research in the social sciences and operations research.

Of the 1,002 research projects in different subjects sponsored or supported by PAHO or even carried out by PAHO staff between 1961 and 1983, 330 (32.9% of the total) related to zoonoses and foot-and-mouth disease, 144 (14.4%) to food and nutrition, and 108 (10.8%) to infectious diseases; or, altogether, 58.1% of the total. Environmental health, parasitic and chronic diseases, and perinatology accounted for 253 (25.3%) of the projects, and the remaining 167 projects (14.7%) were in other subjects. PAHO staff carried out 634 of these projects and 367 on the initiative of local researchers.

In the first of the two latter groups, 323 projects (50.9%) relate to zoonoses and foot-and-mouth disease, 134 (21.1%) to food and nutrition, and 43 (6.8%) to perinatology. In the other group of projects carried out by local researchers, 85 (23.1%) were concerned with infectious diseases, 71 (19.3%) with environmental health, 51 (13.9%) with chronic diseases, and 50 (13.6%) with parasitic diseases.

A more comprehensive view of PAHO's research activities requires a consideration not only of the research projects in progress, but also, as previously mentioned, of all research-related technical cooperation activities such as those for promotion, advisory services, information, etc. A determination was accordingly made of the research activities (in the broadest sense of the term) proposed for carrying out in 1984 under PAHO's programs at both the country and regional level, not counting PAHO's Centers. This information was obtained from the System for the Programming, Monitoring and Evaluation of PAHO's Technical Cooperation with the countries (AMPES).

Of the 5,703 technical cooperation activities programmed for 1984, not counting those of the PAHO Centers, 4,676 (82%) originated in country programs and 1,027 (18%) in regional programs; 413 of them (7%) could be considered as research activities. Of these, 240 (4%) were part of country programs and 173 (3%) of regional programs. Technical cooperation in research accounted for 17% of all activities programmed at the regional level and 5% of those programmed in the countries.

Four of the Organization's programs--Maternal and Child Care (HPM), Tropical Diseases (HPT), Health of Adults (HPA), and Health Services (HSC)--accounted for 72.4% of all programmed research activities. The first three programs accounted for 72.9% of all research activities under the regional programs, and the four programs together accounted for 67.5% of all research programmed by the countries.

This unevenness in the distribution of programmed research among the different regional programs is also found in the country programs in which seven countries (Argentina, Brazil, Colombia, Cuba, Mexico, Nicaragua and Peru) accounted for 54.5% of all research.

Although it is difficult to assign quantities to research efforts in relation to the number of programmed activities alone, the data presented:

- are indicative of the relative value of research activities in the totality of technical cooperation activities;
- suggest that some programs have a greater tendency than other to engage in research activities; and
- indicate that some countries do not regard research as a need in the framework of the technical cooperation provided by PAHO.

In relation to the research funds used in 1984, information was obtained on each of the following categories:

- Professional and support staff belonging to the Organization.
- Consultants and advisers not part of the staff of the Organization.
- Meetings, including seminars, workshops, courses, committees, etc.
- Supplies and materials.
- Formal publications and information work in general.
- Grants, contracts and agreements for technical services.

Each of these categories was also broken down by sources of funds into regular and extrabudgetary.

The funds for research, including research coordination, under all regional programs came to US\$9,958,492.

- The expenditures of programs with centers, but not counting those centers, came to \$1.5 million.
- Expenditures of the centers themselves were almost \$5,250,000.
- In all, programs with centers spent \$6,750,000 on research and those without centers \$2,200,000.

Programs with centers used 75.3% of all research funds, of which 54.1% was provided on the regular budget.

Moreover, only in regional programs without centers, the proportion of regular funds used for research went up to 67.9%.

Of almost US\$10 million allocated to research under the regional programs, 4.8% went for meetings; 14% for supplies; 4.2% for information services, and 14% for grants and contracts.

Of the funds allocated to the regional programs in 1984, about US\$43 million, or 20.5%, was used for research. This figure represents 18.4% of the portion provided from the regular funds and 24.3% of that from extrabudgetary sources.

Information on country programs was sent in only by the PAHO Country Offices in Belize, Brazil, Colombia, El Salvador, Mexico, Paraguay, Peru, Suriname, Trinidad and Tobago, and Venezuela. In these countries more than US\$2.1 million, or 11.8% of all the funds allocated to those country programs, was spent on research; 57.3% of the funds for research came from extrabudgetary sources.

Figures on PAHO's allocations for research have been published before. In 1967 the budget for research was placed at US\$2,500,000, at \$3,600,000 in 1970, at \$4,100,000 in 1976, and at more than \$17,000,000 in the biennium 1980-1981. However, these amounts are hard to compare with the current figures for a variety of reasons. In earlier reports nothing was said about how the information was obtained, or else the figures were stated differently. Besides, only on some occasions was information provided on the funds for research coordination. Moreover, this time data on most of the country programs could not be included. Another impediment to comparison is that up to 1979 the Organization's budget was annual, but since 1980 has been biennial. Obviously, expenditures for research cannot be the same in the two years. It also has to be considered that extrabudgetary funds are being continually received in the course of the biennium.

The foregoing notwithstanding, the amount established for 1984, more than US\$11 million, though incomplete, does reaffirm PAHO's interest in research, especially in view of the fact that over the years PAHO's work in this field has been particularly dependent on the availability of extrabudgetary funds.

In 1967 and 1970, 18% and 24%, respectively, of the funds allocated by PAHO for research came from its regular budget, the balance being provided from extrabudgetary sources. During the biennium 1980-1981 the regular budget supplied 35% of those funds. In 1984, however, more than 50% of them came from that budget.

On making this study, we have learned that to obtain more exact figures on research expenditures, a survey will have to be made at the end of each budgetary period, i.e., every two years, or a regular system devised for keeping track of income and expenditures of funds for research activities. In addition, if a survey is taken, it will be essential to refine the data collection instrument and, in particular, to find a way to elicit more responses from the Country Offices.

Discussion and Recommendations

The members of the Committee congratulated those in charge of research coordination for the paper presented and said that it was the first time they had been provided with information that made it possible for them to evaluate the programming and the expenses of the Technical Cooperation of PAHO/WHO in the field of research with greater clarity. In addition, from the analysis presented, one could infer the budgetary implications of the decisions for the promotion of research.

The Director of PAHO explained that there were factors that could distort information, for example, the obtaining of insufficient funds actually applied to research, such as those allocated by the countries directly. The Committee was of the view that, while this might be the case, influences could be at work to determine the use to which funds are

put, and the important thing was the certainty that allocations go to the priority health problems. It could happen that the excellence of some research groups or the creation of infrastructures by PAHO through its Centers would cause the diversion of funds away from the promotion of other priority areas.

Most of the members expressed surprise at the high percentage of the regular budget that the Organization spends on zoonosis research in its specialized centers, and said that its inclusion in the statistics distorted the real research expenditures for human health.

The participants recognized the importance of eradicating foot-and-mouth disease to the economies of the meat-producing countries, and suggested that the governments be urged to make a massive subregional effort to eradicate the disease.

The Director explained to the Committee the specific situation in the centers doing research in the zoonoses and said that in the short run it would be difficult to eliminate this activity within the Organization, but that, in the long term, consideration could be given to the elimination not only of these centers but of all the specialized centers. He said that they would be eliminated as the countries developed the required capacity to meet the needs now covered by the centers' technical cooperation activities. To illustrate this policy the existence of more than 30 national centers for health education technologies had made it possible to dismantle the Latin American Centers for Educational Technology in Health (CLATES) in Mexico and Brazil, whose functions have been taken over by the corresponding national centers.

Nevertheless, the Director said he shared the Committee's concern and recognized that the Organization's funds for research in human health should be increased.

5. Report of the Subcommittee for Restructuring the Advisory Committee on Health Research

The Subcommittee's report was presented by its Chairman, Dr. Guillermo Soberón Acevedo, who summarized the facts that had led to its creation. He then read out the report, which described the areas in which it is the ACHR's function to advise the Director. These areas are as follows:

- a) Policies applicable to health research in the Region in the framework of WHO's Global Research Policy and in keeping with the guidelines issued by the Governing Bodies of WHO and PAHO.
- b) Formulation of the regional research priorities in line with the objectives of the General Program of Work of WHO, the Regional Plan of Action to implement the Regional Strategies of Health for All by the Year 2000, and PAHO's Medium-Term Program, which covers a specific period and is based on the priority needs of the countries of the Region.

- c) Development of the research potential of the countries in the Region.
- d) The establishment of appropriate mechanisms for the conduct and coordination of research in the Region and for cooperation with other regions and with operations at the global level in WHO.
- e) Evaluation of research activities in the Region.

In regard to a) it is recommended that the basic function of the ACHR be the periodic review, analysis and evaluation of the Organization's research policies and strategies. This activity will be made a topic for discussion in all future meetings of the ACHR.

On b) it is recommended that the function of the ACHR be to review and evaluate established priorities, the methodology by which they have been arrived at, and their relevance to the Organization's research policies.

The Subcommittee, considering that in 1984 the Internal Advisory Committee on Research established the research priorities for PAHO's grant program, recommends that, when considering this report at its next meeting, that Committee also review and examine these priorities. The Chairman of the Subcommittee said that this matter would be dealt with in the executive session.

On c) it is recommended that the Committee periodically discuss one or two special topics that might give rise to original ideas or approaches in areas of research not sufficiently explored or that are perceived as of possible importance for the Region.

On d) it is recommended that, in the periodic evaluation of each of the programs, special attention be given to implementation of the following strategies:

- The design and conduct of multicenter health research projects in the Member Countries using the same or equivalent methodologies and reported in such terms that the results can be compared and equally applied. This will in turn favor the formation of networks of collaboration among participating countries.
- The conduct of national multicenter health research projects for the dual purpose of promoting intrasectoral coordination and mobilizing the country's resources.

It was especially emphasized that the selection of the members of the Committee would be of paramount importance in this activity.

On e) it is recommended that the evaluation be carefully planned, and that it include the formation of ad hoc subcommittees with specialists among their members, and visits to the field as necessary.

The Subcommittee also recommends that the ACHR review and evaluate:

- PAHO's research program and the functions of the components of the system every two years. To this end, the Secretariat must provide it with an analysis of programmed activities, the level of execution, costs, types and numbers of research activities carried out during the biennium.
- The research activities of each PAHO program every four years, with a maximum of three programs per annual meeting.

In relation to the membership of the ACHR, the Subcommittee recommends that the ACHR have a standing core membership of 15 administrators and researchers experienced in the formulation of policies and the organization of research in health and related sectors.

It also recommends that ad hoc subcommittees be made up of researchers and administrators in specific program areas, who would be called upon to work as necessary with a member of the ACHR in the review and the evaluation of a program or the establishment of future lines of research in specific areas. These ad hoc subcommittees would report to the ACHR on their work.

Concerning the designation of members, the Subcommittee recommends:

- That the 15 members of the ACHR be appointed by the Director. Every year the two members with the longest tenure on the Committee would retire so that the membership may be continually renewed.
- That a member of the ACHR who is absent from two consecutive or three alternate annual meetings cease to be a member.
- The ACHR would have a Chairman and Vice Chairman appointed by the Director for four years.
- The Chairman and Vice Chairman of the ACHR shall, in conjunction with the Secretariat, maintain the continuity of the ACHR's activities between meetings.
- The other members of the ACHR shall direct the proceedings of the ad hoc subcommittees entrusted with the evaluation of the different programs. They will also serve as focal points for the topics within their specific fields of technical competence which will be dealt with in the annual meetings. In addition, they will serve as liaison with the technical program or programs concerned with matters falling within their specialties.
- The members of the ad hoc subcommittees may be nominated by the members of the ACHR or by the technical programs of PAHO, but shall be chosen and appointed by the Director.

Dr. Soberón finished his presentation stating that another recommendation made by the Subcommittee was that, in order to improve the functioning of the ACHR, the topics of each meeting be selected by the Chairman of the ACHR and the Director of PASB and discussed with all the members in Executive Session. In addition, the Subcommittee also concluded that, irrespective of its structure and of the functions that would be assigned to the ACHR, its effectiveness would largely depend on a systematic and continuing communication between the Secretariat and its members rather than sporadic communication, as had been the case thus far.

Discussion and Recommendations

On the basis of the discussion that arose on Dr. Soberón's report and the analysis made of the documents presented by the Secretariat, the Committee accepted the recommendations made by the Subcommittee for restructuring the ACHR.

In regard to the difference between the functions of the ACHR and the Internal Advisory Committee on Research (IACR), the Director of PASB explained that the Advisory Committee on Health Research had a broader scope encompassing all PAHO's research subjects and the health research of the countries in the Region. On the other hand, the Internal Committee helped coordinate the research going forward in the Organization's framework and in the establishment of priorities and machinery for implementation of the PAHO/WHO Grant Program.

The Committee decided to set up a small group consisting of Drs. Guillermo Soberón Acevedo, Roberto Caldeyro-Barcia, Luis Fernando Duque and Rodrigo Guerrero, which in turn decided that in the Executive Session broader discussions would be held on the part to be played by the Internal Advisory Committee and the research priorities of the PAHO Grant Program. They also decided to present for discussion in the Executive Session the following recommendations:

- That the Director communicate his decisions on the Committee's recommendations as soon as possible.
- That relations between the ACHR and the IACR be strengthened by a growing exchange of information between them. The Research Coordination Unit would have charge of the exchange by distributing the minutes of the IACR to the members of the ACHR.
- That, so that it could properly advise the Director on the Organization's priority research activities, the ACHR be provided every two years with an analysis of the health situation in the Region and the research priorities of the different Member Countries. The information on the health situation analysis must include data on mortality and morbidity and on their causes, with emphasis on those preventable by proper use of the available scientific knowledge, in addition to up-to-date information on the status of health care systems. In addition, the Committee must be supplied with data on the research being promoted and financed by PAHO/WHO and other international agencies in the countries of the Region.

- That the Secretariat devise methods for standardization of the program evaluation referred to in the Subcommittee's report and accepted by the Committee.
 - That for performance of the ACHR's function referred to in subparagraph (d) of the Subcommittee's report, the members of the Committee travel to the countries that do not have members on the ACHR to promote through the scientific community there the type of research that is of interest to the Organization.
 - That panels of specialists and administrators in the health sciences be formed in the countries where they do not exist, with the direct participation of the Committee.
 - That ongoing communication be established between the Chairman of the ACHR and the Director of PASB on the formulation of the annual program of work of the members of the Committee.
6. Report of the Study Group on Logistic Support for Research Activities at the Country Level

The report of the Study Group was presented by Dr. José Rodrigues Coura, who stated that most if not all logistical problems in conducting research stem from a lack of de facto recognition of research as a national priority. This, in turn, results in the absence of an adequate infrastructure for research development in some countries and in a very weak one in others. Despite this very serious constraint, some of the salient logistical problems that hinder research activities of country level were identified as lack of qualified staff, current information, and some types of equipment and reagents. Given the Organization's role in the administration of knowledge, and the very important part played by research in this role, there was consensus in the Group that PAHO could make a substantial contribution to solving the aforementioned problems.

- Concerning the recognition of research as important for the development of the countries, it was considered that the Pan American Health Organization/World Health Organization should continue to stimulate the ministries of health and the universities to give recognition to the importance of research to the overall development process. Furthermore, it should reinforce the role of research institutes in this process. To attain this objective the Group recommended that the Organization conduct seminars and conferences on health research policies for the staff of health and education ministries and national research councils, similar to those held from 1976 to 1982.
- In regard to the lack of trained personnel, although it was agreed that some exchange training programs between universities and research institutes of countries in the Region are taking place, the Group considered that a more aggressive

attitude on the part of PAHO should increase, facilitate and accelerate this type of exchange. The Group specifically recommended that the Director encourage among Member Governments the allocation of a significant percentage of the PAHO Fellowships Program funds for training of researchers in techniques needed for the conduct of research in program priority areas. The Organization should also make greater use of existing WHO Collaborating Centers with research training functions for placement of research trainees of this Region. In addition, PAHO should develop a data bank on researchers, institutions and their areas of work in Latin America and the Caribbean and make it available to the Member Countries.

- In relation to this scarcity of equipment and reagents, it was recognized that most Latin American countries do not produce their own equipment and reagents for research, and that importation procedures are becoming increasingly difficult and complicated because of high cost, lack of hard currency and bureaucratic obstacles that the countries themselves put in the way of importation.
- The group recommended that mechanisms be devised to facilitate the importation of equipment and reagents for research through PAHO country offices. The scarce research now being conducted is sometimes hindered by a lack of needed materials and reagents. It recommended that the Director of PASB establish an emergency fund for the acquisition of those materials for ongoing projects which respond to national and regional priorities. It also recommended that the Secretariat develop guidelines for the allocation of those funds and study means to streamline existing mechanisms, as well as that all PAHO Technical Programs appoint a scientific advisory committee with authority to determine research subjects to be promoted and those that could make use of the previously proposed emergency fund.
- Concerning information, the most important problem is the lack of technical libraries, and difficulties in the purchase of technical books and journals. To contribute to the solution of this problem the Group recommended as a matter of urgency that PAHO's Technical Programs prepare updated bibliographical information and summaries in their priority research subjects and circulate them to the countries through the Organization's Documentation Centers. It was also recommended that the Organization make full use of the most advanced communication systems.

Discussion and Recommendations

The Committee accepted the Working Group's diagnosis as to the low priority given in the countries to health research in particular and scientific development in general. It concluded that the Organization,

in addition to continuing the strategy of strengthening its relations with health and education ministries and science and technology councils, should establish working relations with the national legislative bodies in consideration of the fact that it is they who decide on the allocation of resources for research in the countries.

The report presented gave rise to an interesting discussion on the priority that should be given to basic medical research within PAHO, particularly if the proposed emergency fund were established.

Some members expressed concern over the progressive decline of basic medical research in the Region, and others said that, historically, the scientific community had always favored this type of research and had downgraded the importance of health services research.

Despite these apparently opposed views, the consensus in the Committee was that there should be some mechanism to prevent research in progress from being interrupted by emergencies. It was proposed that some mechanism be devised for this purpose. It should be used for any research in progress that had been registered with and approved by PAHO, whether or not financed by it.

The Committee welcomed the indications of the Study Group, and specifically recommended:

- That PAHO include in its programs support to research in universities and basic medical science research institutes, and mainly to that oriented to the acquisition of original knowledge that could serve as a basis for the solution of health problems.
- That an emergency fund be established for the purchase of needed materials and reagents so that the few research projects in progress in the Region would not be halted or delayed for lack of them.
- That PAHO expand the existing mechanism for facilitating the rapid importation of equipment, materials, chemicals and other inputs to the laboratories of universities and research institutes in the Member Countries that may be needed for the conduct of health research projects previously registered with and approved by PAHO.
- That the Member Governments be encouraged to allocate a significant number of the fellowships awarded under PAHO's Fellowships Program for researchers at universities and research institutes to participate in advanced research in other countries that would bring them abreast of developments in their fields and refresh their knowledge in specific subjects and enable them to participate in scientist exchange programs.

- That PAHO's technical programs prepare and distribute bibliographical updates and revisions in their respective priority research areas.

III. WORKING SESSIONS ON SPECIFIC RESEARCH SUBJECTS

7. Current Status and Trends of, and Prospects for Biotechnology Research in Latin America

BIOTECHNOLOGY

Dr. Ramiro Martínez Silva (PASB) in his presentation stressed that the spectacular advances made in the last few years in microbiology, molecular biology, biochemistry, genetics and other disciplines have led to an unprecedented development of biotechnology and given this discipline an increasingly important part to play in the socioeconomic progress of countries. The rational and reasonable application of the latest advances, such as gene splicing, the production of monoclonal antibodies and protein engineering, to the solutions of problems in the fields of health, food production, energy, and the environment, has led to the development of technologies that have made themselves felt in the industrialized countries. In the struggle to control diseases and to achieve health, results have already been attained, and evidence of what biotechnology can do is seen almost daily in the mass media.

The expectations of the less industrialized countries from a technology that opens such broad horizons are legitimate, and they are preparing to make use of it either through the transfer of inventions from abroad or in the form of local innovations.

The unfavorable economic situation in which the Region finds itself, and which is unlikely to improve in the short run, makes biotechnology potentially attractive compared with other technologies whose cost places them beyond the reach of many of the countries. Hence, in spite of current constraints, governments have begun to show interest in the development of biotechnology programs, an area of knowledge geared to the production of goods and services through the use of biological systems and their products. This field has evolved from traditional practices and has been augmented by scientific knowledge generated by biological sciences and bioengineering. Bioengineering supplies the basic engineering knowledge that makes it possible to rationalize biological processes for use in production.

An important characteristic of biotechnology is its interdisciplinarity for it draws on the basic sciences, although in many biotechnological developments practical knowledge and tradition have been of decisive influence. Since the dawn of civilization human societies have deliberately selected organisms for the improvement of their crop growing and animal husbandry, of the quality of their foods and fermented products. Genetics has supplied the scientific methods for this process

and molecular biology the knowledge needed to select microorganisms with a high degree of genetic and physiological specialization. However, it is a notable characteristic of biotechnology that the whole process can take place at different levels of scientific and technological knowledge.

Between the practical knowledge of traditional biotechnologies and the fundamental knowledge based on modern science there is a range of possibilities for biotechnological adjustment. Biotechnologies can be generated or adapted for given purposes and under specific socioeconomic and environmental situations. Thus different levels of biotechnology have been established: low-cost intermediate and appropriate biotechnologies. At the first level, the criterion is the cost dimension; at the second, the degree of complexity; and at the third, the social and cultural acceptability. The term appropriate biotechnology--which varies with the circumstances in which it develops--implies the use of local resources, techniques and personnel to attain a specific goal in a given socioeconomic and environmental setting.

There is a feedback process in operation among fundamental biological knowledge, bioengineering and biotechnological development.

As biology has revealed, the working of the cell, and especially of its molecular and regulatory mechanisms, it has become possible to develop increasingly efficient production processes. Today the advances made in cellular biology, molecular genetics and biochemistry have converged to give rise to a new, or modern biotechnology (NBt), as the biotechnology is arbitrarily called that uses organisms modified by the techniques of recombinant DNA. With these techniques the genetic makeup of the organisms used can be changed at will. NBt also includes procedures based on cellular fusion, which includes the fusion of plant protoplasts and the production of hybridomas to secrete monoclonal antibodies.

Undoubtedly, NBt will have a considerable impact on Latin America. In some cases this impact will be beneficial with the development of vaccines and faster medical and veterinary diagnostic techniques. The application of new methods for the culturing of recombinant DNAr in plant tissues and cells to arrive at plant species resistant to the high concentrations of aluminum in tropical soils will make possible the expansion of crop-growing to marginal areas. In other cases, adverse social and economic effects could ensue if developed countries find through NBt ways to make substances now produced in Third World countries or substances that can replace them.

Though NBt can be attractive to the countries in the Region, many problems remain that require traditional biotechnology which involves neither recombinant DNAr techniques nor of monoclonal antibodies. Several countries do not yet produce their own vaccines even though the requisite technology has been known for years. Many Latin American fermentation industries still operate under primitive conditions, but the profits they earn in a captive market are substantial enough that there

is no incentive to consider a resource as elementary as the improvement of their microorganism strains by conventional methods in order to improve their production. In some cases, the use of reactors is very limited despite the fact that the introduction of reactor fermentation technology is an important and necessary step for improving on obsolete production processes. In fact, the design of biological reactors is an undeniable need for the entire Region. The production of biogas in rural areas requires a classic technology, totally unrelated to recombinant DNA and monoclonal antibodies, but great economic and social importance to campesino communities in several Latin American countries. This technology--though classic--still has many unsolved problems the solutions to which are not to be found in the biotechnology textbooks of the industrialized countries, which never had any need to use it.

The industrial biological processes in use in Latin America usually spring from traditional technologies such as the manufacture of alcoholic beverages, distillates, bread yeasts, enzymes for the production of dairy products, etc. However, the biological industries that require more advanced technologies, such as those for the production of antibiotics, microbiological enzymes, citric acid, amino acids, etc., have been set up and put into operation by the foreign firms that own the technologies. In general, it can be granted that, despite the importance of biological processes in the agricultural energy industry in environmental pollution control and mining, and in the health field, areas whose development is of great social and economic impact, their development in the Region has been limited. The reasons for this limited biotechnological development, and for the inadequacy of biotechnology research programs, are that most of the countries have a limited basic sciences infrastructure; there is little if any linkage between higher education (research) and national development plans (the production system); a limited technology infrastructure at the pilot plant level; limited financing; and there are legal aspects as well (transfer of technology and patents). There is obviously, save in rare exceptional cases, a marked correlation between research and development activity and the state of industry, on the one hand, and the economic and social level, on the other hand. The trend is for even the countries with the least resources to try to develop their own technologies that will bring them a standard of living commensurate with their expectations. Many of the countries in the Region have at least some of the manpower needed to ensure the success of biotechnology programs, and national policies are giving technological development priority for the attainment of autonomy and emancipation from dependency on the more advanced countries. However, the conversion of this theoretical potential into practical reality will be no easy matter. The new scientific knowledge can be applied to the solution of Latin American problems only with the active participation of individuals and institutions in several countries. One desirable strategy would be to set up a Latin American Network of Biotechnology Centers, which could be done on a basis similar to that of the centers under the OAS's Regional Program for Scientific and Technological Development and the Latin American Regional Program for Graduate Training in the Biological Sciences of the UNDP. These initiatives have both contributed substantially to research and development in the Region using personnel and institutions already on hand in the countries.

The outlook will be favorable only if serious efforts are made to overcome these limitations, including a strong effort to promote biotechnology. All technological and development adaptation has a political basis and an economic reason. Any attempt to impose a technological innovation in a political vacuum, without social acceptance or any obvious economic benefit, is doomed to failure. Proper development in this area is possible only if all a country's production sectors perceive biotechnology as a necessary contribution to national and regional development. These are the only conditions in which biotechnological personnel can be efficiently absorbed into the production structure and proper appreciation be felt for its accomplishments, such as support to the development of more sensitive, specific and inexpensive diagnostic reagents, better vaccines, and new treatment methods, and support to several courses on hybridoma technology.

In closing his presentation, Dr. Martínez Silva presented to the Committee the priority areas for research and development in biotechnology with implications for the health sector as defined by a group of experts in a PAHO-sponsored meeting of November 1983. The recommendations covered the priority research areas and the following plan of activities for the development of biotechnology in the Region.

Priority was given to biotechnological research geared to the production of vaccines and the development of diagnostic methods, of bioinsecticides and drugs, and the following strategies were identified:

- Pointing out to Member Governments the importance of biotechnology, the opportunities it offers, and the wisdom of strengthening this area locally.
- Asking Member Countries to include the development and strengthening of biotechnology in their national policies on science and technology for economic and social development.
- Suggesting to Member Countries that they should identify priority areas of activity in biotechnology in response to local needs for products and services that will improve the quality of life of their people. This should be done by local interdisciplinary groups that can identify local needs and propose specific programs for arriving at the biotechnology that will meet those needs.
- Strengthening cooperation with Member Countries in defining priority areas and formulating actual development plans with emphasis on the importance of basic research in disciplines provides inputs to biotechnology.
- Establishing relations with the government agencies planning and financing basic and technological research in each country, and cooperating with them in the promotion of biotechnological development.

- Making an inventory of human resources in biotechnology as the basis for an analysis of needs and a determination of the characteristics of this personnel and their numbers in relation to the demands of development plans.
- Identifying and supporting local centers engaging in research and personnel training in the basic disciplines, and centers capable of providing the inputs needed for biotechnology programs for possible distribution to other centers and laboratories (monoclonal antibodies, restriction enzymes, microorganism strains, animal and plant cells, plasmids, bacteriophages, vectors, etc.). The identified centers could be organized into a Latin American network of biotechnology centers.
- Encouraging closer relations between the academic and production sectors, so that biotechnological knowledge can be available to help make production more effective and solve local problems.
- Supporting and encouraging linkages between Latin American scientific associations and other sectors in the countries (business, the countryside, the public sector and the professions) for the design of plans for development in areas of biotechnology that will be of benefit to the production sector.
- Serving as an intermediary to facilitate access for institutions to biotechnology information centers and data banks in the industrialized countries.
- Increasing the Organization's efforts to find extrabudgetary funds for use in the development of biotechnology in Latin America.

It was also said that PAHO should recommend as a fundamental ethical rule the proscription of biotechnological research for military purposes.

8. Implementation of a Biotechnology Program in a Developing Country. The Cuban Experience

Dr. Angel Aguilera said that in 1981 the Cuban Government had decided to promote the development of biotechnology and molecular biology in the country as a means for achieving greater development, and had set up a national program that included:

- Coordination in identifying the priority tasks to be addressed and in determining how to accomplish them; funding for equipment and other materials.

- The establishment of a structure for the provision of scientific information.
- Coordination with universities for making changes in the curricula of professional programs in the biological sciences.

There are at present more than 200 researchers employed in the different subject areas of biotechnology. More than 40 of them, employed in 14 institutions, have more than 10 years of experience each and a master's or higher degree.

The centers working in the field of biology have been organized under a national agency that determines and coordinates their work and priorities and allocates needed funds. At present there is a development program that provides for the construction of new research and development facilities and the training of scientific and technical personnel for them.

The policy for the promotion of science and technology is integrated into all aspects involved, from the setting of working targets and the strategy and tactics for attaining them to application of the results in social practice. Also part of that integration is the education, selection and training of the people who will be employed in this activity. One expression of this integration, for example, is the National Biology Program.

The country is already enjoying the fruits of the work of these specialists in the form of results that have been or are being applied in production. The lines of work in which the most significant gains have been made include:

- The production of single-cell protein from agricultural residues.
- The biotechnology of the production of drugs, vaccines, diagnostic products and other biological preparations of interest for human and animal health.
- The generation of biogas from animal excreta and residues of the sugar industry.
- The genetic improvement of industrial microorganisms by conventional methods.
- The production and purification of interferon.
- The development and selection of a cell line (hybridoma) of highest monoclonal anti-interferon antibody production.
- The chemical synthesis of a dodecanucleotide with a sequence of bases complementary to interferon.

The country has research and development problems in different categories each of which must be addressed in accordance with established guidelines that tie in with the country's economic and social development strategies.

Dr. Aguilera then described the main lines of work for the medium and short term in biotechnology and genetic engineering, and noted the importance of establishing the Biological Research Center for development of the more novel aspects of biology. This center produces interferons, and uses interferon as a model system for the development of molecular biology, having succeeded in a relatively short time in laying the interdisciplinary foundation needed for the mastery of this technology, which includes the techniques of recombinant DNA, cell fusion, and particularly the production of monoclonal antibody-secreting hybridomas and the technology of biological and fermentation reactors.

Other institutions have also achieved results now being applied in production and services, such as those of the National Center for Scientific Research in the use of immunoenzyme techniques for the prenatal diagnosis of congenital deformities, obtaining new varieties of sugarcane by the plant tissue-culture technique, and the use of genetic engineering techniques to develop a method for the diagnosis of hemoglobinopathies.

Several institutions, among them the National Center for the Production of Laboratory Animals (CENPALAB) and the Center for Genetic Engineering and Biotechnology, are under construction as part of the country's effort to raise itself to the rank of a world power in the fields of medicine and biology.

In order to establish an order of priorities for the lines of work to be pursued in the second-named center, a study has been done to determine the scientific and technical feasibility of the different options. This approach has been reconciled and completed with an analysis of research subjects to determine their importance from the economic or social standpoint and as health problems, and the possible advantages of genetic engineering over conventional production methods. The basic lines of research to be pursued in genetic engineering and applied biotechnology are:

- Protein production for health and industry.
- Energy and biomass production.
- The production of vaccines and development of diagnostic products.
- Agriculture.
- The study of cancer.

Discussion and Recommendations

Both speakers were commended by the Committee, which recognized that the development of biotechnology in Cuba showed what political will can accomplish in a developing country.

The Committee received updated information on the development of biotechnology in Mexico and Colombia, which provided a firmer basis for its discussions and recommendations.

The Committee decided that the information provided on Mexico was to be included in the document presented by the Secretariat on the subject.

This topic revived the discussion of the importance of research in basic sciences, regarded as a mainstay of biotechnological development. It was also brought out that what was happening in Latin America in this area could be described as a technical and scientific revolution with features of its own, whose effects were reflected in changes ranging from diagnostic methods to the organization of services. It was said that this area had the potential for articulating basic knowledge with applications in health, and could also contribute to the economic development of Latin America and the Caribbean.

There was concern on whether safety rules were being observed in experiments in and the use of biotechnology, and on ecological considerations, which did not always affect health. The Committee was informed that the standards worked out by the National Institutes of Health of the United States had been translated and circulated to all specialized institutes in the Region. It was recommended that PAHO be the meeting place for the adoption of a code of ethical standards for research in and applications of biotechnology in the Region that were acceptable to governments, universities, and research and production centers, and would protect both man and the environment.

The Committee also gave summary consideration to the problem of the use of patents for the protection of advances and developments in biotechnology, but made no specific recommendations.

It was also emphasized that work in biotechnology must be geared to the problems of developing countries, and particularly to the production of inexpensive, effective and transportable vaccines.

The Committee gave high priority to research of this kind and considered that activities for the promotion, coordination and support of advanced training programs, the identification of groups and exchanges of knowledge in this area should be made a special program of the Organization because of their capacity to influence the development of all its present constituent programs.

It also felt that the most important of the strategies identified was the formation of networks for collaboration, which would make possible not only the sharing of expensive equipment, but also the pooling of efforts for a common purpose. It was unanimously recommended that the document prepared by the Secretariat on the subject be widely circulated in the Region.

ENVIRONMENTAL HEALTH

9. Environmental Health Problems: Work in Progress and Priorities for Research in Air Pollution

Dr. Antonio Rivera-Cordero, of PAHO/WHO, began his presentation by saying that, although the effects of urban atmospheric pollution most readily apparent to the general public are those of unsightliness, reduced visibility, odors and other general nuisances, the most important effects were the associated health hazards. It has been proven that brief exposure to high concentrations of air pollutants and extended exposure to low concentrations constitute serious health hazards. In these situations it is incumbent on health authorities to take corrective measures.

International organizations such as PAHO, countries and cities have taken basic measures to control atmospheric pollution in Latin America and the Caribbean. The Pan American Air Pollution Sampling Network (1967-1980) is a valuable source of information and experience. The cities of Rio de Janeiro, Sao Paulo, Caracas, Bogotá, Cali, Medellín, Santiago (Chile), Havana, Lima and Mexico City are members of the PAHO-administered World Environmental Monitoring System (SIMUVIMA/AIRE) of the United Nations Environmental Program. SIMUVIMA activities to ensure the quality of information focus on a) the design of an air quality monitoring system and the training of technical staff; b) the study of the results of the methods and their comparison with one another; and c) validation of data.

Although much progress has been made in Latin America toward the control of air pollution, much remains to be learned on several aspects of this Regional problem, including a variety of legal, administrative and executive matters; manpower development; the establishment of criteria, standards and guidelines; planning processes; several economic and health considerations; the determination of sources of pollution, particularly those requiring priority attention; and low-cost technologies and methodologies that can be used in less-developed countries.

On several occasions between 1972 and 1985 air quality monitoring and control programs have been carried out which varied widely in their complexity and the air quality they provided. Federal, provincial, state and municipal governments have adopted air quality standards whenever they have identified local problems. With few exceptions, these programs

have done little to achieve lasting solutions to air pollution problems. No sooner is one problem solved that was created by an industry or other source of specific pollution, than another emerges. Dealing with air pollution problems in a systematic way and by proven methods appears to be the exception rather than the rule in the Region.

Dust and suspended particulate matter are air pollutants that generally exceed desired standards and present a visible nuisance. A major source of them is garbage incinerators. During the seventies measures were taken to control the practice of garbage burning in the major cities of Argentina, Brazil and Chile, where this practice was entirely prohibited and replaced by that of compacting the garbage and depositing it in sanitary earthfills. The total ban on garbage incineration has spectacularly improved the quality of the air in some cities, especially in Buenos Aires and Rio de Janeiro, where it has not been possible to do away with suspended particulate matter owing to the emergence of fresh sources.

Another visible source of pollution by suspended particulate matter in the metropolitan area of these three countries is diesel engine emissions. Studies made indicate that in the commercial quarters of the leading cities diesel exhaust accounts for 29% to about 50% of all emissions of suspended particulate matter. In addition to the physical damage they cause, carbon particles from this environment-fouling and visibility-impairing exhaust also contain a wide variety of polycyclic aromatic hydrocarbons (PAHs), some of them carcinogenic. The diesel engine is a mobile source that ejects particles into the air breathed by the population, and the extensive spread of this air pollutant correlates closely with traffic density, frequent stops of vehicles to pick up and drop off passengers, and traffic-light synchronization.

Several stationary sources of air pollutants have been identified, including some that are dangerous to health, chiefly owing to their large size and their proximity to populations. In Jujuy province, Argentina, for example, there are within a radius of 15 kilometers and very close to human settlements seven lead foundries. The levels of lead in the air are higher than those of air quality standards. In small numbers of blood samples, lead levels higher than 100ug/ml, greater than commonly accepted limits, have been found. A detailed evaluation of the health hazards of air pollution should include the collection of larger numbers of blood samples to determine lead levels, and of air samples to determine the lead concentration in inhalable particles.

In densely populated parts of Rio de Janeiro there are five small-scale glass factories. It is known that the ingestion over several years of fluoride in a proportion greater than 1mg/kg of body weight produces injurious physiological effects. The degree of exposure to fluoride should be determined by monitoring the air in these neighborhoods and determining the levels of fluoride in the urine of a representative sample of the exposed population.

It is considered that, among the various matters relating to applied research in air pollution control, priority should be given to the following:

Suspended Particulate Matter

- Action to monitor levels of particulate matter in air, including the physical and chemical classification of inhalable particles.
- The devising of techniques for reducing emissions of suspended particulate matter from diesel engines.

Gases

- Determination of the photochemical reactivity of emissions of alcohol-burning motor vehicles.
- Determining the exposure of the population to fluoride in the environs of fluoride sources such as glass factories and fertilizer plants.

Quality Control

- Establishing a cooperative air quality monitoring program that includes data validation and the comparison of methods and results for the more common pollutants.

Air Quality Control Strategies

- Developing and adopting air pollution control measures and techniques.

Discussion and Recommendations

The Committee expressed concern over the paucity of actual pollution control in some countries. It also recognized that, while the methods for determining the degree of air pollution are fairly inexpensive, the cost of control measures is virtually prohibitive for most if not all of the countries. It was considered that intersectoral coordination was of vital importance to the development of control methods.

The Committee urged the Director to give attention to this problem, whose solution it feels is beyond the means of the health sector. It also recognized that, in view of the growing severity of the problem, the current priority is to apply what is now known about prevention and control mechanisms, and it suggested that the Director ask the Directing Council to make an emphatic statement on the need for energetic measures by the Member Governments.

IMMUNIZATIONS

10. Development Priorities and Applied Research in the Expanded Program on Immunization

Dr. Ciro de Quadros (PASB) said that basic research has already produced a prodigious assortment of safe and effective vaccines and that the outlook for more and better vaccines is promising. Although the basic function of the Expanded Program on Immunization (EPI) is to build up national capabilities for the provision of vaccines so that any vaccine of importance to public health can be effectively supplied, this work is simplified to the extent that a particular vaccine is not only safe and effective, but also thermally stable, storable for long periods, and suitable for administration in the first months of life, preferably in a single dose and not by injection. The ideal would be most closely approached by a stable vaccine consisting of a dose containing many antigens and that can be administered orally, intranasally or percutaneously at any time after birth.

The DPT, measles, oral polio and BCG vaccines and tetanus toxoid currently used under the EPI only account for about 14% of the total cost of the program. It should also be possible to finance the new and improved vaccines produced for worldwide use, in the awareness that their financiability must be determined relative to the benefits of the given vaccine. However, the vaccines used by the EPI have set a high standard of benefits relative to their costs, by which new vaccines will be measured.

The least satisfactory of the EPI vaccines are those for whooping cough and BCG. While the questions about BCG vaccine relate chiefly to its effectiveness, those about whooping cough vaccine raise concerns as to its safety as well as its effectiveness. These concerns stem from a rate of negative reactions higher than for other vaccines, and an estimated efficacy rate of about 80% after three doses is much less satisfactory than the rates for measles, polio, diphtheria and tetanus vaccines, all higher than 90%. BCG and whooping cough vaccines must be improved, and research is in progress to that end. Thanks to the interest of the industrialized countries in whooping cough, research in this disease has been supported more actively than research in tuberculosis.

None of the immunization schemes now applied may be regarded as ideal, for each program represents a compromise between the need to immunize in the first years of life for the sake of early protection and the need to wait until a satisfactory immunologic reaction can be produced. Logistic considerations may necessitate the provision of immunization services only at intervals ranging between one and six months, and that the administrators of programs adapt the schemes as best they can. However, more information is required on the minimum age for the administration of EPI vaccines (BCG excepted), and in some cases

fuller information is also needed on the possible and optimal doses and the intervals at which they should be administered.

Several problems have been pointed out in connection with vaccine stability. Trivalent oral poliovirus vaccine (TOPV) is the least stable of all the EPI vaccines, and it would be useful to discover methods for enabling it to withstand 37°C of heat for one week, which is the uniform temperature established by WHO for freeze-dried measles vaccine. It may be necessary to continue giving attention to the cold chain for some time, because even fairly stable vaccines such as tetanus toxoid can be inactivated by exposure for only a few minutes to 60°C, to which temperature the inside of a closed vehicle parked under a tropical sun can easily rise. This applies also to the diluent added to measles vaccine, which can quickly inactivate it if hot. The storage life of vaccines also limits the choice of logistic systems.

Immunization programs would benefit from the use of improved vaccination methods. Subcutaneous and intramuscular injections must be administered by trained personnel using sterile needles and syringes. Unfortunately, sterilization is often improperly done in developing countries.

In 1978 and 1979 WHO/EPI conducted laboratory and field tests of a variety of injectors actuated by hydraulic, mechanical and gas pressure. The results pointed to a rather high frequency of maintenance for all models. One injector that was not tested at that time was the manual injector, which, with its normal maximum capacity of 20 doses, is better suited to the EPI's requirements. Several models of this type are manufactured at present, one of them in a developing country, and are being use in the field. However, current models can only be used to administer intradermal injections because the mechanism of a pressure syringe is only strong enough for injections to that depth. Moreover, these manual injectors are not reliable, cause some foaming of the vaccine at the nozzle and, with BCG vaccine, hardnesses of varying diameter. Moreover, no studies have yet been made of the pressure speed needed to properly administer a subcutaneous injection to an infant under one year of age. It would probably be possible to design a manual injector (not requiring gas) for this purpose. The considerable differences in speed observed in the injectors tested by WHO suggest that this matter has not yet been sufficiently considered.

Another possibility for vaccine administration is the reusable plastic syringe. Made of heat-resistant plastic, this syringe eliminates the frequent breakage of glass syringes and reduces the cost and supply problems associated with disposable syringes. PAHO/EPI has tested single-dose syringes of this type in the laboratory and is studying the feasibility of introducing steam sterilization and plastic syringes in five developing countries.

One-shot disposable syringes have also been tested. One frequent problem with these syringes and their needles is that they are used more than once. One way to avoid their reuse is to design the barrel and plunger so that the plunger remains anchored in the barrel once it has been driven home, and its handle breaks off if an attempt is made to withdraw it.

Another method in use is to attach a needle to a flexible plastic bag previously filled with vaccine, which is then squeezed to drive in the injection. The cost of these methods has given problems, however.

Other methods that could be used are intranasal, percutaneous and aerosol vaccinations. However, the aerosol vaccinating technology is complex and, while the method does offer advantages for the administration of measles vaccine, further research and advances are needed to set up a commercially practical system. Administration by the intranasal route is being suggested. This possibility may be considered in future as part of WHO's Vaccine Development Program. Percutaneous vaccination by bifurcated needle was highly effective in the smallpox eradication program. It would be useful to have vaccines that could be administered by this method.

The last five years have seen conspicuous progress in the range and quality of the materials used for the storage and transportation of vaccines. For lack of training, replacement parts and tools, many refrigerators stop working only months after delivery. To solve the problem, a list has been compiled of the replacement parts and "universal" tools with which about 90% of the repairs to refrigerators used in developing countries could be made. In addition, training courses on those replacement parts and sets of tools are being conducted in those countries for repair technicians. However, better solutions are needed for areas where reliable sources of electricity are unavailable. Fuels, such as kerosene and propane, are often very expensive or not to be had, and kerosene refrigerators are particularly difficult to maintain. This problem is aggravated when the kerosene is inferior or contaminated. WHO has made some investments in order to solve the latter problem by promoting the design of an improved kerosene burner and wick, and the possibility of using additives to improve the quality of the fuel is being considered.

WHO is working with several manufacturers of solar refrigerators, NASA and the Centers for Disease Control to field-test refrigerators of this type, and further tests will have to be made as new systems emerge. Their initial cost is high at present. While these refrigerators do not require repairs and maintenance as frequently as those fueled by kerosene, specialized technical services are needed to identify and repair defects. Most solar refrigerators convert solar energy into the electricity that actually runs the refrigerator. WHO has not yet made any outlays for exploration of the use of other energy sources such as wind and biogas. Time/temperature monitors have also been improved. WHO

and UNICEF are now monitoring vaccines with a product that shifts gradually and irreversibly from white to blue when the temperature rises above a certain level. Each batch of 5,000 TOPV, measles and DPT vaccine supplied by either organization is accompanied by a card with two devices indicating whether the temperature has risen above 10°C and 38°C. The trial of another system for the time/temperature monitoring of measles vaccine is nearing completion. This monitor is less expensive than the aforementioned one and can be applied directly to the vaccine ampoule either by printing it on the label or by some other means. In the trial in progress, encapsulated plastic points are attached to the cap of the ampoule. Work in this area must be pursued so that each vaccine ampoule may have its own indicator that the vaccine is active as a guarantee to the user.

Dr. de Quadros also remarked that immunization services are frequently described as provided by three basic strategies.

- a) A "stationary" strategy based on health facilities able to offer ongoing immunization services as an integral part of maternal and child care.
- b) An "extension" strategy in which a health worker or team travels to places at distances from the health center in order to provide certain services regularly.
- c) "Mobile" services provided by a self-sufficient team that must replenish its supplies only every several weeks and is able to visit a given settlement only two or three times a year.

Many national immunization programs in developing countries use a combination of these three strategies. As health services develop, the pattern gradually shifts toward a preference for "stationary" services, but local studies of the cost-effectiveness of these different methods will remain necessary for the guidance of administrators in the course of their programs. It is probable that these studies will be valid only for the programs for which they are done, for many of their conclusions will be difficult to apply to other programs.

In addition to research chiefly for the benefit of those in charge of providing health services, community-oriented research is a priority in most immunization programs in developing countries.

Reduced initial coverages can be blamed simply on a lack of services, but when as many as 50% of beneficiaries drop out between successive vaccination shots--a very common occurrence at the present time--it becomes necessary to identify the problems that prevent those who have received their first shots from returning for the second. Research has indicated that parents, and particularly mothers, were virtually uninformed on the purposes of the immunization, the immunizable diseases to be protected against, and the need for several shots of some

vaccines. Moreover, studies are needed in those health centers to improve the effectiveness of the health education imparted through the mass media.

One factor that research has already helped identify is the immunization of children suffering from mild disease or undernutrition. A WHO/EPI analysis highlights the risks of contracting diseases confronting children who have not been immunized. A policy has since been adopted that recommends not refraining from immunizing children with mild disease or undernutrition. Many programs could benefit from a review of the opportunities for immunization that are missed in children taken to health facilities.

While it is desirable to make immunization services available to all children for reasons of equity, this may not always be logistically practical and may not be needed to achieve an optimal reduction of morbidity and mortality. It is necessary to learn to devise strategies that focus efforts on the individuals and groups most likely to contract the diseases of interest and on the chief carriers of diseases.

The EPI has devised a simplified method of study based on aggregates by which immunization coverage can be calculated within a range of ± 10 absolute percentage points with a confidence of 95% using a sample of 210 children selected in groups of seven starting from 30 initial points selected at random. The simplicity of this method has been an important reason for its use in more than 500 studies since its introduction in 1977, and it has demonstrated its capacity to show in a very satisfactory way whether the coverage in a given area is low, intermediate or high. However, as programs proceed there is a growth of interest in documenting coverage increases within the confidence limits of this method, and other methods must continue to be explored.

One such method is the "batch quality evaluation," which is used widely for industrial quality assurance but has not yet been applied anywhere in the health field. For it to be used a level must be set that is accepted as a satisfactory limit and the samples taken must be large enough to show convincingly that the level of coverage in an area is or is not satisfactory based on the number of nonimmunized children in the sample. The sample can be smaller than the required size for methods designed to estimate the actual coverage instead of determining whether an area does or does not exceed the limit. This advantage is offset by the need to select each individual at random and not as a member of an aggregate. More experience is needed in the use of this method in the field. Disease surveillance is one of the weakest aspects of the EPI today. Routine reporting systems are deficient in developing countries; some of their problems relate to the frequency of contacts between cases and health facilities, accurate diagnosis in local health units, the presentation of reports by those units, and the reliable transmission of reports received from local units to higher levels of authority.

In addition to activities for improving the general reporting system, recommendations have been made on the development of control information units that will at least help determine the incidence trends of a disease. One acknowledged problem in this area is that the units that present the most reliable control reports may also offer better immunization services than elsewhere, and probably do not convey a realistic picture of disease trends in other areas.

The EPI has formulated criteria for the diagnosis of the program's target diseases, but no criteria have yet been developed for their application in the countries nor has any test yet been made of their sensitivity and specificity. Better diagnostic tests are also needed, particularly for whooping cough, diphtheria and tuberculosis.

Studies of one or more diseases have been used as a complement to reporting systems. For low-frequency diseases their cost is high, however, and they cannot be used frequently to monitor the progress of a program. There is growing interest in the substitution of studies of specific diseases with studies compiling information on the leading causes of mortality in children under five years of age. Work must be done to simplify and adapt methods so that those studies can be used as needed in developing countries, and also so that the resulting information will be as useful as possible for the administration of prevention programs. While serologic studies to document the incidence of diseases have their enthusiastic advocates, the logistical problems involved in obtaining and analyzing specimens, joined to the difficulties of interpreting the results, have prevented the EPI from promoting them so far.

Although studies of this kind can be of use in any part of an immunization program, what is required in particular are cost-effectiveness studies of different morbidity and mortality prevention strategies. This applies to the vaccines now covered by the EPI and will be of importance in evaluating priorities in the inclusion of new vaccines. These studies not only require the availability of good calculations of the effect of the diseases considered on nonimmunized groups, but also an evaluation of the part played by immunization in reducing overall morbidity and mortality. This can require prospective and mortality studies.

In several countries cost studies have been done that include routine program administration, and these studies should be broadened. Those done so far have stressed the deficiencies found in a country that had adopted a policy of building uniform health centers throughout the country staffed with equally uniform personnel. Owing to differences between rates of use of services and the size of beneficiary areas, cost-effectiveness was found to be several times higher at some centers than others. Studies of the cost of refrigerators throughout their service life have indicated that their purchase and distribution often account for only one third of their total cost over ten years of use,

while about half of the costs are incurred for replacement parts and tools and the greater part of the remainder for energy. Donor and recipient countries must be aware of these total costs of refrigeration equipment and devise methods for financing them that cover these total costs more effectively than present methods.

In closing the presentation, Dr. de Quadros said that, although the basic research needed was obviously a matter for individuals and institutions engaging in research by preference, the people best suited to do operations research are those who need it as a tool for the administration of programs, that is, the program administrators themselves. That research is often confused with routine program administration, and particularly with the control and evaluation functions. All programs have problems and all face the challenge of adapting to evolving technologies and cultures. Active programs of applied research, whether or not called by that name, are the best guarantee of success for the programs in the long run.

11. Cost-Effectiveness Analysis of Vaccination Programs. The Experience of Brazil

The presentation was made by Dr. Marfa Alicia Domínguez-Ugá, who said that the purpose of the study had been to compare in economic terms the performance of the different vaccination strategies adopted in Brazil in 1982 and brought together in the National Immunization Program (NIP).

These strategies were described as follows:

- Routine: Includes measles, tuberculosis, poliomyelitis, diphtheria, whooping cough and tetanus vaccination services routinely available in the permanent facilities of health units.
- Routine Intensification: This term covers deferred vaccination services offered for short periods by itinerant teams either at the periphery of the supporting health unit's district or in the rural hinterlands of a municipality where the population is scattered and hence beyond the reach of any health unit. Routine intensification is planned and carried out by the regular staff of supporting health units, which in some cases offer the full range of the Program's vaccinations and in others only one or two.
- Mass Vaccination Campaign: This is a service of finite duration. It is generally confined to the administration of one single vaccine, to which specific resources are allocated. Several sectors of society participate in it and contribute material and human resources.

The implementation of these strategies was studied in a sample consisting of the 55 health units of 15 municipalities in two Brazilian

states of fairly different characteristics: Pernambuco (in the Brazilian Northeast) and Pará (in the Northern Region).

Health units were characterized in terms of:

- Size: Health posts, health centers, composite units and the local hospital.
- Locale: Whether urban or rural, and easy or difficult to reach.
- Governmental level: Federal, state or municipal.

The methodology adopted for economic evaluation of the vaccination strategies follows, broadly speaking, the cost-effectiveness technique presented in the WHO document "Expanded Program on Immunization--Costing Guidelines," by the economist Andrew L. Creese.

The cost-effectiveness ratio is the performance indicator of each strategy; in it the cost is the social cost, that is, the resources provided by the society (and not just by the responsible institutions) for the conduct of the National Immunization Program, and the effectiveness is the number of children under one year of age who have been completely vaccinated, by type of vaccine and number of vaccinations of children in this age group.

The analysis was made at two levels:

- At the first, the "intrastrategy" level, it was found that in the local units (health posts) fixed costs are a high proportion of total costs partly because of the idleness of some components. Moreover, the unit cost of a vaccination tends to rise in inverse proportion to the size of the unit. It was further observed that vaccinations of infants under one year of age do not amount to 50% of all routine vaccinations.
- In the "interstrategy" analysis, the problem is whether the complementary routine intensification and campaign strategies offset each other in terms of cost-effectiveness, and what is the best combination of the two strategies in those terms.

It was found that the costs to be borne by users of the service are lower in the campaign and intensified routine modes than in the routine mode itself. In considering overall social costs, however, routine vaccination proved the most economical mode in the units of the Pernambuco sample and in some of those at Pará, but routine intensification also showed, on the whole, good results.

Coverage was best in the campaign, but in some municipalities the results of routine vaccinations, if combined with those of routine intensification, are comparable to those of the campaign.

In conclusion, the study recommends a strengthening of the health centers (which are more efficient than smaller units), on the basis of which deferred vaccination services would be expanded until they finally become an ongoing activity. Moreover, it emphasizes the need to promote the relationship between the health unit and its community, and thereby to make the most of the infrastructure of the unit for the conduct of health education activities.

It is suggested that, whenever a program of this type can be implemented, the campaign strategy should be reserved for outbreaks of epidemics of diseases not controlled by the routine vaccination program, for which that strategy is irreplaceable.

12. Clinical Efficacy of Trivalent Oral Poliovirus Vaccine (TOPV).
The Honduran Experience

Dr. Harrison Stetler, of the Centers for Disease Control of the United States of America, described the inception of the study. He said that in December 1984 the Ministry of Health of Honduras, in collaboration with the Pan American Health Organization (PAHO), had made a second evaluation of the Expanded Program on Immunization (EPI) in Honduras (the first having been done in October 1982). In consequence of the outbreak of polio in Honduras earlier that year, an evaluation of the clinical efficacy of trivalent oral poliovirus vaccine (TOPV) was added to the EPI evaluation. Since there had been only 36 cases clinically compatible with a diagnosis of polio and they had been widely scattered in the country, the clinical efficacy of the TOPV used in the EPI in Honduras was calculated by a method of study using cases and controls. In this method, the greatest possible number of cases (it is not necessary to encompass them all) is selected, to each of whom is assigned one or more controls depending on the case's age and place of residence. The vaccination history of cases and controls is established with great care, preferably on cards. It then becomes possible to calculate the ratio of probabilities (the probability of a case being vaccinated over the probability of a control being vaccinated). This ratio of probabilities can be substituted for the relative risk in the equation for calculation of the efficacy of the vaccine.

To ensure that there are enough controls who had not received any dose of TOPV vaccine or had received fewer than three doses, five controls were selected for each case. For a case less than two years old at onset of the disease, the controls were selected to be not more than two months older or younger; this allowable difference was increased to six months if the case had been two to five years old at onset of the disease; and if the case child was more than five years old, the difference between his or her age and the controls could be as great as one year. The controls were selected at random from among the families living in the vicinity of the patient's home at the time of onset of the diseases. In addition to the basic identifying information, age and a detailed history of the past administration of TOPV vaccine, the data

sheet included several questions on possible risk factors. Clinical information was taken down only on cases, and a simplified physical examination was included in addition to laboratory data.

Two methods were used to calculate probability ratios and vaccine efficacy. In the first method, an analysis was made by computer program between cases and controls paired in variable relationships. Only the first four controls were used, as the program could not handle more than four. In the second method, only the first two controls who had received no shots or fewer than three were used. A 2 x 2 chart was drawn, the cases and controls were analyzed separately, and the probability ratio was calculated.

The efficacy of the vaccine was calculated by each method, first in all cases studied (49 of a total of 50 received no shot of TOPV vaccine or fewer than three shots) and then in the cases confirmed in the laboratory (27 of 32 have not received any shot of TOPV or fewer than three shots). Vaccine efficacy was found to range between 35% and 51%. Owing to the small number of cases in the study, the limits of the 95% confidence interval were fairly wide.

Of the 59 cases investigated, it was confirmed that 31 (52.5%) had received three or more shots of TOPV vaccine one or more months prior to onset of the disease. Moreover, 51 (86.7%) of the 59 cases showed residual results consistent with poliomyelitis two or more months after the appearance of the symptoms. Eight (3.6%) of the 59 cases died. The data on the risk factors are now being analyzed.

This is the first time the case-and-control method was used to calculate the clinical efficacy of trivalent oral poliovirus vaccine.

The EPI evaluation, done concurrently with the study of cases and controls, uncovered several cold chain problems. Vaccine-handling problems at the central level may account for the low clinical efficacy of the vaccine observed in this polio outbreak and uniformity of the geographic distribution of the completely vaccinated cases. Plans have already been set in motion for correcting these problems, particularly at the central level. In addition, the potency of the TOPV vaccine used in Honduras will be regularly checked at all stages of the cold chain.

13. Epidemiological Evaluation of National Vaccination Days. The Colombian Experience

The presentation was made by Dr. Rodrigo Guerrero, a member of the ACHR and a Professor at Valle University in Cali, Colombia. The study had been done to evaluate the National Vaccination days (NVDs) held on 23 June, 28 July, and 25 August 1984 in Colombia. The work was confined to an epidemiological evaluation, the evaluation of the administrative, financial and social communication aspects having been made independently.

The purpose of the NVDs was to increase by 50% the existing coverages as determined by the Expanded Program on Immunization (EPI) of the Ministry of Health, and to strengthen the vaccination strategy (the so-called "channeling" strategy). The coverages of infants under one year determined by the EPI for 1983 were 43.7%, 43.3% and 43.4% for polio, DPT and measles, respectively.

The study was based on a probabilistic sample of 131 settlements representative of the country and located in 105 municipalities in 22 political-administrative subdivisions. All the housing units in the selected settlements were visited and the survey questions were asked in the units containing children under four years of age on the date of the first Vaccination Day in order to estimate the vaccination coverage of the different age groups for each vaccine. The sample included 12,545 tenanted housing units, in 90% of which reliable responses were obtained.

Information was obtained on the vaccination status of 6,312 children, for 94% of whom the source was the vaccination card, which was regarded as highly reliable.

The results show that the coverages at the time of the survey--that is, two or three months after the last Vaccination Day--of children under one year of age were 67.8%, 66.8%, and 81.6% for polio, DPT and measles, respectively.

The coverages for children under four were 72.3%, 72.7% and 75.0% for polio, DPT and measles, respectively.

Comparing the coverages prior to the Vaccination Days with those at the time of the survey revealed increases of 54.0%, 54.3% and 88% for polio, DPT and measles, respectively, which exceeded the targets established for those NVDs.

A cohort analysis of the children born in the last three years showed that the percentage of coverage by the first birthday had increased substantially from year to year; this must be taken as an improvement in the vaccination program, which was greatly advanced by the National Vaccination Days.

The coverage data obtained are consistent with those estimated from the data of the information subsystem in the Ministry of Health.

Discussion and Recommendations

The Committee commended the speakers for the clarity and precision of their presentations and noted the value of research of this kind; not only was this research innovative, but the methodology, once developed, was in most cases easy to apply. In addition, the EPI was regarded as an integration model that illustrated how research needs articulated with the questions that emerged from the operational program and so contributed to the decision-making process.

The Committee took note of the Cuban experiences in immunization, which had resulted in the eradication of poliomyelitis. It also accepted with thanks the offer of information on this experience for circulation through the facilities of the Organization.

Several methodologies for the evaluation of immunization programs were discussed. It was agreed that the best indicator was the reduction in the incidence of a disease.

In regard to BCG vaccination it was felt that more studies were needed on its efficacy.

The Committee concurred in the following research priorities cited by the EPI:

In Engineering:

- Inexpensive one-shot vaccination devices.
- Simplified, easily maintained and inexpensive cold-chain equipment.
- Simplified pressure injectors.

In Biochemistry:

- High-potency one- or two-shot vaccines (e.g., against whooping cough).
- Viral vaccines of high potency and stability (e.g., measles and polio).
- Simplified diagnostic methods (e.g., whooping cough).

In Operations:

- Vaccination age.
- Schemes for complete immunization in two shots.
- Strategies for the extension of coverages and eradication of poliomyelitis.
- The improvement of monitoring and evaluation systems.

The Committee also noted the great importance of the subject of administrative aspects and models for the attainment and maintenance of useful levels of coverage by means of known technologies.

Health for All by the Year 2000. Strategies

14. Health Research Strategy for the Attainment of HFA/2000. Draft Report of the Subcommittee of the Global Advisory Committee on Medical Research

The report of the Subcommittee of the Global Advisory Committee on Medical Research was presented by Dr. Thomas McKeown. He said that, since its foundation, WHO has recognized that health is more than the absence of disease, a state of complete physical and mental well-being that results when disease-free people live in harmony with their environment and with one another. This concept keeps before governments and the public the understanding that health is not something that can be achieved exclusively by traditional health services; it is profoundly influenced by conditions of life. The value of this interpretation is in no way diminished by recognition that it defines a long-term objective, one which largely depends on advances not within the control of health administrations: elimination of poverty; universal education; full and rewarding employment; and, perhaps most important of all, avoidance of nuclear war.

The short-term aim was identified by the Thirtieth World Health Assembly--the goal of health for all by the year 2000 (HFA). This concept has been described in numerous publications.

As present health levels vary widely between countries, no single standard can be set for the year 2000, and the HFA goal is necessarily stated in general terms: to achieve a substantial improvement in health in all countries, particularly in those where the need is greatest. However, it is not unrealistic to define more precisely a level of health below which it is hoped that no country will fall: infant mortality of 50 (per 1000 live births) and life expectation at birth of 60 years.

A research strategy is approached by considering four questions.

- How does disease arise?
- In the light of knowledge of its origins, how can disease be prevented or, where this is not possible, managed in other ways?
- What kinds of research are needed for prevention or management of disease?
- What should be the role of WHO within the total research framework?

The report presents evidence for regarding disease, with some well-defined exceptions, as in principle preventable by modification of ways of life. In this context "ways of life" is a synonym for its two components, environment and behavior, and the report discusses their influence in each of the major disease classes.

A fundamental issue confronting research in the health sector is evaluation of two approaches to the problems of disease, one through control of disease origins, the other through intervention in disease mechanisms. And as both are needed, what is wanted is a decision about the distribution of effort between them and, so far as possible, recognition of the kinds of problems with which each is likely to be successful. For the purpose we require a classification of diseases, not on the conventional physiological or pathological lines, but according to disease origins. Such a classification is needed to provide insight into the means and feasibility of disease control.

Prenatal Diseases Determined at Fertilization

The conditions determined at fertilization are mainly the single gene defects and chromosomal aberrations, but they include others, particularly associated with aging, which are also independent of environmental influences. It is unlikely that they include any of the so-called "common diseases."

Prenatal Diseases Determined After Fertilization

These diseases are not established irreversibly at fertilization and must be determined by other influences during intrauterine life. They fall broadly into two groups.

- Some of the abnormalities arise very early in pregnancy and are probably the result of hazards associated with implantation and early embryonic development.
- The other abnormalities are quite different, in that they result from well-recognized causes (e.g. malformations caused by rubella and thalidomide; diseases attributable to iodine deficiency during pregnancy, those caused by radiation and possibly tobacco and drugs--conditions resulting in low birth weight).

Postnatal Diseases Due to Deficiencies and Hazards

For most of his existence, man has suffered from direct or indirect effects of food deficiency. The improvement in the food supplies through the first agricultural revolution 10,000 years ago led to an increase in population size which in turn created the conditions for spread of infectious diseases.

As a result of major improvements in nutrition and hygiene during the last few centuries, diseases due to deficiencies and hazards are no longer the principal cause of sickness and death in developed countries. In much of the world, however, the picture remains essentially unchanged.

Infectious disease is still the predominant cause of death, and malnutrition, defective hygiene, and excessive growth of populations are the major influences.

Postnatal Diseases Due to Maladaptation

Several lines of evidence suggest that the disease pattern now predominant in developed countries (e.g. cardiovascular diseases and cancer) is due essentially to recent changes in conditions of life.

Many are influences over which the individual has little control: atmospheric pollution; chemicals used in industry, agriculture and as food additives; adverse working conditions; road traffic; radiation from nuclear processes; risks associated with medical investigation and treatment. Other hazards are from changes in behavior, many of which are made possible or encouraged by the affluence which resulted from industrialization: smoking, sedentary living, use of drugs, excessive or ill-balanced diets. Hence some of the contemporary health problems can be resolved by public action, whereas others also require modification of behavior.

The role suggested for WHO is primarily directed to the following areas:

- The first priority should be to encourage and assist research which will raise the standard of health in developing countries and in certain deprived sub-groups of developed countries. The steps needed are well known: provision of sufficient food, clean water, sanitary facilities, limitation of fertility, and immunization against some of the common infections, and the research required is essentially of the health systems type. It is probably true to say that if these basic steps were implemented throughout the world by the year 2000, one of the most important aspects of health for all would be achieved even if nothing else were done.
- If these measures are not implemented, HFA will not be achieved whatever else is done. The effectiveness of these measures is already evident from the rapid progress recently made in some developing countries.
- Improvement in the health of developing countries also requires advance in knowledge of diseases characteristic of the tropics that do not respond adequately to a rising standard of living, and basic knowledge required for their control is still lacking. They therefore need to be tackled with all the research resources that can be brought to bear on their prevention and treatment.

- Second only to the primary goal should be promotion of research on the non-communicable diseases, predominant in developed countries and now threatening to advance in developing countries which are at risk of having the worst of both worlds. In some, the influences, such as smoking and alcohol, are well known, and the research needed is largely of an applied kind. But in many diseases the hazards have not yet been identified, and the research required is essentially epidemiological, to unravel the disease origins. In these diseases the predominant influences are behavioral.
- Even if progress in prevention is as rapid as we would like it to be, the treatment and care of the sick will continue to be of the highest importance. On the most optimistic assumptions it will still be necessary to care for patients with disabling and life-threatening illnesses, as well as with the many kinds of morbidity which diminish the quality of life from day to day.
- A further requirement is for research on health services that address the critical determinants of health (health systems research). The precepts of HFA imply that such services cover entire populations, particularly the most vulnerable individuals and groups. The research questions are formidable: how to join with policy makers and communities in assessing needs, planning, financing and implementing programs, and evaluating them in terms of coverage, efficiency and effectiveness. Health services, to a substantial extent, are specific to local circumstances--traditions, resources, politics, culture--and it is necessary, therefore, that there be local capability for this kind of research. This calls attention to the need for the development, organization and support of research on the delivery of health services, which requires, in turn, national, regional and international collaboration.

In conclusion, Dr. McKeown indicated that, against the background of the preceding analysis, the following are the steps which are likely to lead to rapid advance.

- Control of diseases associated with poverty. The research needed is essentially of the health systems type, as the effective measures are well known.
- Control of diseases, both infectious and non-communicable, specific to the tropics. These diseases should be attacked with all the resources--laboratory clinical and epidemiological--that can be brought to bear on them.
- Control of diseases associated with affluence. In some, the major influences (tobacco, alcohol, occupational hazards, etc.) are already known and the research required is of the applied type; in others, the influences are unknown and research, mainly epidemiological, is needed into disease origins.

- Treatment and care of the sick. Even on the most optimistic assumptions about disease prevention, it will be necessary to make extensive provision for the treatment and care of the sick. For this we rely mainly on biomedical research (which also, of course, contributes powerfully to the preventive measures).
- Delivery of health services. The critical determinants of health must be addressed through health services that are relevant to local needs and cultures and also aim at covering entire populations, particularly the most vulnerable groups. How to join with policy makers and communities in assessing needs, planning, financing and implementing programs and evaluating them in terms of coverage, efficiency and effectiveness is the challenge to research workers.

The application of these principles will inevitably differ between Regions and between countries within the same Region, according to many variables: the nature of the predominant health problems; the present level of health; economic resources; cultures, political and religious traditions. However, the objective should be common to all: to do the kinds of research which will make it possible to advance rapidly to the HFA goal.

Discussion and Recommendations

The document presented by Professor McKeown was regarded as stimulative of discussion and the generation of new ideas. It was agreed, however, that its global view and approach detracted from its practical relevance to the Region.

There was also consensus among the members of the Committee on the value of the basic philosophy expressed in the document that disease cannot be accepted as a given and that there is much to be done in this regard provided there is proper articulation between the health concept and government policy.

In view of the requirements for attaining the goal of HFA/2000, the Committee was of the view that the document was wanting in practical realism, which was needed for the identification of problems and the development of activities to be carried out in the Region.

Regarding the classification proposed in the document, the Committee recommended that it be revised in light of the diversity of situations not only in the Region as a whole, but within a single country, which affects socioeconomic and health indicators. The Committee recommended to the Director that he appoint an ad hoc committee to study the document on the Region's socioeconomic and health profile and formulate recommendations on policies, priorities, classification and strategies for the conduct of basic and applied research in the Region.

15. HFA/2000 Strategies. The Role of the University. Preliminary Proposal for the Americas

Dr. Gladstone R. da Cunha, of PAHO/WHO, presented the topic on the basis of the technical discussions held during the Thirty-seventh World Health Assembly in 1984. He said that human resources had grown haphazardly and disparities in them were generating unplanned changes in the production functions of services, leading to inadequate adoption of and abuse of technology. Also, professional practice was at times betraying a lack of identification with the interests of the public by favoring the squandering of resources at care levels of greater complexity and the skimping of resources at the primary levels.

More recently, the economic crisis that had set in throughout Latin America and the Caribbean was forcing governments, because of the magnitude of their external indebtedness, to internal adjustments which in turn curtailed the financing for social sectors, including health. Determining the consequences of the recession for health was no easy task, firstly because of a degree of inertia in the health situation which delayed the emergence of its effects, and secondly because once sensitive indicators (infant mortality and its relationship to the standard of living) had lost their specificity as indicators of social development.

This situation had brought the health sector to a clear understanding of the inadequacy of sectoral action alone. Intersectoral coordination, today recognized as necessary, was becoming an imperative of tomorrow. What had been regarded as objectives for the medium and long term were becoming acutely urgent needs: Community participation and control--with the requisite deconcentration and decentralization--selectivity as a means of implementing equity by identifying the social groups at highest risk, and measures to spread a sense of solidarity both within and between the countries in the Region. The adoption of advance technology could not be interrupted, but neither could it be continued as a chaotic and unselective practice. Critical inputs for the sector often made demands on acutely scarce foreign exchange.

Based on the foregoing, the present program was being launched in order to promote in the university as a whole broad participation in the conceptual, scientific-technical and methodological analysis of the health development process in its intersectoral dimension. In particular, this effort was intended to favor the economic and social goals of the strategy for HFA/2000, such as equity, effectiveness and efficiency, accessibility, social participation, intersectoral articulation, and cooperation among countries.

The program, Dr. da Cunha said, reinforces interaction between reflection on development problems and research on concrete situations in the health field, and is directed at drawing on these experiences for feedback to the management of development by means of far reaching conclusions disseminated through the channels of training and technical cooperation in which the university itself participates.

In view of the evolution of the Organization's technical cooperation, the terms of reference examined and the proposed objectives, three alternative or complementary lines of action are suggested:

- The promotion of research in the priority areas of the PAHO program.
- Participation in the health technology development process.
- Encouragement to advanced training for the reinforcement of decision-making levels.

In an interdisciplinary context these three alternatives integrate with and complement each other, and in this way research generates new knowledge and finds application in technological development. Moreover, advanced training derives from the efficiency with which the first two processes are put into practice, which become essential components of the leadership it is desired to foster.

Discussion and Recommendations

Dr. da Cunha's presentation was welcomed by the Committee, which also mentioned the contribution made on this subject in the Thirty-seventh World Health Assembly.

It was recognized that there were real difficulties in the way of implementing these strategies, including the autonomy of the university, which sometimes was not sufficiently conducive to the development of close relations with health ministries and other government agencies.

The Committee took cognizance of the efforts made by the Governments of Colombia and Mexico, where councils have been set up with officers of the Ministries of Health, Higher Education, and Labor, universities and science and technology councils as their members. A mechanism of this type made it possible to pool efforts, experience and resources for manpower training and research in the health field. Another integration model commented on was the Cuban experience, in which the design and operation of the national health system had made necessary the integration of service, teaching and research institutions. The Committee considered that the university's function is chiefly to train health personnel at all levels and research personnel for the generation of knowledge. The purpose of research in the university must be the development of critical and scientific thinking in student and teacher with a view to the search for solutions to the countries' problems.

The health ministries and their attached institutes should promote primarily research that could provide a foundation for the design of health policies and programs and for the evaluation of their results.

The Committee was of the view that PAHO/WHO could play an important and active part in bringing the universities into the effort to attain the goal of HFA/2000, and recommended that it:

- Circulate widely among health, education and labor ministries and universities the concrete examples of coordination described during the discussion of this subject and others that fit the idea developed by WHO.
- Give priority to collaborative research projects among teaching and service institutions.
- Strengthen and promote the development of units and departments of scientific and technological research in health ministries, which must enjoy privileged status in relations with universities.
- Foster the organization in each country of composite groups which include representatives of health institutions and universities.

At the close of the working session of 18 July, the Chairman invited Dr. Juan Kourí, Vice Minister for Science and Technology in the Ministry of Health of Cuba, to present to the Committee the topic "Development and Organization of Health Science and Technology in Cuba."

Dr. Kourí began his presentation with a historical review of the health situation in his country and then described the development and organization of health science and technology there, its incorporation into the country's development plans over the last 26 years, and its outlook for the future.

His lecture drew several questions from members, some of them concerning the publication of scientific papers and others, the training of research personnel.

The Chairman, Dr. Frederick Robbins, thanked Dr. Kourí for his presentation and adjourned the meeting for the day.

IV. EXECUTIVE SESSION

16. Report of the XXVI Meeting of the Global Advisory Committee on Medical Research (ACMR)

The subject was presented by Dr. M. Abdelmoumene of WHO. In discussing the salient items of the agenda he focused particularly on the activities of the Subcommittees of the Advisory on Medical Research (ACMR).

Much of the XXVI Meeting was given over to a discussion of the Subcommittee's draft report on the research strategy for attaining the goal of Health for All. A revised version has been prepared that includes, to the extent possible, the comments made both in the ACMR and at other levels in the Organization.

Two other subcommittees presented reports on the progress in relation to research on health personnel and the transfer of technology in the health field.

The ACMR welcomed the progress made in implementing the Action Plan for Health Personnel Research approved in its XXV Meeting. This Plan was based on a strategy whose "principal purpose is to create data processing and other research capabilities at the national level, particularly in developing countries."

Health personnel research involves a "complex task of enlisting the interest and support of decision-makers, guiding research, education and training institutions in the development of health services that will meet the needs of the community, and making research responsive to the needs and interests of decision-makers." In this statement, support for health programs research (HPR) and the conduct of research are directly linked to the use of its results in arriving at decisions on health personnel development (HPD).

As a rule, research has carried little weight in decisions on HPD. Decision-makers have regarded it as a luxury to be dispensed with rather than a powerful management tool, which has resulted in a downgrading of HPR and little support for its development. To reverse this trend, HPR must be continually adjusted to the demands of decision-makers. It could then receive more aid, which would increase the number of research projects on problems of national importance.

The ACMR approved the Subcommittee's proposals and recommended that WHO encourage and support efforts by the Member Governments so that these research projects might be carried out and their results profited from.

Lastly, the Subcommittee separately reviewed and approved the proposal to promote research career structures in developing countries. In keeping with the Committee's recommendation, a consultation was held recently the report on which is available.

The terms of reference and plan of work of the Subcommittee on technology transfer, and its initial work on promising technological advances and their transfer to developing countries, were presented in the report of the XXVI Meeting. The terms of reference were:

- To outline the new concepts in the biological and physical sciences that can be developed with practical technologies.

- To determine the areas of health in which new technologies can be used to advantage.
- To propose ways of putting them to effective use.

The Subcommittee identified three areas in which it attached special importance to the application of new biological concepts:

- The development of vaccines.
- New diagnostic techniques.
- The use of DNA probes for the diagnosis of infectious diseases and the detection of congenital disorders.

The Subcommittee had requested reports on two of the new concepts and techniques: One on materials technologies (regarded as important for water and sanitation problems) and another on systems technology and design (important for the planning of multisectoral studies and resource allocation problems). A third area that was widely discussed is the use of microelectronics and information technology.

The Subcommittee had therewith completed the first of its tasks, and in its last meeting, held early this month, had made headway in its deliberations in the second part of its work--the best means for the transfer of technology. This part could include a study and recommendations for the establishment of infrastructures by which this transfer might be effected, including mechanisms for the establishment of appropriate industrial training.

The Subcommittee noted the need for a national policy on health technology as part of a broader policy embracing other areas as well as health.

This policy would determine the priorities and mechanisms for transfer, including a compilation of the country's leading health problems and an evaluation of the contribution that could be made by the existing technology to control those problems.

Steps should be taken to ensure that the technology to be applied is not only effective and safe, but also in harmony with the culture of the country and within its economic means.

Developing countries vary considerably in the extent to which they are able to obtain and absorb technology, and many have devised effective ways of doing so. The group considered that in some countries the transfer of technology could be facilitated by setting up a research and development unit which included a group for the evaluation of technologies. This unit would evaluate technology to be transferred in relation to the country's needs, and advise on equipment to be acquired, with emphasis on simplicity of design, reliability, the availability of replacement parts, ease of maintenance, and other factors.

WHO could facilitate the evaluation of technology transfer to developing countries, and it was suggested that it do so by:

- Advising in the formulation of a country's policy on health technology.
- Advising a country in the selection of the technology to be transferred by making appropriate evaluations.
- Promoting in a country the establishment of groups with the requisite experience in the technology concerned, for the evaluation of human resources.
- Assisting in the exchanges of information and experience needed to implement the transfer of technology.
- Identifying WHO collaborating centers that could provide appropriate technical and administrative advisory services.
- Supplying to the developing countries, in an impartial way, information on sources of technologies.

These activities are receiving the attention they deserve in the European Region. A Collaborating Center in Health Technology was recently created for that Region. This Center could become part of a global network to facilitate the transfer of technologies.

In the Western Pacific Region a working group on international cooperation in the transfer of technology in the health field will meet at the end of this month in Tokyo.

As is customary, the Chairmen of the regional advisory committees presented summaries of the reports of their meetings.

The subject of improving the integration of the system of the Advisory Committees was briefly discussed. It was suggested that a small group, headed by the Chairman of the Global ACMR, frame a few preliminary proposals for presentation to the XXVII Meeting of the global ACMR.

Discussion and Recommendations

The Committee thanked Dr. Abdelmoumene for his succinct and informative presentation and considered that some of the approaches of the Global Committee agreed with those stated by the ACHR.

The Committee attached importance to the development of an infrastructure at the country level to evaluate technologies and their adoption relative to the needs of the country concerned.

17. Report on Action Taken by PAHO on the Recommendations of the XXIII Meeting of the Advisory Committee on Health Research

The subject was presented by Dr. María Leite-Ribeiro (PASB). In the XXIII Meeting specific recommendations had been made for the restructuring of the ACHR, and on the logistics of health research in the countries and the funds allocated by PAHO for research. In this XXIV Meeting extensive reports had been presented on each of these matters. The recommendation to set up networks had eventuated in several PAHO programs in connection with health manpower research, epidemiology, the development of health systems, drugs, biotechnology, the monitoring of resistance to antibiotics, immunology, perinatal, maternal and pediatric care, and care of the elderly and of those suffering from mental illness and cancer.

In regard to pharmaceuticals, workshops had been held on the surveillance of these products following registration and on biopharmaceutical evaluation in Panama. In addition, a protocol was in preparation for a study of the supply and use of antineoplastic drugs in Latin America and the Caribbean and an analysis of the health sector, including drugs, in Peru. Another project already under way is for research on the prescription and consumption of drugs in Cali, Colombia, on the basis of an epidemiological analysis.

A project on the transfer and evaluation of technology had been launched for the purpose of analyzing the following aspects of the technology development process: a) technological policies; b) available technologies; c) demand for and use of technology, and d) effects of technology. These four aspects could be covered by 16 protocols drawn up by seven countries in the Region.

Another project focused on the analysis, evaluation and development of technology in six fields of crucial importance: technological policy and innovation; technology in prenatal care; childbirth technology; neonatal technology; technology in growth, and development and way of life; and composition of the family. A project had also been proposed that was now in the first phase of execution on a small scale pending the availability of extrabudgetary funds for it. This project related to cytostatic drugs, cervical cancer, kidney dialysis, and technological donations.

A document on health services research was in preparation which presented general guidelines for the design of basic protocols for health manpower research and the identification of country groups that could take part in it. Also, contact had been established with the Organization of American States so that its Department of Scientific and Technological Affairs and the Inter-American Center for Social Development (CIDES) in Argentina might assist in health manpower research, particularly in regard to the job market and the sociological aspects of the different professions.

Regarding the recommendation made on health and auxiliary personnel, a study had been done in 1984 to identify and analyze the work of health promoters in the nonformal education of adults in four municipalities in Valle del Cauca department, Colombia, and in three marginal districts in the outskirts of Lima, Peru.

Educational monitoring programs were already in progress in 10 countries: Bolivia, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, Guatemala, Honduras, Nicaragua, and Peru. Particularly in the Central American countries, the subject of training in research methodology had been introduced into continuing education programs. Teaching materials (slides and a manual) had been prepared for the purpose and were expected to have a multiplier effect. In addition, several PAHO programs had supported training in the Region for the treatment of cancer, mental disorders, and tropical diseases.

In regard to maternal and child care, the Organization had served as an executing and technical agency for the performance of studies at the country and regional level on mortality (perinatal, infant, and in the early years of life) in three countries: Bolivia, Paraguay and Uruguay. In addition, comparative case studies would be done to find explanations for changes and trends in mortality levels and, on that basis, to determine steps to be taken. An example of this approach was a meeting in Mexico City which had studied and analyzed the cases of three countries (Chile, Costa Rica and Cuba), Neuquén province in Argentina, and Valle del Cauca department in Colombia.

In the area of scientific cooperation among countries, specific activities were carried out for the development of technology in essential reagents and in advanced biotechnology. Also, a controlled clinical study was in preparation for determining the effects of interferon on hemorrhagic dengue under a program of cooperation between Cuba and several countries in the Caribbean basin.

Pursuant to the recommendation that PAHO upgrade its relations with the National Council for Science and Technology and similar organizations in the Region, a meeting on scientific cooperation among countries was held in Brazil in 1984 and used the case of the endemic diseases as a model. The participants in this meeting were representatives of the Ministries of Public Health and Research Councils of Argentina, Brazil and Peru, and of the Ministries of Public Health of Bolivia and Costa Rica. This seminar had not only strengthened the ties between PAHO and research councils, but had helped improve relations between the councils and ministries of public health in the participating countries.

Discussion and Recommendations

The Committee took note of the report and thanked the Secretariat for the effort it had made to compile the information and present it in a succinct and informative way, and expressed concern over the activities in research on tropical diseases.

It also underscored the major part played by the Special Program for Research and Training in Tropical Diseases in promoting scientific research in the concrete health problems generated by tropical diseases in the countries of the Region, and recommended:

- That PAHO's Tropical Diseases Program be reinforced and be given priority and requisite support for the conduct of projects in this area.
- That PAHO emphasize the need that funding for research by the Global Program of Tropical Diseases be based on the realities and health needs of the countries in the Region.
- That the Director urge the countries in the Region to step up their research efforts in tropical diseases, and that an analysis of the activities of the countries in this area be presented to the next meeting of the Committee.

18. Research Priorities for the PAHO/WHO Grant Program

The topic of the IACR and PAHO's Grant Program and its priorities was again taken up by the Committee. The Secretariat explained that in the past the grant program, though limited in its funds, had supported biomedical research of good quality. It was seen to lack direction in this activity, however, which could be owing to a combination of two factors: the diversity of the research subjects, and the scarcity of the available funds. In 1984 this Program had undergone two substantive changes. Firstly, the available funds had been significantly augmented, and secondly, it had been decided that, instead of the research topics being selected by the researchers, proposals would be initiated with PAHO encouragement in topics selected by the Organization. It was later determined that the purposes of the research would be:

- To generate knowledge for the proper planning, development and rational use of available resources for increasing the existing operational capacity.
- To identify areas in which it is worthwhile to establish or improve intersectoral coordination for the solution of health problems.
- To serve as a basis for guiding technical and financial cooperation among countries (TCDC), and between them, PAHO and other institutions.
- To identify future areas of research.

In light of these objectives, the IACR selected the following criteria for establishing the Program's priorities.

- A lack of knowledge, methods and experience in subjects of fundamental interest to the countries and to the Organization.
- The possibility of the research being carried out by all the countries.
- Difficulty of obtaining or inexistence of external financing for given areas or subjects in which research is worthwhile.
- A contribution could be made to a better definition and orientation of country policies and of technical cooperation as well.
- A contribution to multiprofessional and interdisciplinary work could be made such as to provide integral solutions to health problems.
- A contribution could be made toward counteracting the adverse short-run effects of the current economic and financial crisis and its social and political sequelae.
- A contribution could be made to the generation of more dynamic processes that would stimulate a faster absorption of knowledge.

Thus, two major priority research areas were established, one of them being the analysis of the health situation in the countries, which includes research in the following subjects:

- Health profiles.
- The technological development process.
- Health policies.
- Job market.
- Use and accessibility of health services.
- Financing of the sector.
- Use, accessibility, efficiency and effectiveness of environmental health services.

The other area was research in the health problems of specific population groups, which includes research in:

- Infant survival.
- Chronic diseases of adults.
- Health problems of workers.
- Health problems of the elderly.

This research must take account not only of the frequency and distribution of diseases, but also of the biological and social risk factors that influence their distribution, and must study the effectiveness and efficiency of prevention and control measures.

In addition, studies of problems of the elderly must consider aspects relating to the social welfare of the aged.

There was also emphasis on the priority given to subjects in the area of health services. The Director pointed out that both the ACHR and the IACR were part of PAHO's research system, and should therefore work as one body to accomplish the Organization's research objectives in the Region.

Discussion and Recommendations

The Committee reaffirmed its view of the role of the IACR, which had been discussed previously, and thanked the Secretariat for its clarifications.

Before closing the Executive Session, the Chairman opened the floor to the members to discuss any matter of interest to them.

Dr. Roberto Caldeyro-Barcia took the floor to give thanks for the many kindnesses that the members of the Committee had received during their stay in the country, and congratulated the Cuban authorities for the significant gains they had made so far.

Dr. Alina Llop, on behalf of her country, then thanked Dr. Caldeyro-Barcia for the sentiments he had expressed and said that the presence of the Committee, which was meeting in Cuba for the first time, was a great encouragement to all health workers in Cuba.

With these words, the Executive Session came to an end and the Chairman asked all the participants and observers who had been invited to the Closing Session to enter the meeting room.

19. Other Matters

The Chairman opened the discussion of other matters, which included the provisional agenda and the place and date of the XXV Meeting of the ACHR. The Committee decided to discuss the following specific research subjects:

- Situational diagnosis of the research institutes in the Region.
- Situational diagnosis of relations between universities and health ministries in regard to research.
- Report of the ad hoc Committee on research policies and strategies for the Region toward the goal of HFA/2000.

In regard to the organization and administration of research in PAHO/WHO, the Committee considered that the provisional agenda should include:

- An update on the funds used for research in PAHO/WHO (1985).
- Evaluation of the PAHO/WHO Grant Program.
- Evaluation of the research component of three of the Organization's technical programs.

The members of the Committee agreed that the Chairman, with the support of the Secretariat, should decide in more detail on the final program. There was also consensus that the next meeting should be held in Washington, D.C., from 21 to 25 April 1986. This change from the date on which the Committee had traditionally met derived from the need that its recommendations also be considered by the Organization's Executive Committee, which is always convened for the end of June.

V. CLOSING SESSION

1. Address by the Chairman

Dr. Robbins opened the Closing Session and expressed appreciation in his personal capacity and on behalf of all the members of the Committee for the opportunity to work in Cuba. He also gave special thanks for the organizational efforts of those who had hosted the Meeting.

The Committee's proceedings had been intense, said Dr. Robbins, and he thanked all the speakers for their excellent and stimulating presentations, which had given impetus to the discussions and promoted the types of exchanges and recommendations that made the Committee an efficient advisory body to the Director and, by extension, to the Organization.

2. Address by the Secretariat

Dr. Leite-Ribeiro thanked the hosts and local staff of PAHO/WHO for their support. She also said that, with the support of all the members of the Committee, she had no doubt that she would successfully perform her functions as Chief of the Research Coordination Unit in PAHO.

3. Address by the Director of PAHO/WHO

The Director said that he joined the speakers who had preceded him in their expressions of appreciation.

He referred to the Committee's recommendations as posing a definite challenge to the entire Secretariat. The economic crisis, to which he had referred in his opening address, would not make the task any easier, nor would the challenge that the Director saw in these recommendations be less stimulating. He also said that the paradox of rising needs and diminishing resources compelled an ordering of priorities among needs, objectives, strategies and resources. It also necessitated a consultation and intensification of efforts and greater cooperation among institutions, governments and, above all, among the peoples of the Region. He said it was essential to take an aggressive stand against the squandering of the scarce resources available to the countries for responding to the needs of the underprivileged.

The Director took the opportunity to remind the members of the Committee that the right to make recommendations carried with it an individual and collective commitment. This commitment was not just to him as the Director, but to the Organization and its Member Governments to promote the development of health science and technology. He urged them to move with greater energy in their home institutions to promote cooperation among countries in the research field.

In closing, the Director said that every crisis was a challenge to the imagination which, armed with knowledge and political will, had the potential for transforming the uncertainty of the present into an optimistic future for the peoples of the Region.